Why Lean?

Dick Bayer
TRG THE REALIGNMENT GROUP CANADA

Agenda

Background:

What are the problems we mean to solve?

Current Paradigm:

How do we currently go about it?

Our Goal:

What are the results we want? What do we want the system to do?

New Paradigm:

What do we do to get those results?

The Problem: Let’s focus on buildings

- To create buildings that work
- That can be built in a reasonable time
- For a reasonable cost
- With the desired quality
- Without sacrificing some one or more aspects of the solution for another

The Current Paradigm:

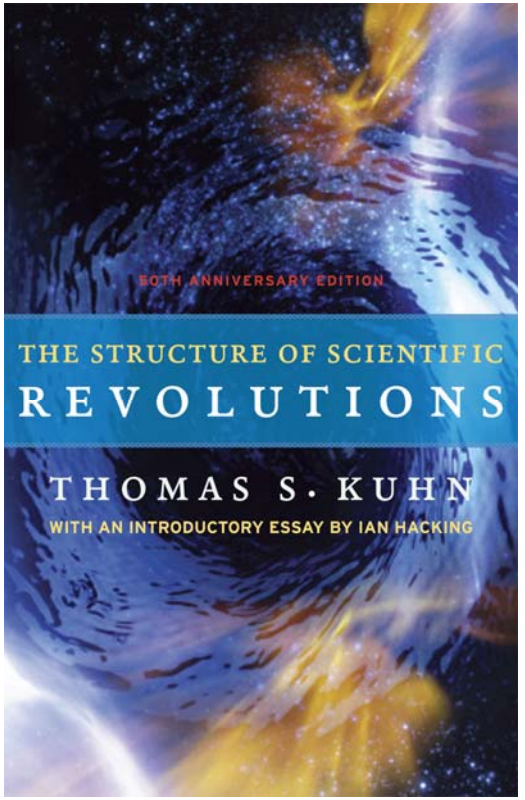
Paradigm:

“the practices that define a scientific discipline at a certain point in time."

. . . a comprehensive **model of understanding** that provides a field's members with viewpoints and rules on how to look at the field's problems and how to solve them.

"Paradigms gain their status because they are more **successful than their competitors** in solving a few problems that the group of practitioners has come to recognize as acute."

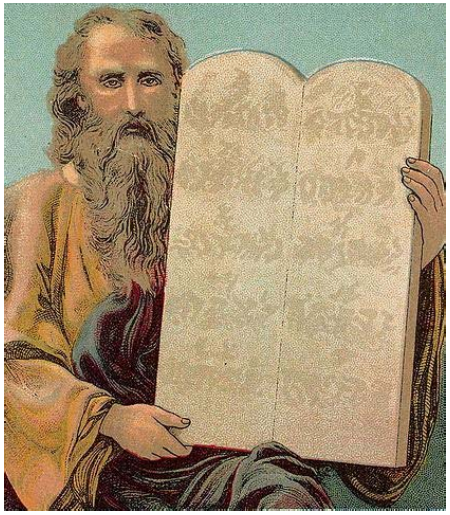
http://www.thwink.org/sustain/glossary/KuhnCycle.htm



The Current Paradigm: What's the current model of understanding?

Base beliefs:

- Buildings are complicated
- Building them is risky
- Because they are complicated, we should break each part of the business into individual pieces
- We should start with design
- We then go to the market with the design
- We hire someone to build the design based on how they have priced the design and how they have decided to tell us what that price is



The Current Paradigm: What's the current model of understanding?

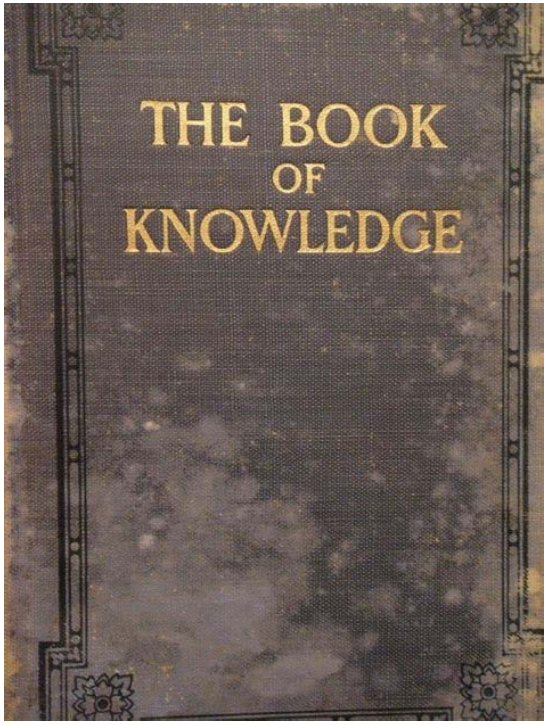
Base beliefs:

- We often find that the price is too high
- We direct a re-design that often eliminates program from the building (value engineering)
- We direct a re-pricing and re-design cycle until we find something we can build for the money we have
- We hire someone to build the new design based solely on their committed price for building that design

The Current Paradigm: What's the current model of understanding?

Base beliefs:

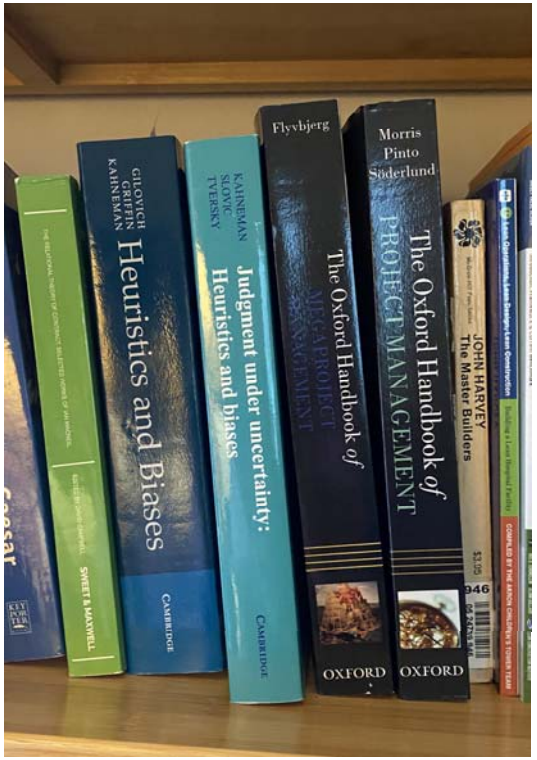
- Because buildings are risky, we should sell the risk of the individual pieces to the individuals we hire
- We should leave the hiring of the trades to a "manager" to whom we have sold the risk of cost and schedule and quality and let him/her sell component parts of those risks to the trades
- The trades cannot be trusted to build without leadership



The Current Paradigm: What's the current model of understanding?

Base beliefs:

- We can know what buildings will cost and how long they take if we just make enough assumptions
- Because the business of each piece is opaque, we dare never share any information with anyone else
- Our assumptions are an accumulation of our prejudices and our biases
- Although data exists, we don't use it because we don't have time



The Current Paradigm: What's the current model of understanding?

Base beliefs:

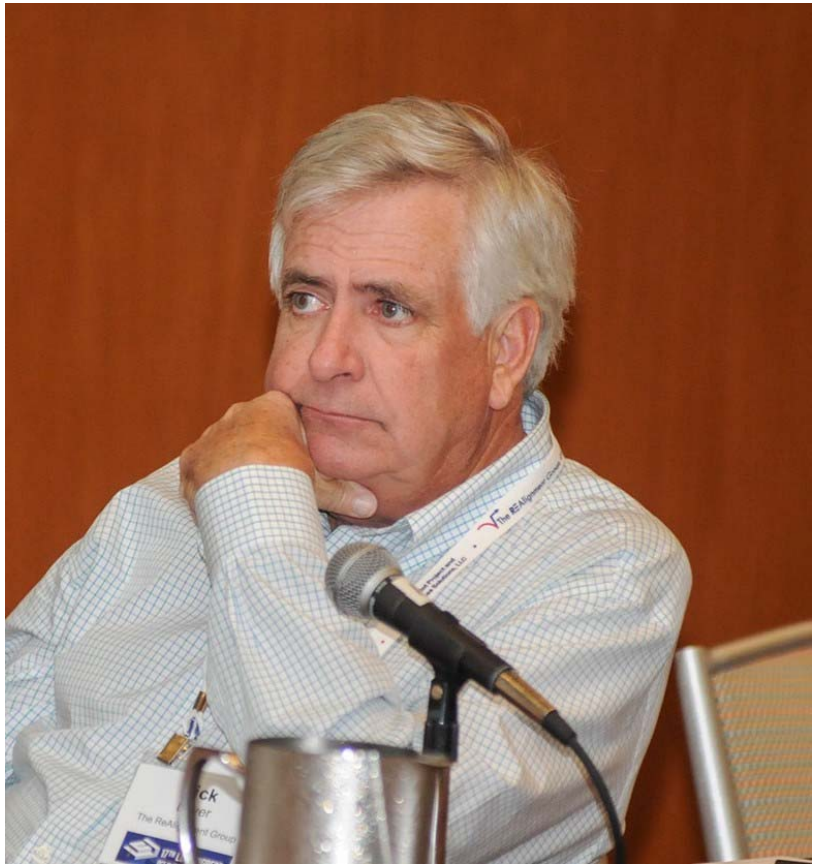
- The leadership is based on driving trades to complete their work for the negotiated price in the negotiated time with "substantially" the requisite quality
- The leadership reports to the Owner every month on progress (schedule)
- Cost is not reported or transparent because the risk of cost is owned by the Construction Manager

The Current Paradigm: What's the current model of understanding?

Base beliefs:

- The risk of contractor failure is covered by a bond
- The risk of failure of the building is covered by insurance
- All other risks have been sold off and are subject to litigation if not managed or mitigated appropriately

Bayer's confusion: why do we guess about things we can actually know or at least know more about?



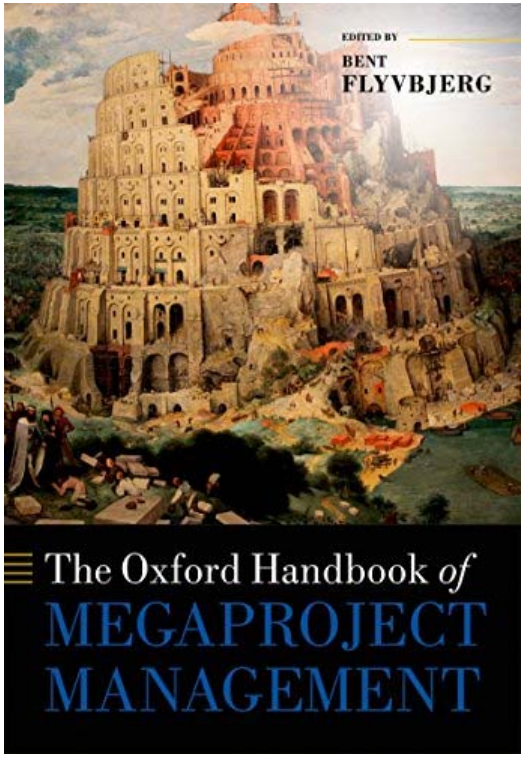
The Current Paradigm: What does the current system deliver?

The “Iron Law of Project Management”:

“Over budget, over time, under benefit, over and over again”

Bent Flyvbjerg,

Professor of Major Programme Management at Oxford University's Saïd Business School and the first Director of the University's BT Centre for Major Programme Management.



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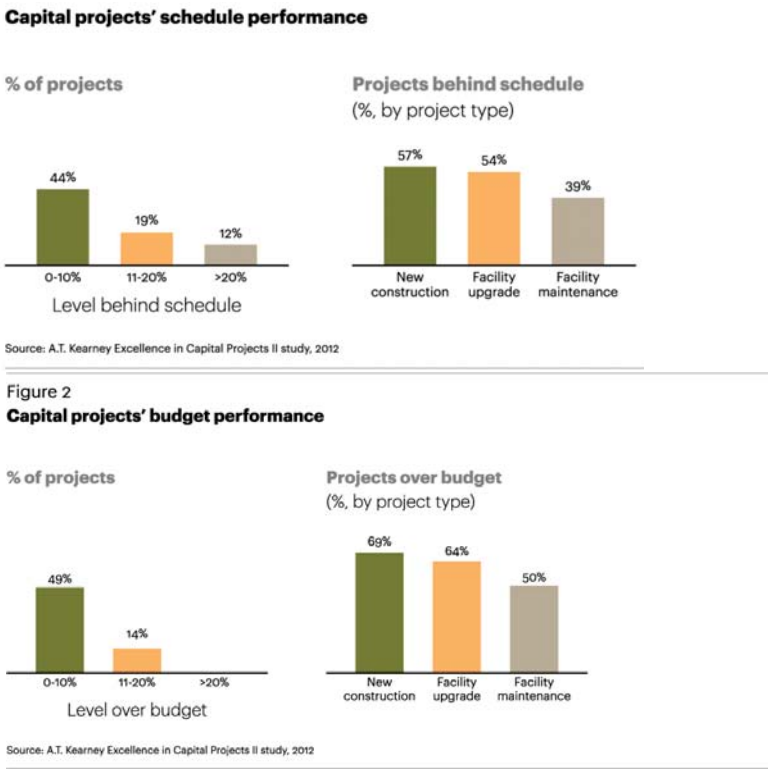
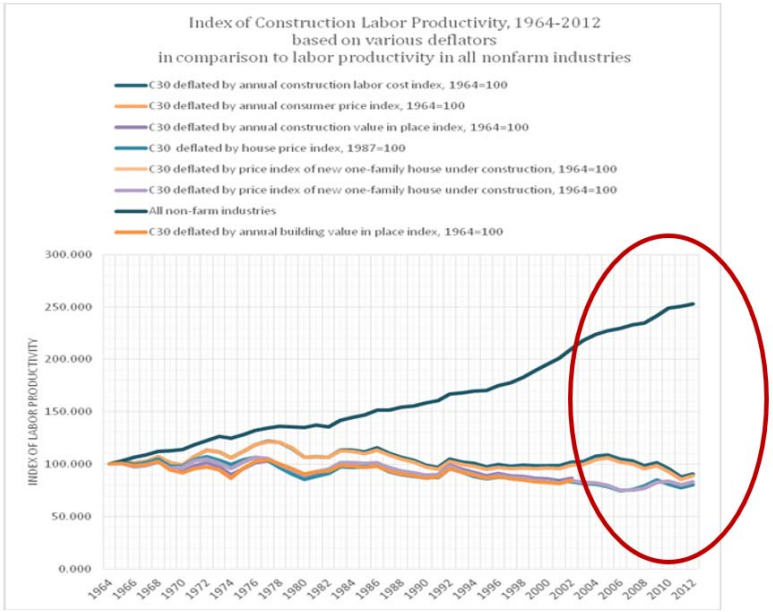


The Current Paradigm: What does the current system deliver?

Continuing to Underperform

Paul Teicholz article updated, March 14, 2013



Infamously Over Time, Over Budget

Scottish Parliament Building
Edinburgh, UK
Architect: Enric Miralles
Contractor: Bovis Lend Lease
Completion: 2004
Delay: 3 years
Original cost: £10m - £40m
Actual cost: £414m
Overrun: 935% - 4,040%

Berlin Brandenberg Airport
Berlin, Germany
Architect: Gerkan, Marg and Partners
Contractor: Various
Completion: 2017 (est.)
Delay: 6 years (est.)
Original cost: £1.9bn
Actual cost: £3.4bn
Overrun: 78%

Jubilee Line Extension
London, UK
Architect: various
Contractor: Sir Robert McAlpine
Completion: 1999
Delay: 1 year
Original cost: £2.1bn
Actual cost: £3.5bn
Overrun: 67%

Sydney Opera House
Sydney, Australia
Architect: Jørn Utzon
Contractor: Civil & Civic / M.R. Hornibrook
Completion: 1973
Delay: 10 years
Original cost: £3.5m
Actual cost: £51m
Overrun: 1,357%

What do we want?

- To create buildings that work
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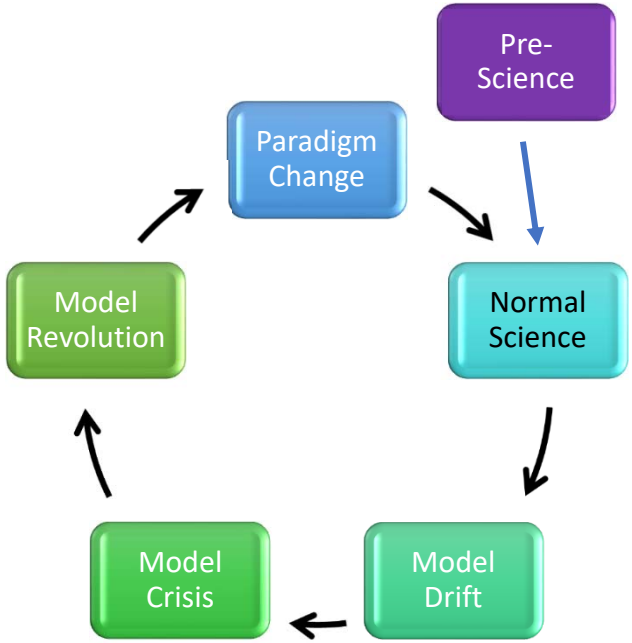
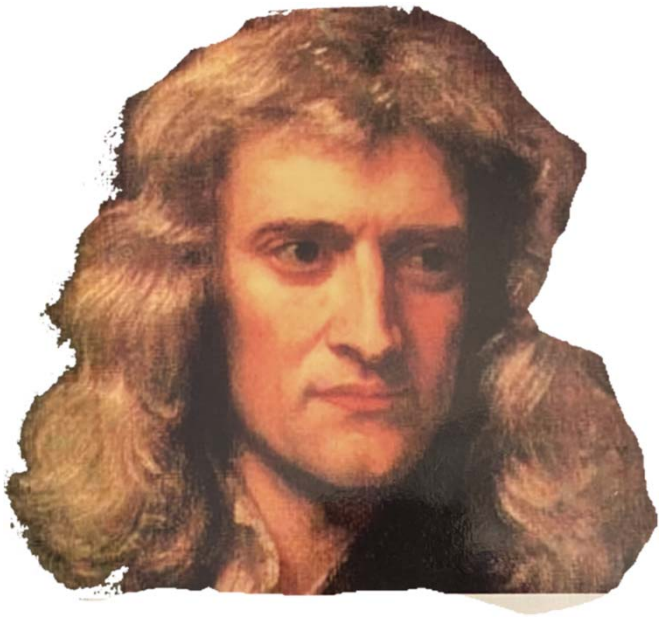
The Current Paradigm: Kuhn Cycle

3. Model Crisis - The Model Drift becomes so excessive the model is broken. It can no longer serve as a reliable guide to problem solving. Attempts to patch the model up to make it work fail. The field is in anguish.
4. Model Revolution - This begins when serious candidates for a new model emerge. It's a revolution because the new model is so radically different from the old one.
5. Paradigm Change - A single new paradigm emerges and the field changes from the old to the new paradigm. When this step ends the new paradigm becomes the new Normal Science and the Kuhn Cycle is complete.



Growing anomalies

- When the current system can no longer generate desired results
- But it doesn't go away until there is something to replace it
- What should replace it?



The new paradigm: designed on purpose

"The decision to reject one paradigm is always simultaneously the decision to accept another."

Kuhn, 2012 ed., at 73

Why lean?

focus on value

Why lean?

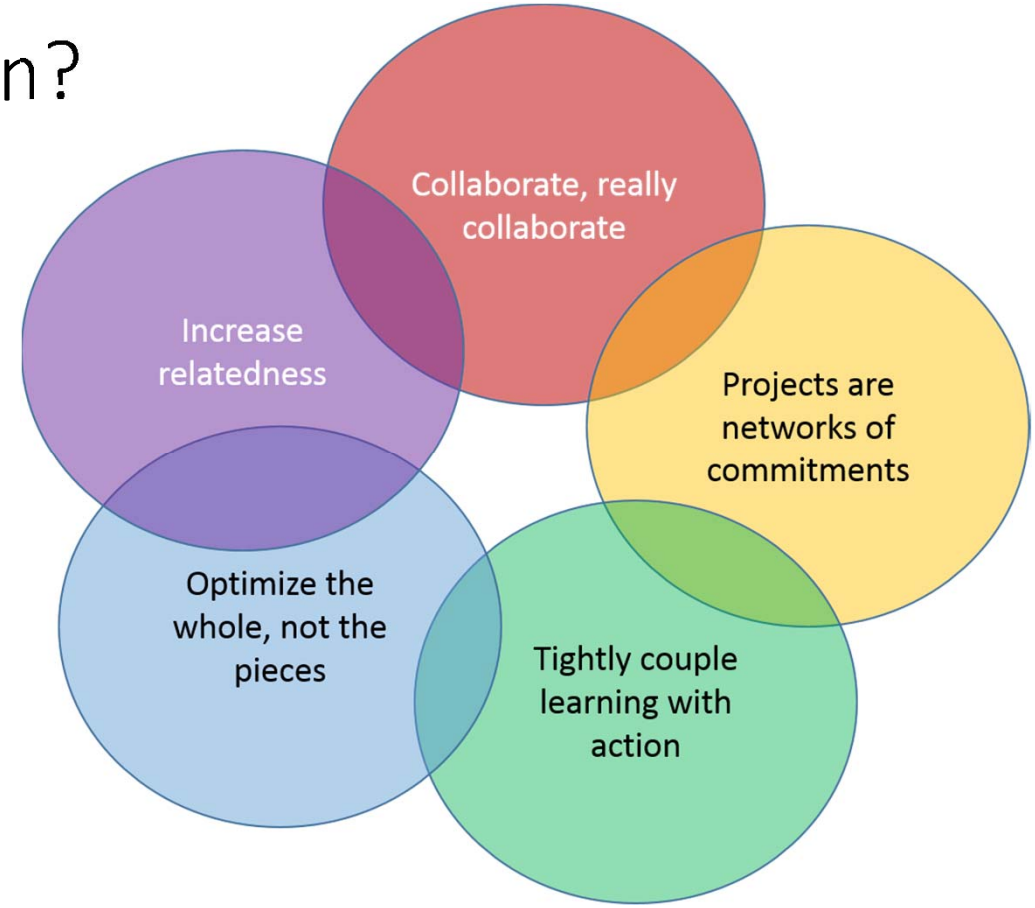
focus on value

Why lean?

Table 1: The Principles of Value Generation (Koskela, 2000) and the associated Knowledge Management Process (Rooke, et al., 2010)

Principles of Value Generation	Knowledge Management Processes
1. ensuring that all customer requirements, both explicit and latent, have been captured;	1. to adequately discover and define customer requirements;
2. ensuring that relevant customer requirements are available in all phases of production, and that they are not lost when progressively transformed into design solutions, production plans and products;	2. to deliver knowledge of customer requirements to relevant parties throughout the production process;
3. ensuring that customer requirements have a bearing on all deliverables for all roles of the customer;	3. to transform these into an optimum design;
4. ensuring the capability of the production system to produce products as required;	4. to identify the required inputs for production;
5. ensuring by measurement that value is generated for the customer.	5. to facilitate customer evaluation and production process learning cycles.

Why lean?


Collaborate, really collaborate
Increase relatedness
Projects are networks of commitments
Optimize the whole, not the pieces
Tightly couple learning with action

What do we want?

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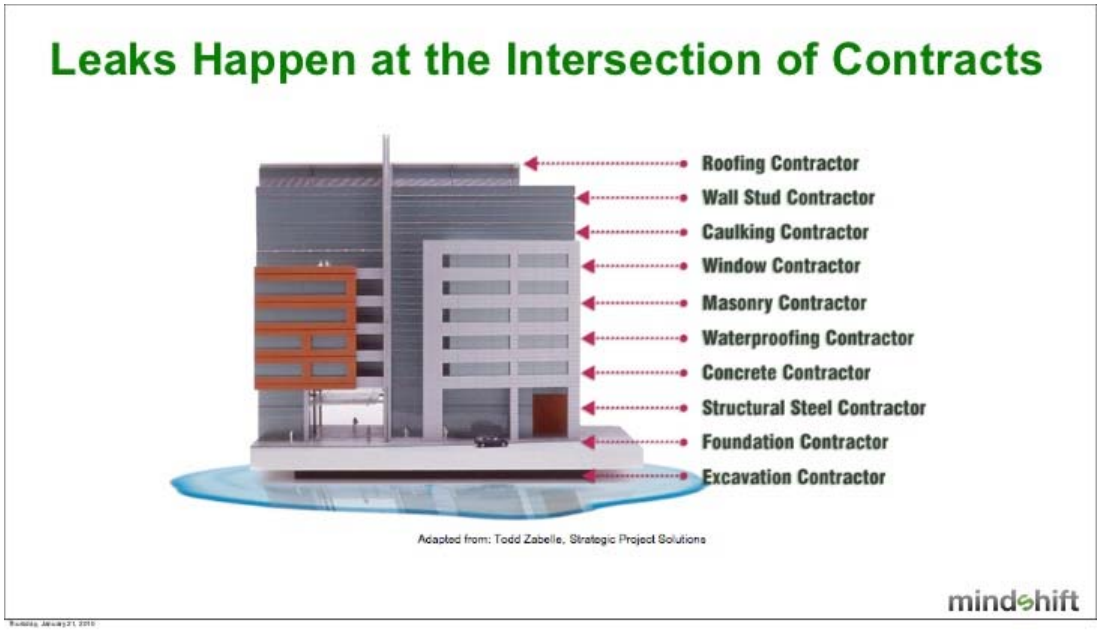
Addressing Anomalies: A building that works

- Create a building that works
- Complexity vs complication
- Coordinated efforts, “webs of interdependence.”

(Peter Senge, MIT)



Addressing Anomalies: A building that works

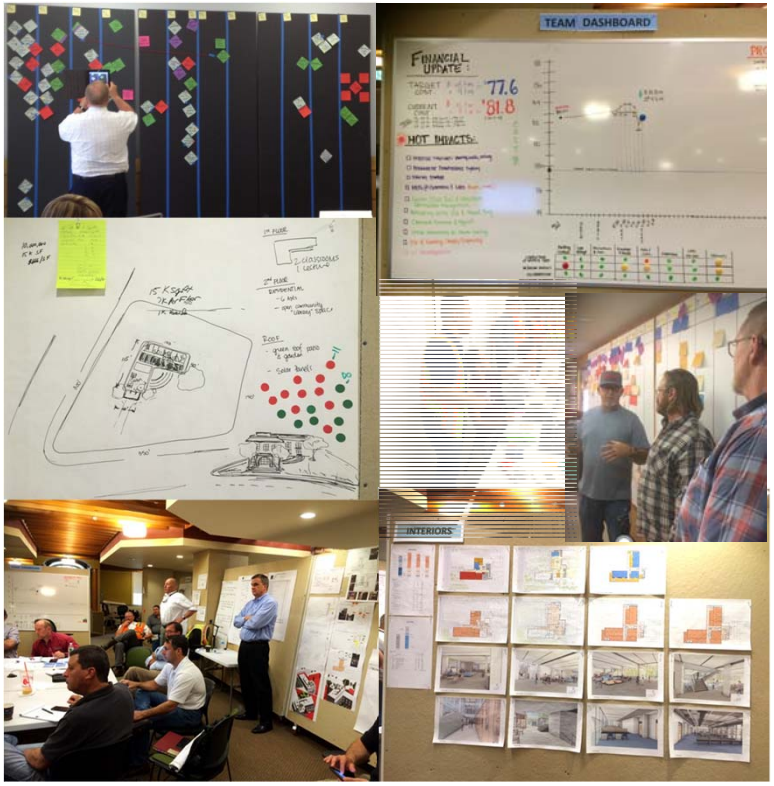
What's important to a building that works?

- Identify value from the owner's perspective
- A reliable design process that designs both the building and how it will be built to ensure that it will work
- Mitigate the known and unknown risks of complexity and chaos

Addressing Anomalies: A building that works

- Align people, processes, policies and products
- Anticipate and mitigate risks of mis-alignment
- Share information broadly and in real time

Triangulation: *"You need to get different people, from different points of view, who are seeing different parts of the system to come together and collectively start to see something that individually none of them see."*



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Addressing Anomalies: the right time

"It takes time to build a building"

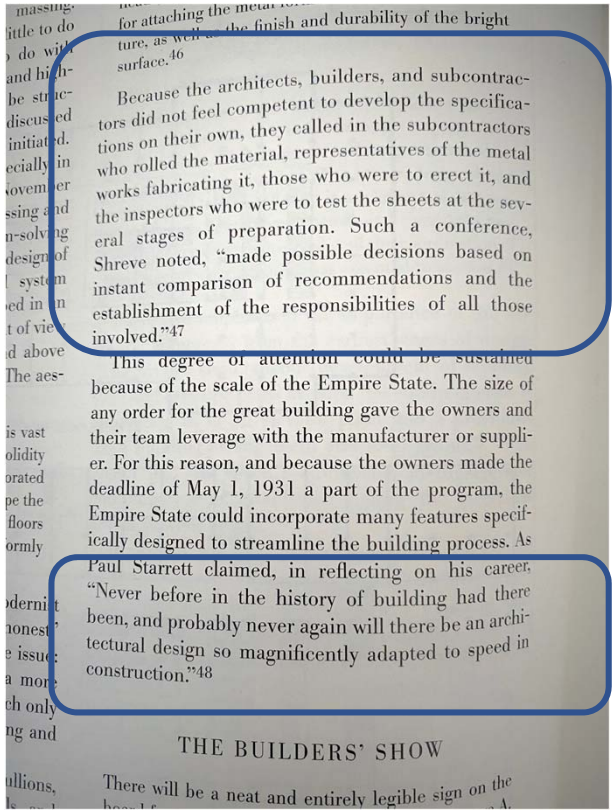
Dick Bayer, 2020

The Empire State Building was designed by William F. Lamb from the architectural firm Shreve, Lamb and Harmon, which produced the building drawings in just two weeks.The building was designed from the top down.[26] The general contractors were The Starrett Brothers and Eken, and the project was financed primarily by John J. Raskob and Pierre S. du Pont.

Excavation of the site began on January 22, 1930, and construction on the building itself started on March 17—St. Patrick's Day—per Al Smith's influence as Empire State, Inc. president. The project involved 3,400 workers, mostly immigrants from Europe, along with hundreds of Mohawk iron workers, many from the Kahnawake reserve near Montreal. According to official accounts, five workers died during the construction.[30] Governor Smith's grandchildren cut the ribbon on May 1, 1931.

Addressing Anomalies: the right time

- What was the secret of the Empire State Building?



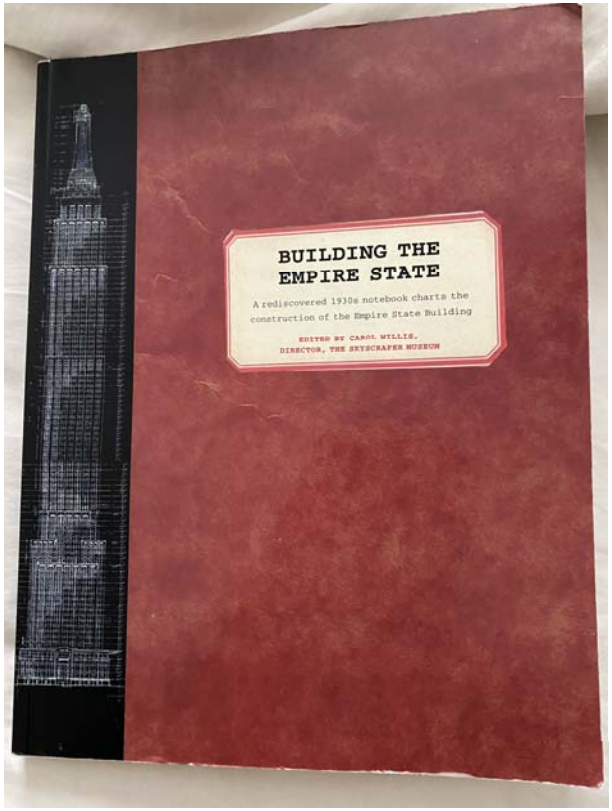
for attaching the metal ... the finish and durability of the bright ... surface.[46]

Because the architects, builders, and subcontractors did not feel competent to develop the specifications on their own, they called in the subcontractors who rolled the material, representatives of the metal works fabricating it, those who were to erect it, and the inspectors who were to test the sheets at the several stages of preparation. Such a conference, Shreve noted, "made possible decisions based on instant comparison of recommendations and the establishment of the responsibilities of all those involved."[47]

This degree of attention could be sustained because of the scale of the Empire State. The size of any order for the great building gave the owners and their team leverage with the manufacturer or supplier. For this reason, and because the owners made the deadline of May 1, 1931 a part of the program, the Empire State could incorporate many features specifically designed to streamline the building process. As Paul Starrett claimed, in reflecting on his career, "Never before in the history of building had there been, and probably never again will there be an architectural design so magnificently adapted to speed in construction."[48]

THE BUILDERS' SHOW

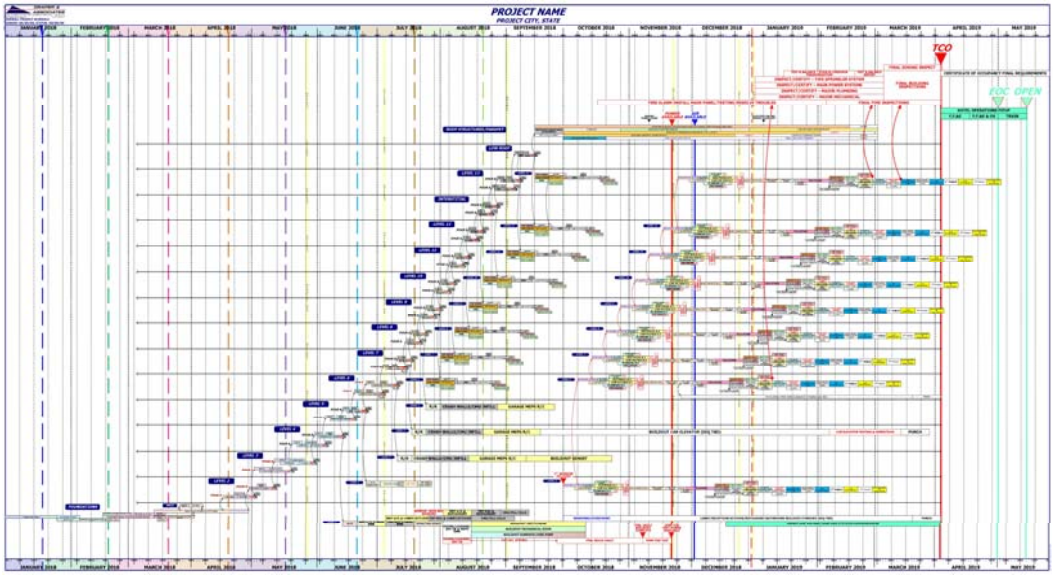
There will be a neat and entirely legible sign on the



Addressing anomalies: the right time

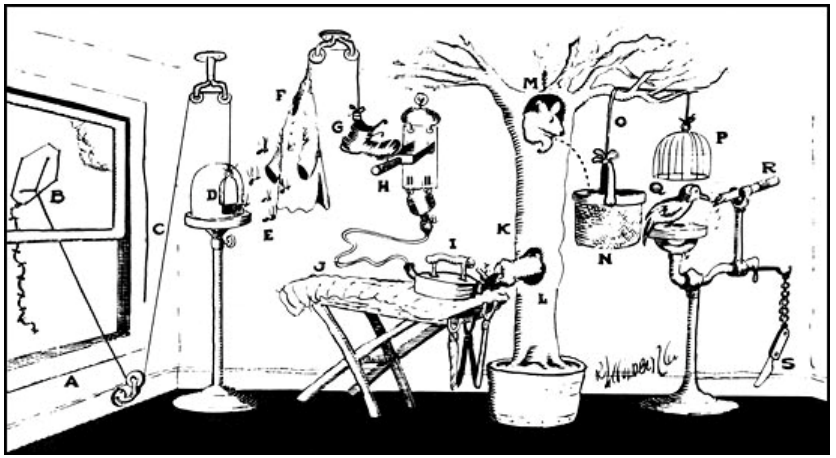
What makes the current system anomalous?

- Schedules rather than plans
- Schedules based on assumptions rather than facts
- Schedules produced in a vacuum
- Failure to understand complexity
- Occam’s Razor



Addressing anomalies: the right time

- A desire to make it easier
- Technology not suited to the task
- Contracts that imposed deadlines before the team knows what is building
- Lack of coordination
- Lack of integration
- Lack of collaboration

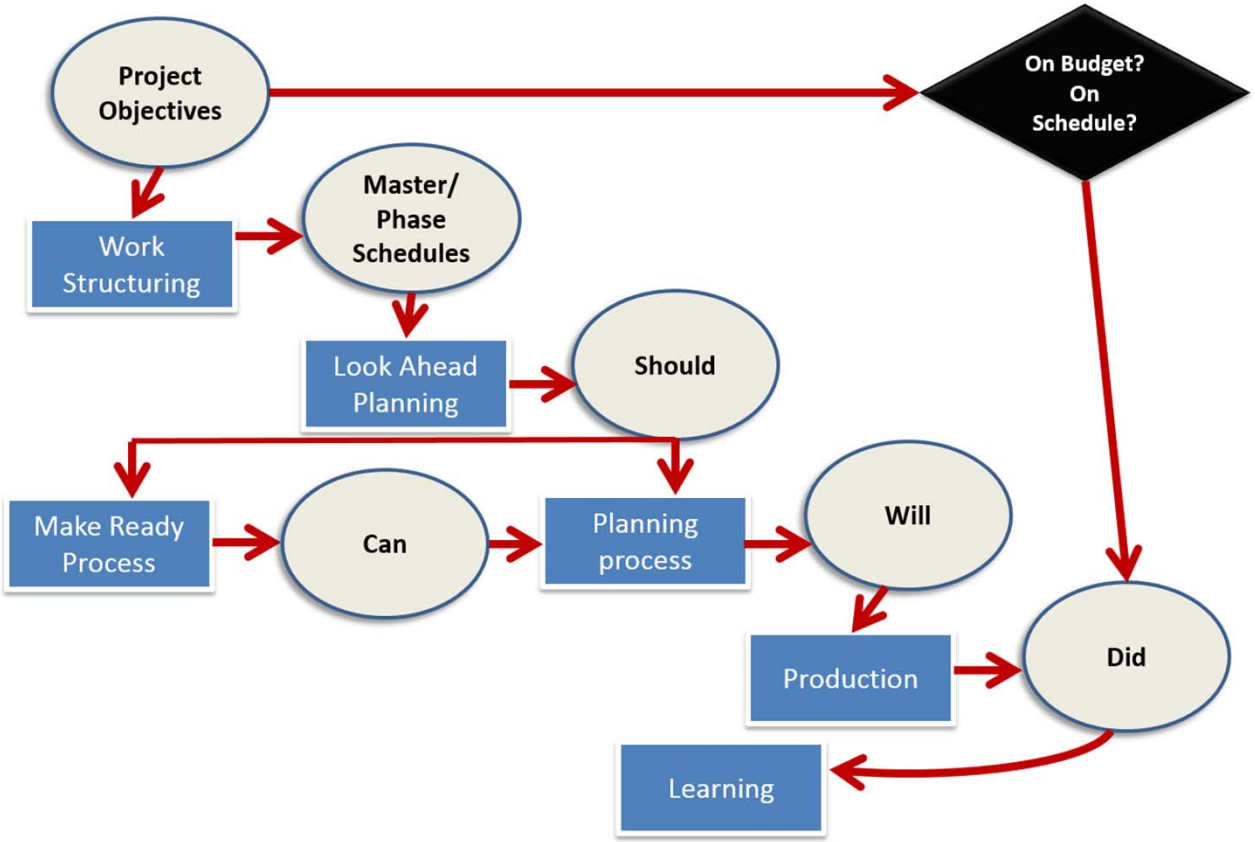


Addressing anomalies: the right time

What insures the “right time”

- A design that designs how it will be built informed by those that will build it
- Creating a system that understands what work needs to be done and makes that work ready in time
- A reliable system updated in real time every time work is done
- A system that focuses on the flow of work *designed by those whose work must flow*

Addressing Anomalies: the right time



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- **For a reasonable cost**
- With the desired quality
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Addressing Anomalies: the right price

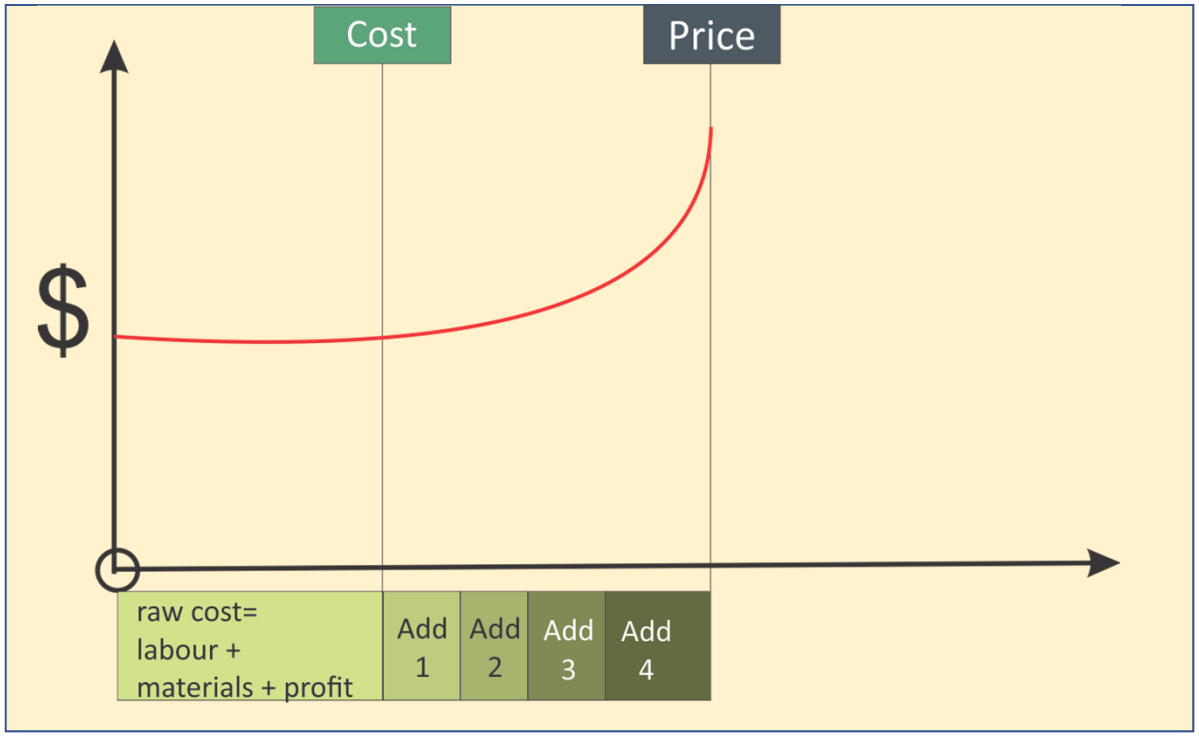
"We can't tell how much something will cost until we build it"

Dick Bayer, 2020

focus on value

focus on value

Cost in Relation to Price



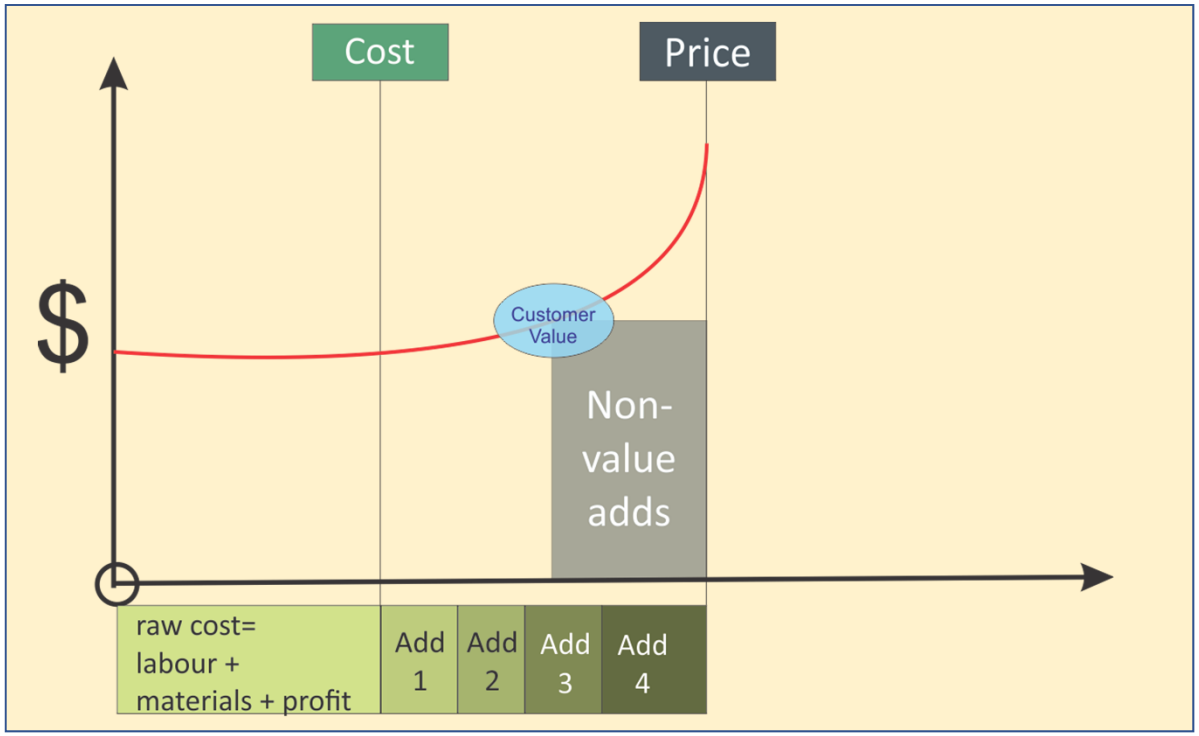
Why is the price always so much higher than the cost?

Cost in Relation to Price

Cost vs. Price Dilemma in the Built Environment

Actual Costs of Value Adds	
Design	$2,000,000
Material	$25,000,000
Labour	$23,000,000
Admin	$500,000
Cost:	**$50,500,00**
Price	**$65,000,000**

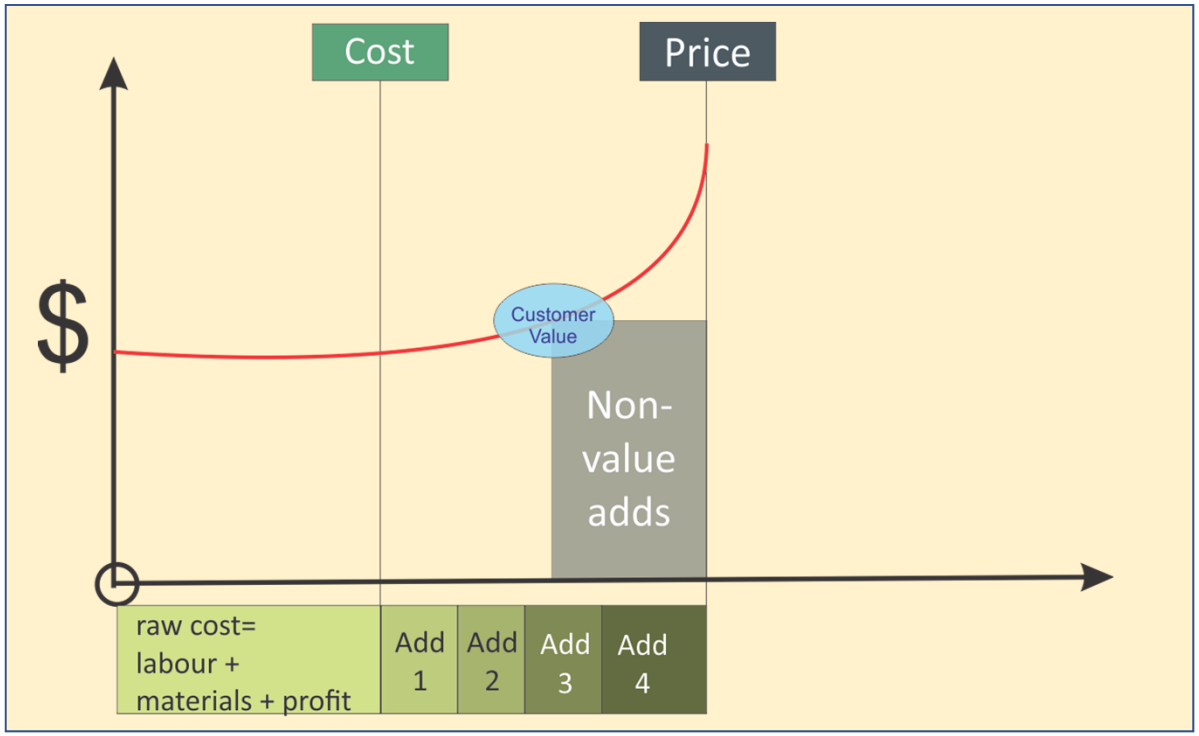
Cost and Price in Relation to Value



Value Adds might include necessary waste:

- Owner required reporting
- Regulatory and permitting compliance
- Health and Safety
- QAQC

Cost and Price in Relation to Value

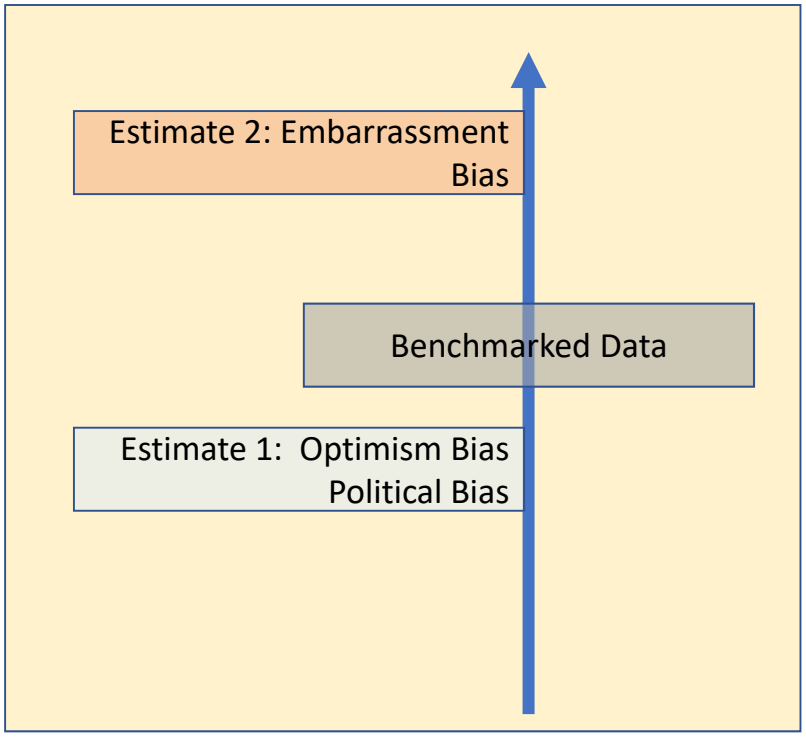


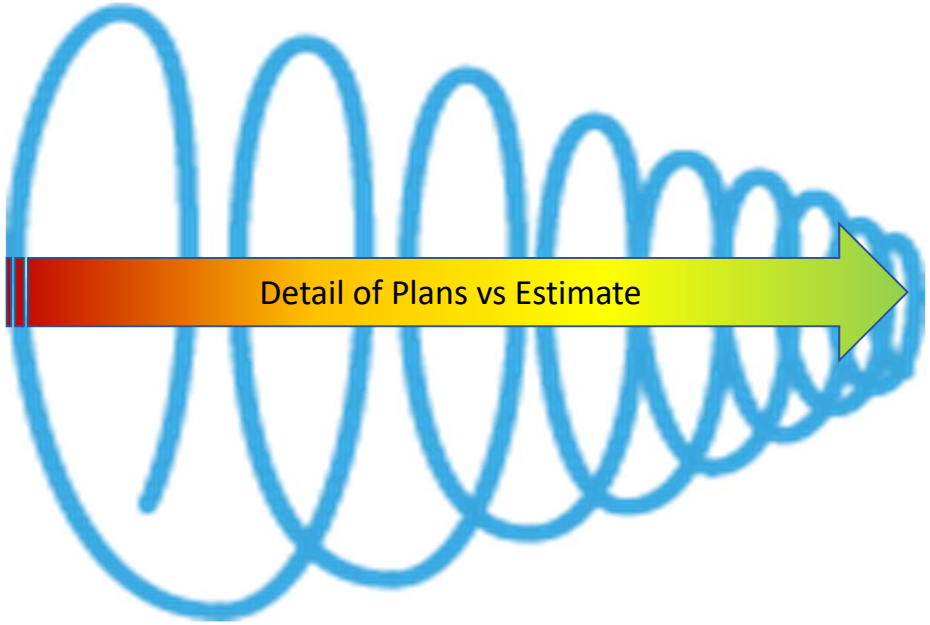
Non-Value Adds might include:

- SD, DD, CD process
- Submittals
- RFIs
- Rework
  - Punch List
  - Defective Work
  - Trade Damage
- Serial vendor commissions

Cost and Price in Relation to Value

What's wrong with our pricing?





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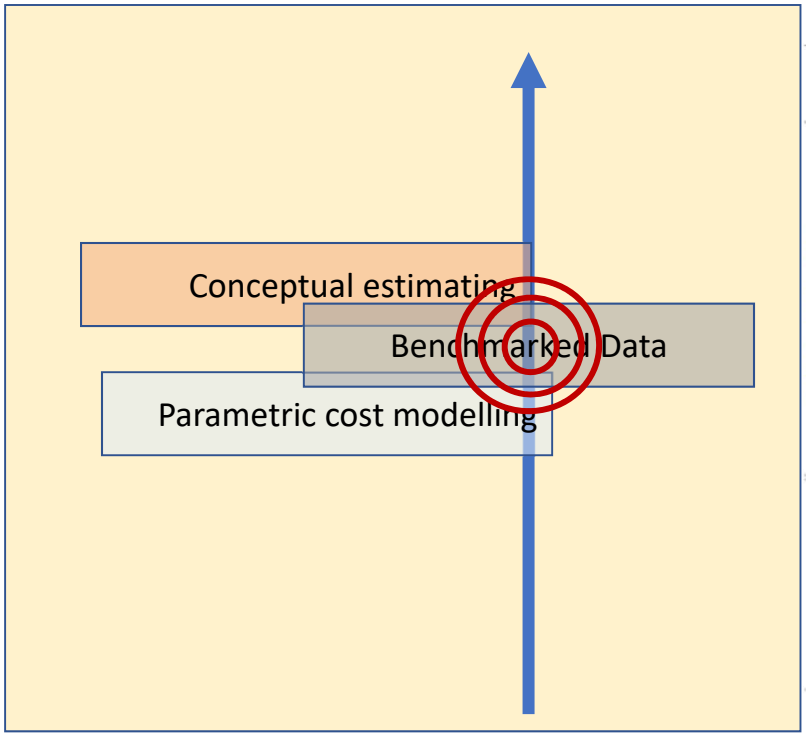
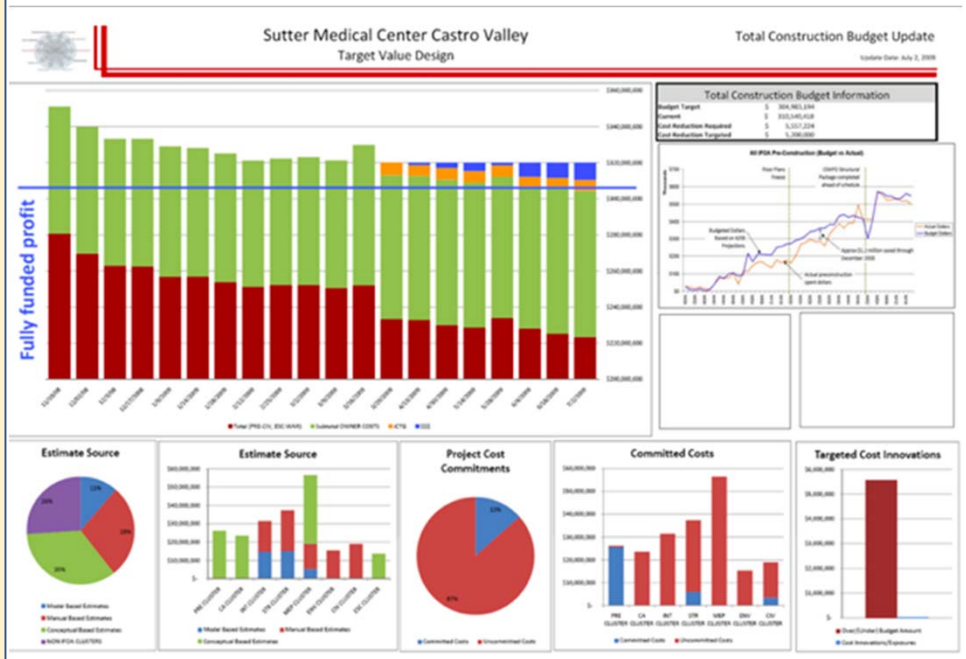
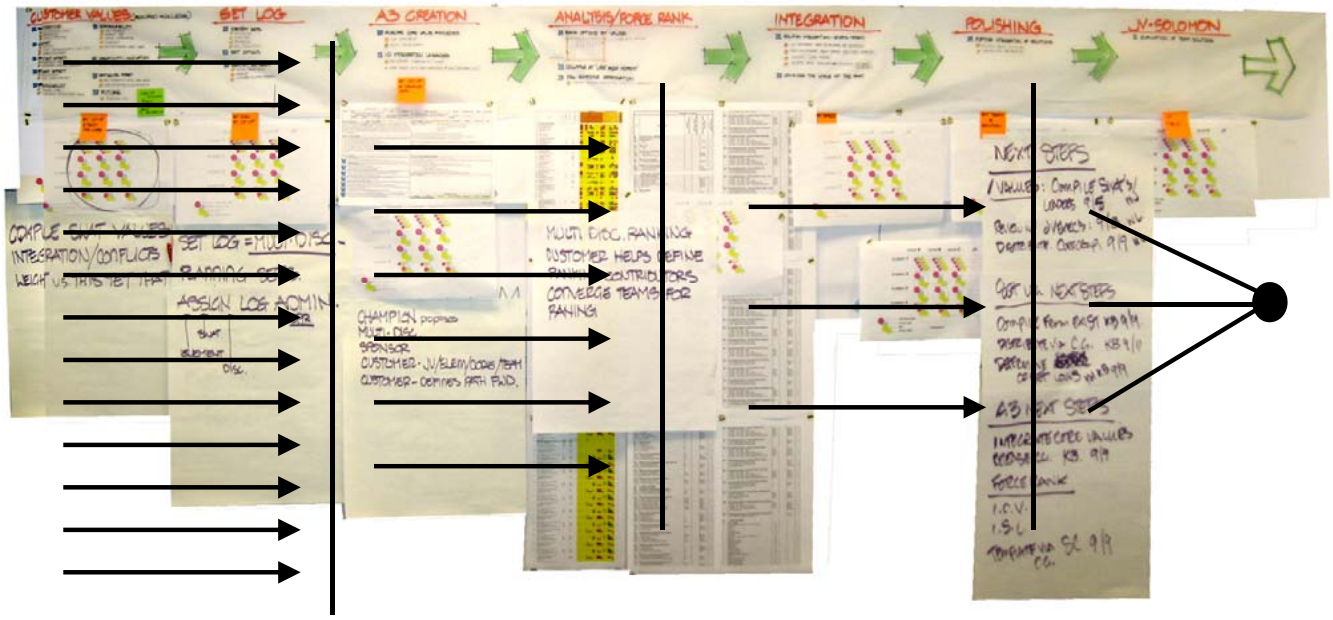




Cost Validation: Set Based Design



l/Surg, ICU, and LDR Rooms, Administration Floor

erhead, mixed air distribution approach.
vas investigated as an alternative method

ils at the AHU and Zone reheat

implementation throughout the hospital

urg (PP, AP, Peds Acute), ICU, LDR, Admin
the interior areas will have ceiling supply and exhaust grilles

perature
both cooling and heating energy.
acity by 600TR down to 2700 TR.
different yet acceptable results

ctice for air delivery in a hospital facility. Since then more
istribution system, lose the ability to save operating energy and
rooms.
comfort.
achieving up to 4 LEED points, in conjunction with other energy

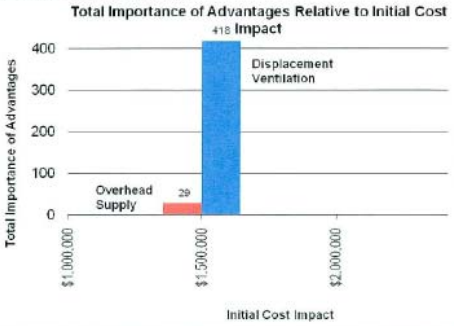
should have the an be tolerated):	OTHER FACTS, ASSUMPTIONS AND UNKNOWNS:
tion	a. Limited installations in operating healthcare facilities
sign	

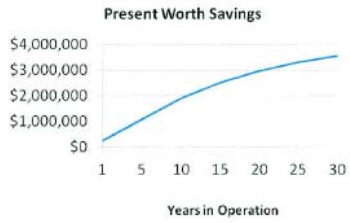
METHODOLOGY USED
a. Mock-up patient room testing
b. Computerized Fluid Dynamic (CFD) analysis
c. Field investigations

ughton, MEP Cluster

Reviewed: Cluster Ldr __X__
Value Mgr ____ Op Mgr __X__

ement Ventilation-Kelley-091103





3 Advantages	Alternative 1 – Overhead Air Distribution with 3300 TR chiller plant	Alternative 2 – Displacement Ventilation with 2700 TR chiller plant
	• Familiar technology/method of air supply. •	• Better air quality in occupied spaces • Better Patient Comfort • Lower energy/water usage • Fewer cooling towers, less maintenance

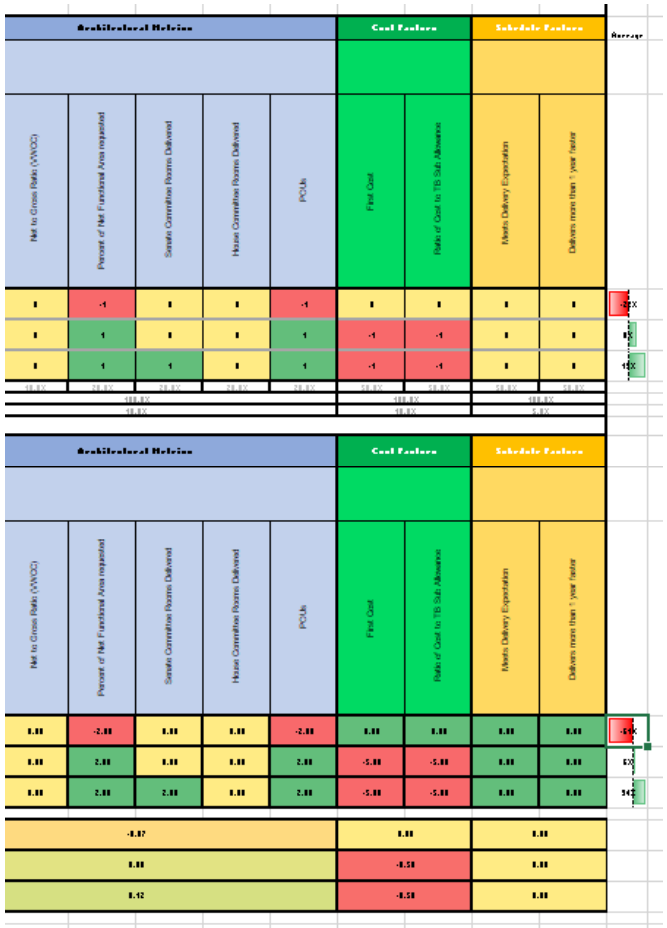
Larger font indicates those advantages that we believe have greater importance to Sutter/CPMC. Core Group is asked to confirm assumption of importance.

4 Proposal	Proceed with displacement ventilation in the patient tower Levels 6 through 14 in conjunction with the reduction of the chiller plant capacity. Scope of work noted adds $0 and $260,000 Annual Operational Savings Detail: a. Cost based on Added Cost for Displacement installation $2,400,000, Reduction in CUP <$1,000,000>, Elimination of Pony Chiller Need <$1,400,000> b. Presentation to OAC with Grant Davies, Malia Weinburg, Tim Hern, and Bud Shaw with CPMC on 10/26 was successful

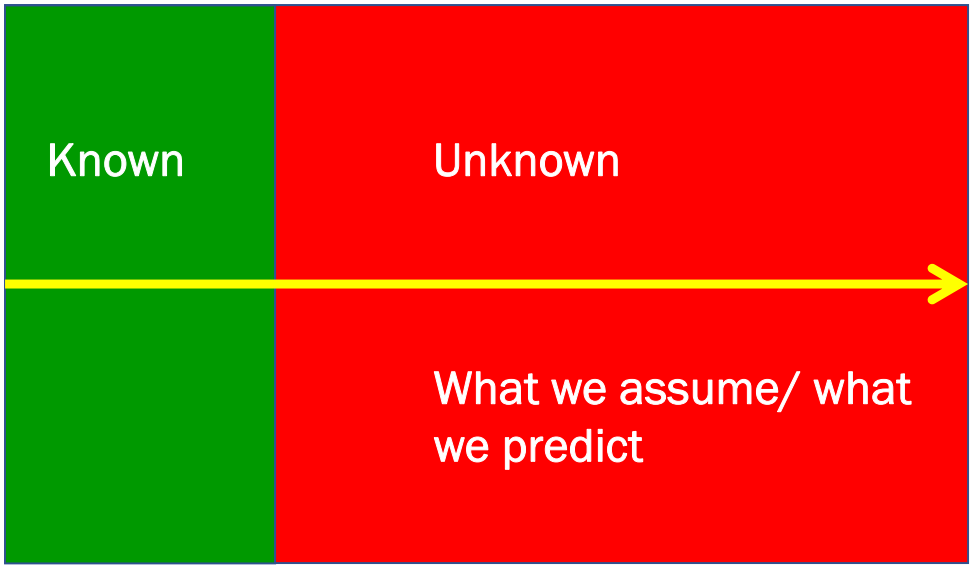
5 Action Pan	Brief: The path forward consists of : • CHAMPION: Jessica Kelley • Continue incorporation of DV into Design Detail: a.

APPROVAL SIGNATURES (Please initial and date)

David Long — 11/3/09
Steve Peppler
Dennis Layden
Geoffrey Nelson — 11-3-09
Paul Reiser — 11-3-09
Tony Burg
Tim Hern
Lonnie Andrews — 11-3-09
EMG Approved



Manage Risk Collaboratively



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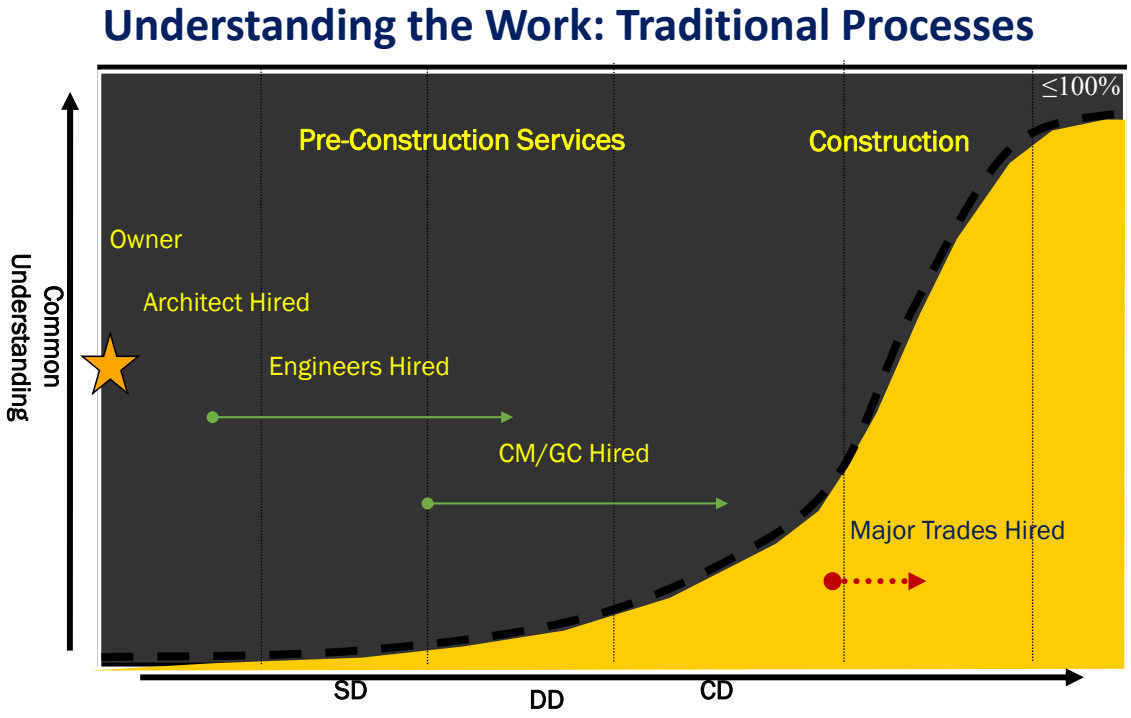
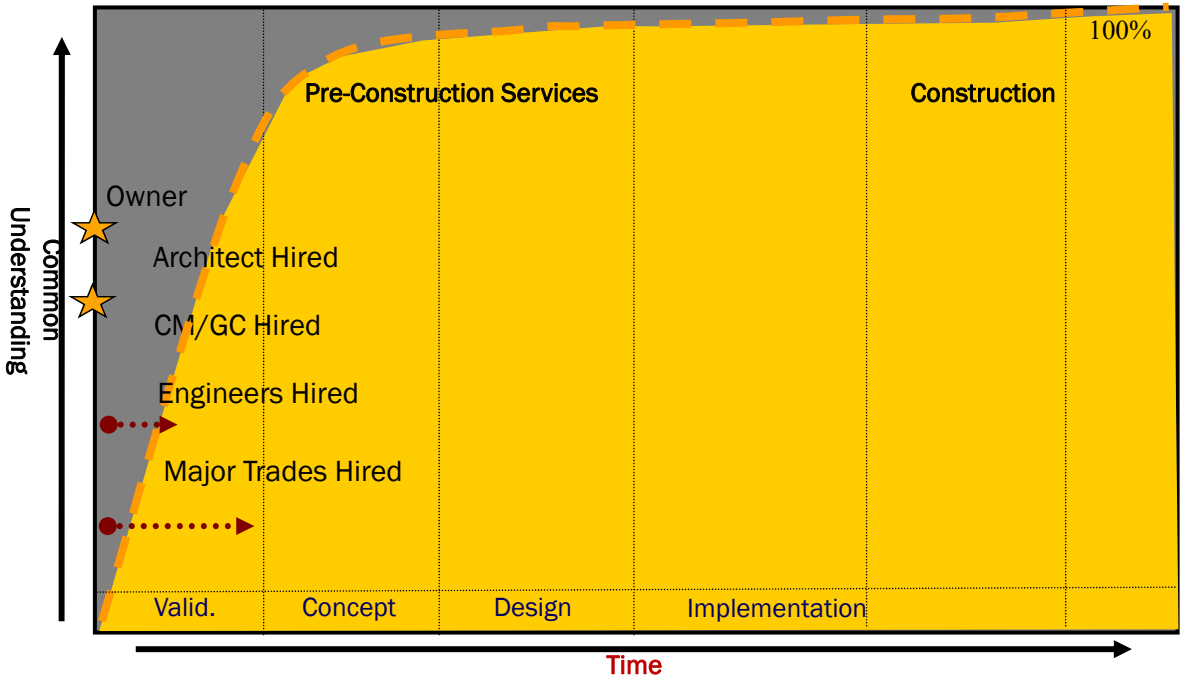
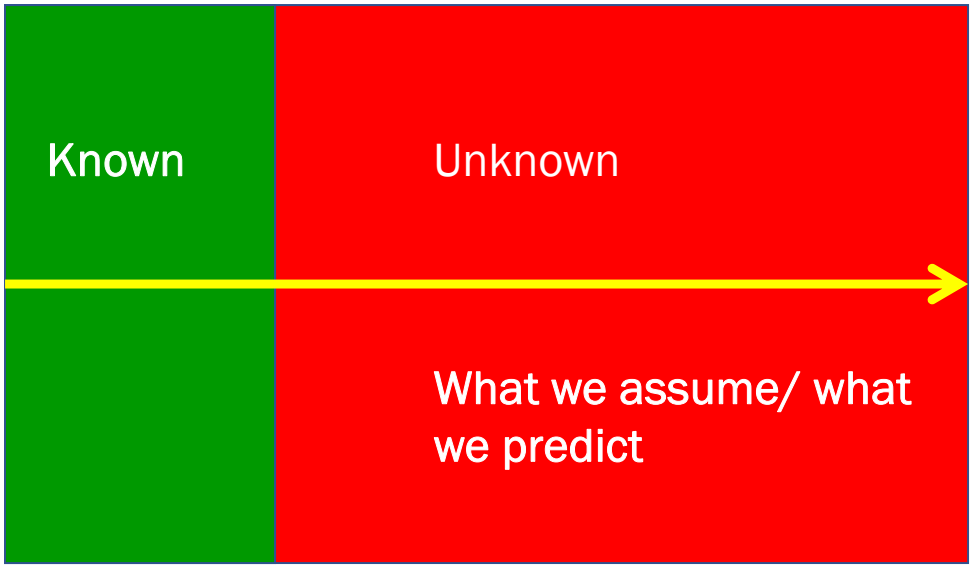


Manage Risk Collaboratively

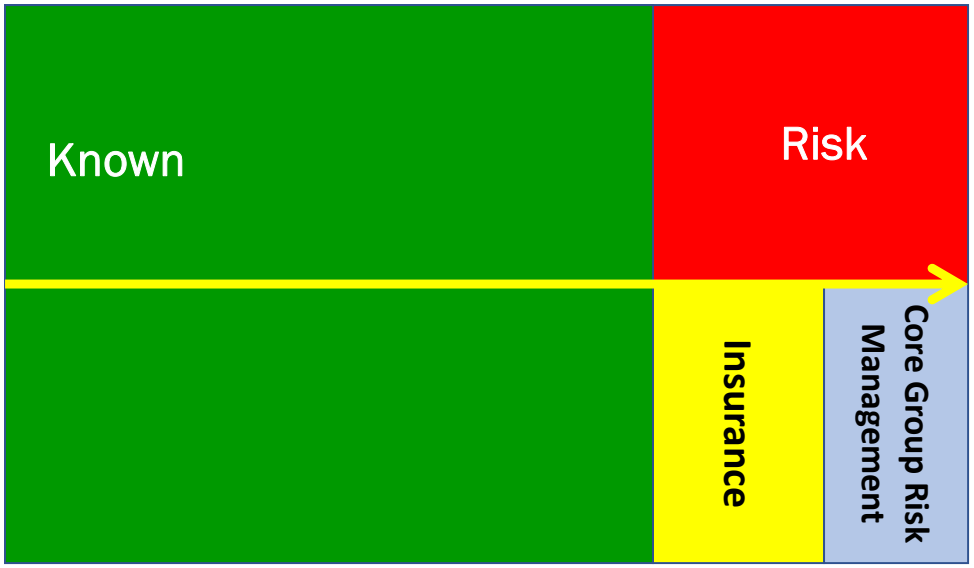
Understanding the Work: LEAN IPD Project



Manage Risk Collaboratively



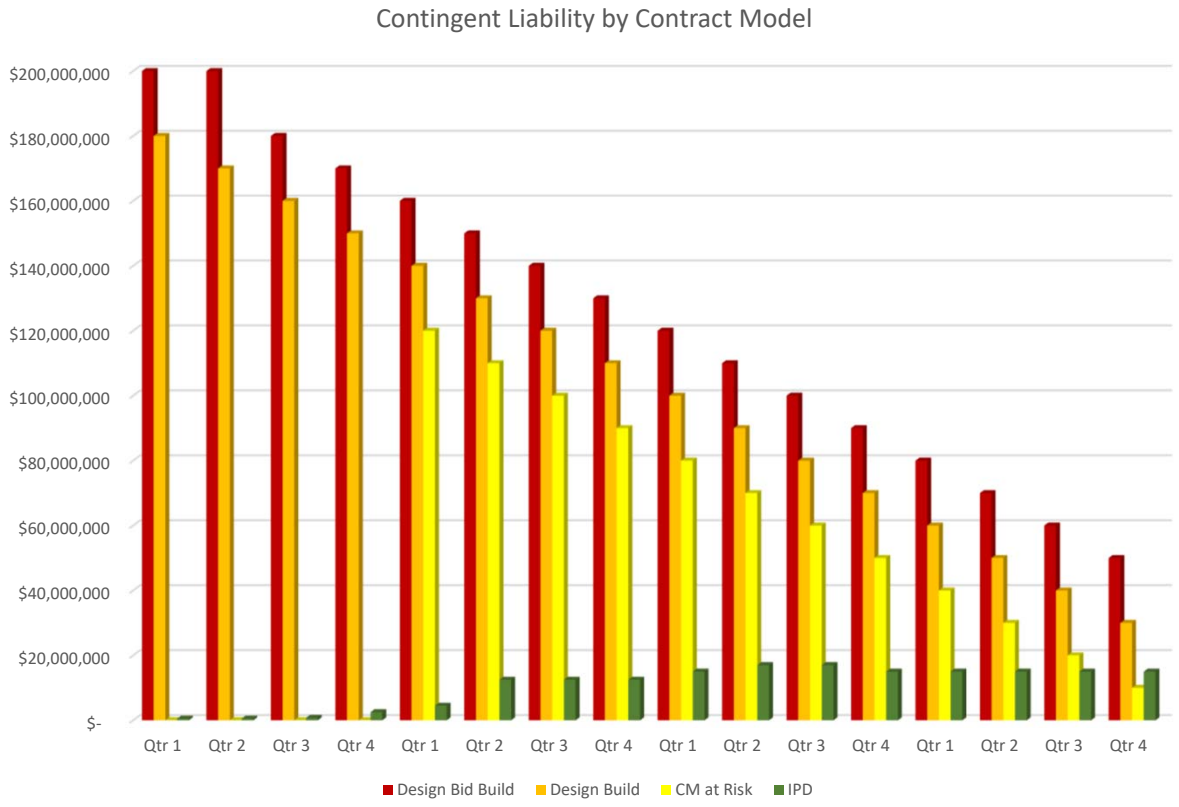
Manage Risk Collaboratively



Contingent liability in different contract models

Model	Highest Month
Design Bid Build	$ 200,000,000
Design Build	$ 180,000,000
CM at Risk	$ 120,000,000
IPD	$ 17,000,000

Identified expected cost:
$180,000,000



Fixing the Current Risk Strategy

• Sell risk to another party	• Jointly manage risk
• Risk goes to the single party most capable of dealing with it	• The risk jointly managed because money and losses are jointly shared
• Focus on activities	• Focus on workflow
• Reporting, oversight	• Focus on eliminating non-value items
• Search for the guilty, punishment of the innocent	• Everyone swims or sinks together, motivated to work out issues
• Estimating and Predicting on assumptions	• Joining knowledgeable resources, designing the production as we design the outcome (fewer assumptions, different focus)
• Tough contracts	• Contracts are terrible at controlling or dictating behaviour

What do we want?

- To create buildings that work
- That can be built in a reasonable time
- For a reasonable cost
- **With the desired quality**
- Without sacrificing some one or more aspects of the solution for another

Value, Like Beauty, Is In The Eye Of The Beholder

by Sam Klaidman | Jun 15, 2015 | Customer Value Creation

Addressing Anomalies: the right value

"There is only one beholder in the lean world: the customer. But there are a lot of customers"

Dick Bayer, 2020

Understanding value

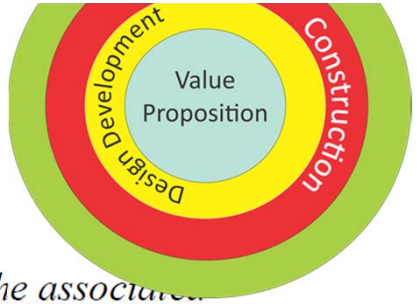
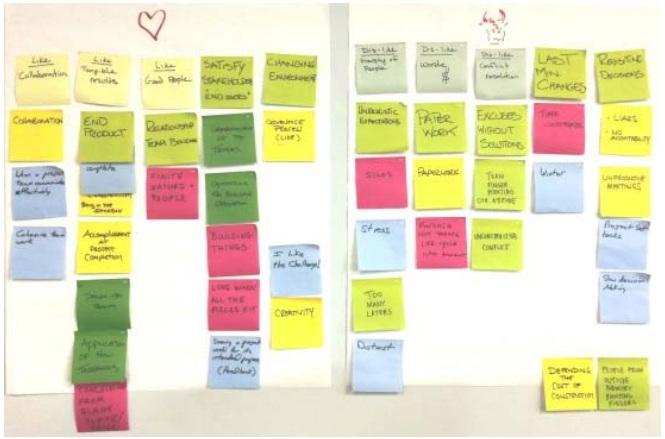


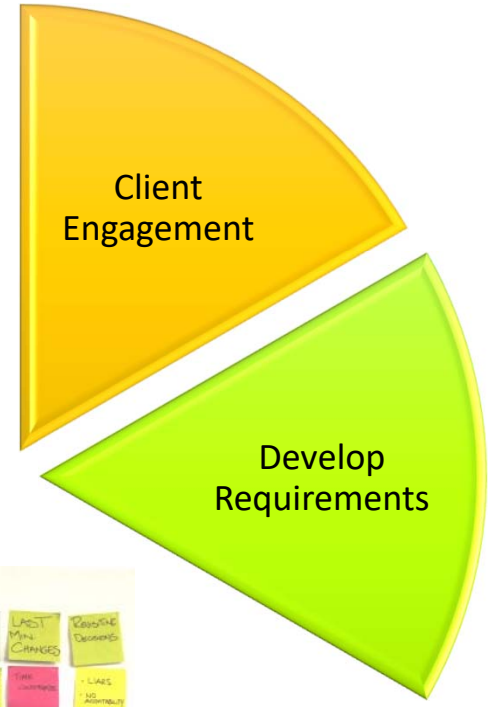
Table 1: The Principles of Value Generation (Koskela, 2000) and the associated Knowledge Management Process (Rooke, et al., 2010)

Principles of Value Generation	Knowledge Management Processes
1. ensuring that all customer requirements, both explicit and latent, have been captured;	1. to adequately discover and define customer requirements;
2. ensuring that relevant customer requirements are available in all phases of production, and that they are not lost when progressively transformed into design solutions, production plans and products;	2. to deliver knowledge of customer requirements to relevant parties throughout the production process;
3. ensuring that customer requirements have a bearing on all deliverables for all roles of the customer;	3. to transform these into an optimum design;
4. ensuring the capability of the production system to produce products as required;	4. to identify the required inputs for production;
5. ensuring by measurement that value is generated for the customer.	5. to facilitate customer evaluation and production process learning cycles.


Measure value
Client Engagement
Develop Requirements
Distribute knowledge of requirements
Take knowledge to optimum design
Identify required inputs for production

- Functional must haves
- Values workshop
- Create values matrix to track value adds





Project: Humber Cultural Hub Date: January 31, 2020 A3 No.2019-001 Preparer: Dick Bayer Collaborators: Entire Team

Project Values Matrix

BACKGROUND: All projects need context and background for determining at the outset why the project is being undertaken. What problems does it solve? What does it mean to represent? Who are the Stakeholders and what are their objectives? Development of a values matrix, a representation of the varied values the parties mean for the project to represent, anchors the project in a certain context that allows the parties to work across the creative tensions of varying values and arrive at the best built environment solution.

CURRENT CONDITION: Humber College is building a new complex of projects at its Lakeshore Campus known as the Humber Cultural Hub. Highlighting the program is a state of the art 150 seat performing and recording space, a 400-600 seat larger auditorium/performance space, a 300-bed student residence, Film Studios, academic programs for the Schools of Music and Film and necessary support spaces. The Program has an approved budget for design and construction of $178M.

PROCESS: On November 19, a Values Workshop was held and the team worked in teams of 3 each to brainstorm and develop essential values for the Program as well as teaming values to be implemented in the IPD process. During this workshop, the project values and conditions of satisfaction developed by Humber were shared with the team and discussed.
The following values are the results of the workshop:

Project Values

Value 1: Landmark and Flagship Building: The Buildings will be landmark/flagship buildings for the Lakeshore Campus, focused on enhancing community connectivity

1. The project will be surprising, generating WOW from users and visitors.
2. The buildings will be hardy, diverse, inclusive, comfortable, supportive, emotionally empowering, playful, durable, long-lasting, safe, welcoming, inviting, easily and universally accessible and will explain themselves to visitors and users seamlessly.
3. The planning will involve users and the community in the design process to maximize use in beautiful, simple spaces representing transcendent design.
4. The buildings will represent a gesture towards the rest of the campus, provide visibility from and to the Lakeshore, and provide optimal space in a borderless, energy positive manner.
5. The buildings will provide collaboration spaces and promote collisions that evoke curiosity and spark engagement.

Value 2: Learning Spaces: The Buildings will be useable for Breakfast to Bed Learning, will engage and enhance the learning community served by the Program and will create an intellectually stimulating space where students and faculty can thrive.

1. All spaces to support an environment of creative exploration and exchange of ideas. The building should encourage the breakdown of barriers between disciplines.
2. All spaces will be usable for teaching
3. The program will provide different kinds of spaces for different kinds of learning and spaces adaptable to the diverse learning abilities of all students.
4. The spaces will set the benchmark for learning spaces in Canada and the world.

Value 3: Sustainability: The facility will demonstrate global leadership in tackling climate change through healthy, accessible and effective design and construction of sustainable spaces.

1. We will challenge the status quo in pursuit of energy savings and optimization of resources.
2. We will use life cycle cost data to inform decisions.
3. We will provide a healthy, productive, and safe environment both during construction and in the final facility.
4. We will choose responsible equipment and materials, that focus on capturing and reusing heat and energy throughout the campus.
5. Building will showcase visible sustainability element on the interior and exterior to promote sustainability and foster creative thinking, innovation and education. The LEED credit for Green Education must be achieved
6. The facility will be LEED Platinum Certified, CaGBC Zero Carbon Building Design Certified (with special focus on Embodied Carbon Metrics) , Energy Use Intensity of 75 kWh/m2/year or less, Thermal Energy Demand Intensity of 32 kWh/m2/year or less with universality of design based on Passive House and WELL Building principles.

Value 4: Operational and Maintenance Values: The Program will be focused around resilient, low-maintenance, flexible and durable systems focused on life-cycle costs and ease of access for maintenance and renovation

1. Mechanical and electrical systems will be simple, flexible, passive, adaptable, intelligent, innovative, reliable and redundant where necessary, with special attention to operational costs
2. The program will be built with locally accessible products and equipment with established local value chains for replacement and service The program will optimize natural light, use developed heat in innovative and shared applications, and be transparent to expose systems and how they work.

Value 5: Identify with our Indigenous Past: The Program will demonstrate the connection and honour the history of Indigenous Peoples and the historic uses of the site.

1. The project will seek out ways to connect cultures through music and other media.
2. The program will provide a beacon for community gatherings and awareness displaying indigenous history and incorporating indigenous architecture.
3. The program and the buildings will be inviting to all communities including indigenous communities.
4. The spaces will provide education on truth and reconciliation.

Team Values

During the Values Workshop, the team agreed on the importance of developing a positive team culture to promote collaboration and trust. The team brainstormed how they would like to see the team work together and the results were grouped into 6 themes/categories:

1. Open & Effective Communication – promoting inclusive and transparent communication
2. Organized Team Structure – clear definition of team leadership and roles & responsibilities with organized delivery and quality assurance and control
3. Open, Respectful Behaviours – treating everyone with the utmost respect, providing a supportive and safe team environment and keeping an open mind to all ideas
4. Learning & Thinking Wide – environment that encourages questioning (healthy skepticism), continuous improvement and innovative problem solving
5. Brining your Best Self – everyone demonstrating active engagement and accountability
6. Fun & Happiness – work with humor and celebrate our achievements

Implementation Process: Value effect matrices have been developed in the column to the right, for reflecting how values will be tracked. The values will be used to make decisions and measure the appropriateness of choices made with respect to the Project.

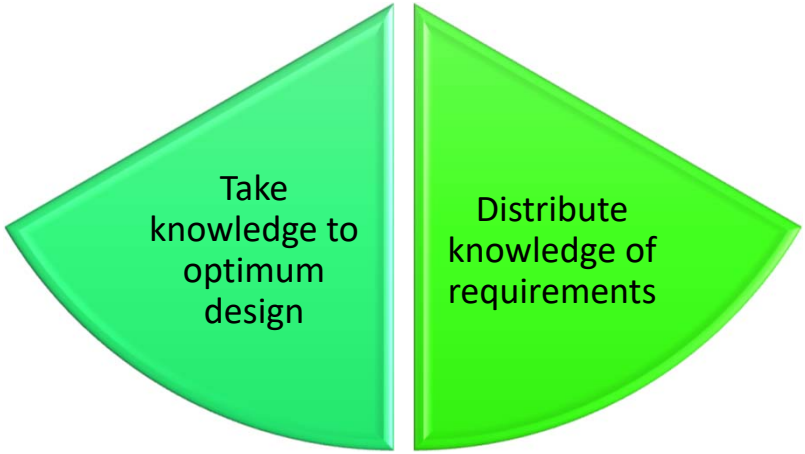
Project Values Measurement

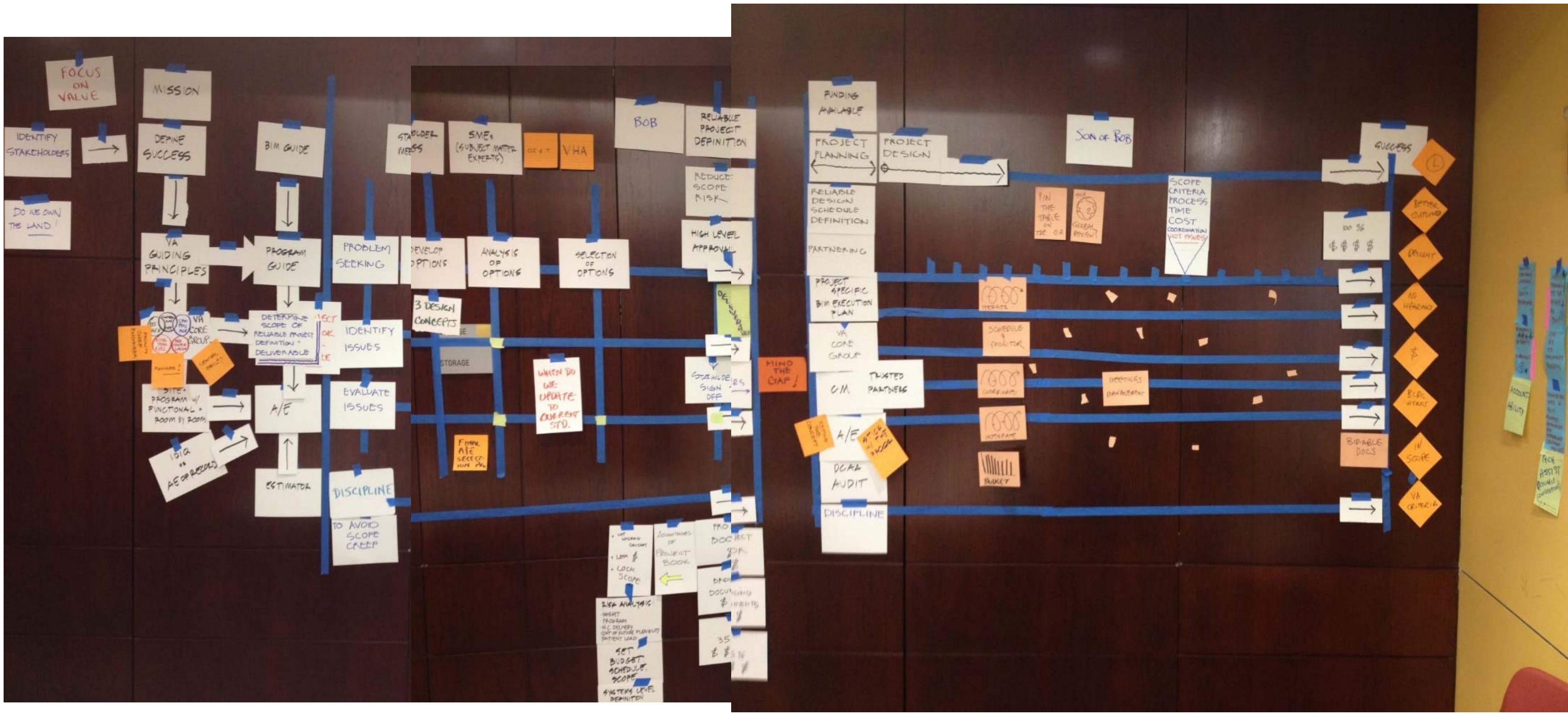
Effect on:			
Landmark/Flagship Building			
Learning Spaces			
Sustainability			
Operational and Maintenance Values			
Identify with Indigenous Peoples			

IPD Teaming Values

Effect on:			
Open & Effective Communication			
Organized Team Structure			
Open, Respectful Behaviors			
Learning & Thinking Wide			
Bringing your Best Self			
Fun & Happiness			

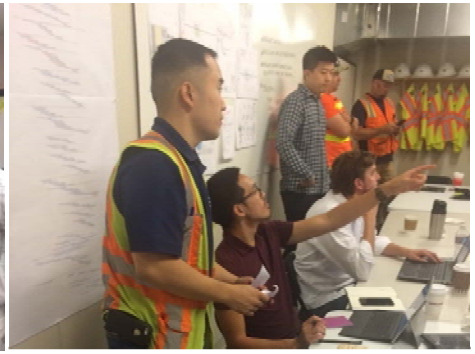
- Create an open, transparent visible space for working through requirements
- Create process for gathering and sharing information
- Iterate information exchanges, price design options, move to optimum design



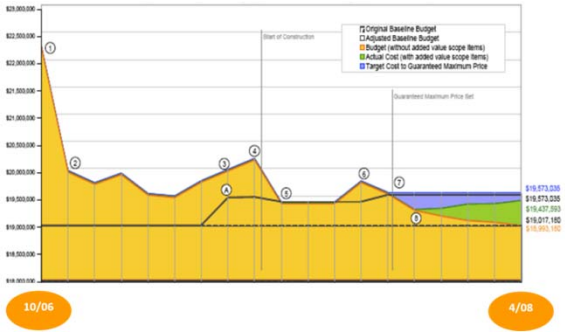

FOCUS ON VALUE
MISSION
IDENTIFY STAKEHOLDERS
DEFINE SUCCESS
BIM GUIDE
DO WE OWN THE LAND!
VA GUIDING PRINCIPLES
PROGRAM GUIDE
DETERMINE SCOPE OF RELIABLE PROJECT DEFINITION "DELIVERABLE"
SITE + PROGRAM w/ FUNCTIONAL + ROOM BY ROOM
A/E
ESTIMATOR
PROBLEM SEEKING
IDENTIFY ISSUES
EVALUATE ISSUES
DISCIPLINE
TO AVOID SCOPE CREEP
SMEs (SUBJECT MATTER EXPERTS)
VHA
DEVELOP OPTIONS
ANALYSIS OF OPTIONS
SELECTION OF OPTIONS
3 DESIGN CONCEPTS
STORAGE
WHEN DO WE UPDATE TO CURRENT STD.
BOB
RELIABLE PROJECT DEFINITION
REDUCE SCOPE RISK
HIGH LEVEL APPROVAL
MIND THE GAP!
FUNDING AVAILABLE
PROJECT PLANNING
PROJECT DESIGN
SON OF BOB
SCOPE CRITERIA PROCESS TIME COST
RELIABLE DESIGN SCHEDULE DEFINITION
PARTNERING
PROJECT SPECIFIC BIM EXECUTION PLAN
VA CORE GROUP
C/M
TRUSTED PARTNERS
A/E
DCAA AUDIT
DISCIPLINE
BUDGET
SUCCESS
DD %
BIDABLE DOCS
IN SCOPE
VA CRITERIA

Measure value

Identify required inputs for production



Description of Risk & Impact	Risk Owner	Pre-mitigation Probability	Pre-mitigation Impact	Pre-mitigation Rating	Mitigation Strategy	Post-mitigation Probability	Post-mitigation Impact	Post-mitigation Rating
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name1	1	5	5	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	1	5	5
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name1	3	3	9	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	2	1	2
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name1	2	4	8	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	1	4	4
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name2	4	2	8	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	2	1	2
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name2	5	5	25	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	3	4	12
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name2	3	3	9	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	2	3	6
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name2	2	1	2	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	1	1	1
There is a risk that <some business impact> will happen if <some event happens or fails to happen in the project>	Name2	3	2	6	This is a list of the activities completed and controls in place that provide some mitigation to the risk described. This should reflect mitigating controls in place and not a wish list of activity to be done in the future which may or may not be successful.	1	1	1

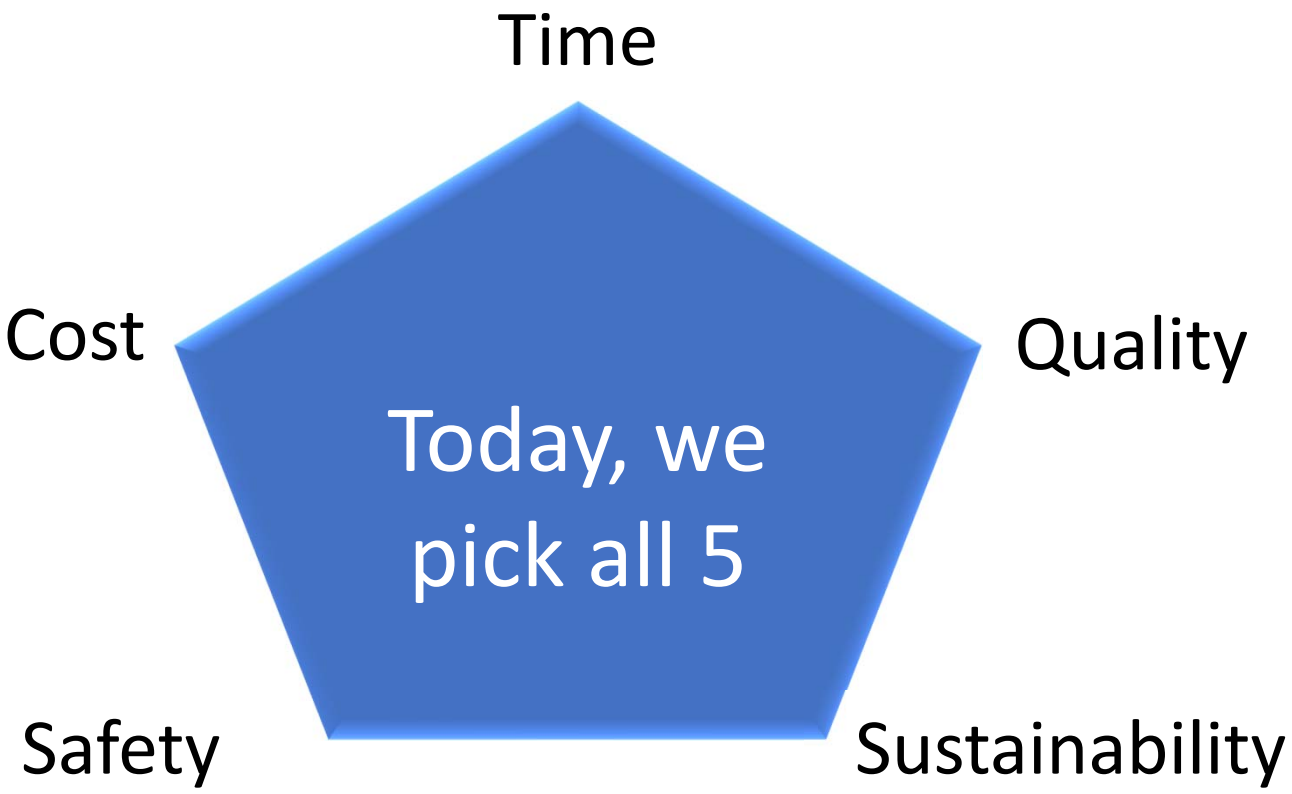


What do we want?

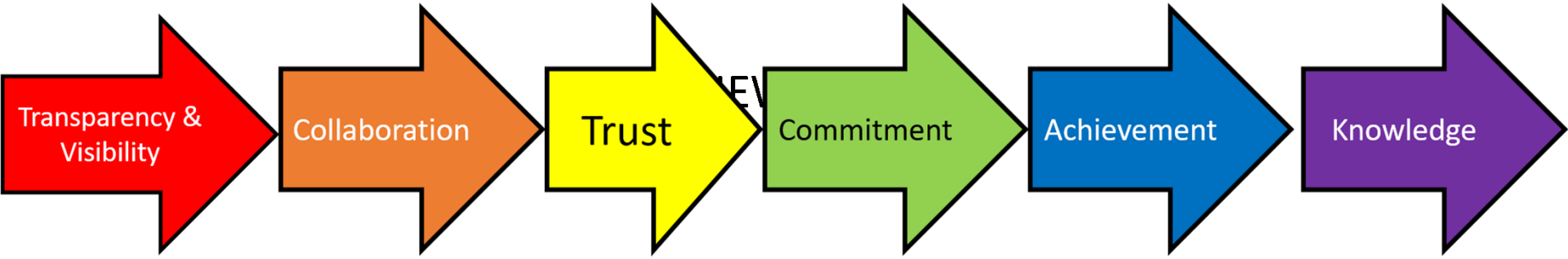
- To create buildings that work
- That can be built in a reasonable time
- For a reasonable cost
- With the desired quality
- Without sacrificing some one or more aspects of the solution for another


Time
Pick Two
Cost
Quality


Time
Pick All Three
Cost
Quality


Time
Cost
Quality
Today, we pick all 5
Safety
Sustainability

THE NEW MODEL



THE NEW PARADIGM

Thank you

Dick Bayer
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