



Operating System 2.0



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Director, CII



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- Civil Engineering faculty at the University of Texas at Austin
- Visiting Professor in Production Systems at the Norwegian University of Science and Technology (NTNU)
- Former employee of Fluor, Phillips Petroleum, Bechtel, ePM, and Texas State University



EC
ITB*

Current Industry Status



Industry Advancement?



98%

of mega-projects
>\$1 Billion experience cost
overruns of 80%

(Source: Bechtel)

95%

of all projects
FAIL to meet one or more of
their business objectives

(Source: CII)

70%

of all projects are not
completed within 10% of
budgeted cost or schedule

(Source: CII)

>40%

of project capital is **WASTED**
on transactions

(Source: CII/NTNU)

“I think the current model within our industry is broken.”

– Ian Edwards, Interim CEO, SNC-Lavalin

(on August 1, 2019, after SNC-Lavalin reported a \$1.6B loss and their stock dropped to a 14-year low)

We Are Not Delivering Financially

Dow Jones U.S. Heavy Construction Index (DJUSHV) vs. DJI (Nov. 5, 2014 – Nov. 5, 2019)



+55%

+2%

0.5% profit
on \$93B in
2018

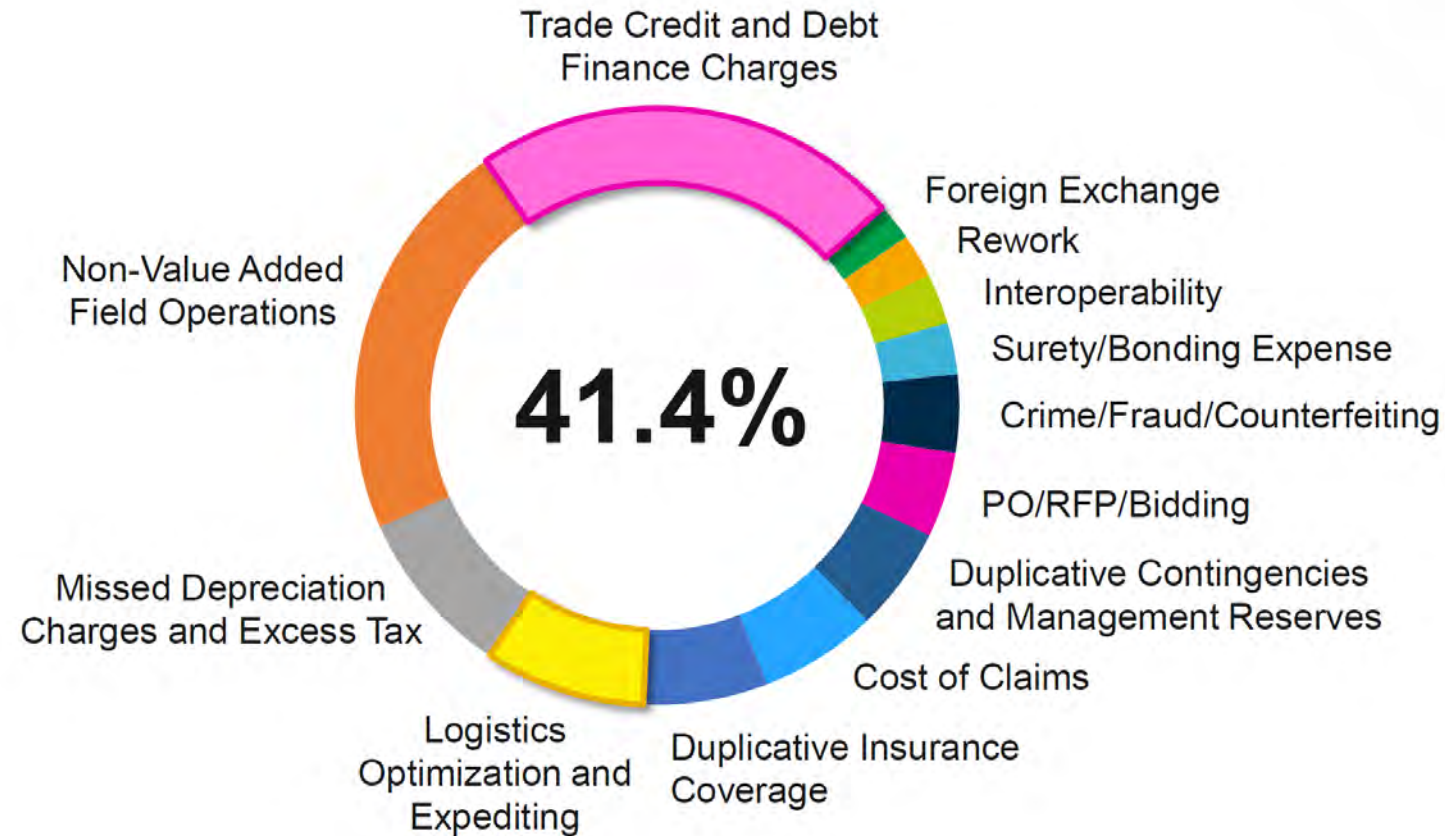
- McDermott
 - 2018: \$2.8 billion loss on \$2.1 billion of revenue
 - 2019: Secured \$1.7B loan at 10% interest
- Fluor
 - Q3 2019: \$782 million loss
 - Divesting government and equipment businesses
 - Selective on the types of projects being pursued

Poor Productivity (of Capital)

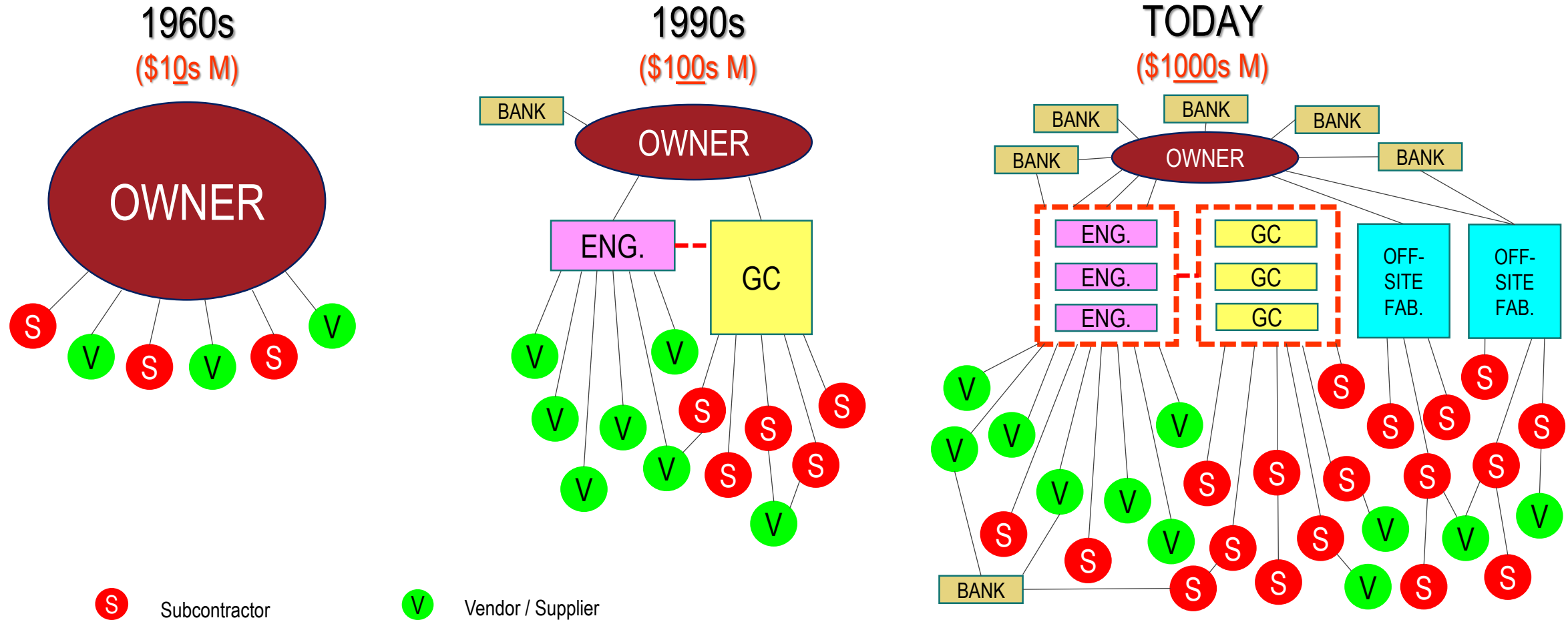
- Need to improve capital efficiency
- Not attracting enough investment
- Financially unhealthy (0.5% net profit)
- \$1.6T lost productivity each year, globally
- 5.7% increase in US construction cost in 2018 (vs. 1.9% inflation)
- Breakthrough vs. continuous improvement
 - Improve 2.5% / year via Best Practices, but...
 - Industry declines 3% / year



Primary Sources of Transactional Waste



Increasing Fragmentation and Complexity



Lipstick on a Pig?



- Today's BEST PRACTICES and technology POINT SOLUTIONS are good, but they aren't delivering step-change improvement.
- Why? Because they are being applied to an inherently broken business model.
- We need a NEW BUSINESS MODEL that allows our best efforts to thrive:
 - Advanced Work Packaging (AWP)
 - Early (Agile) Planning
 - Alignment and Team Building
 - Modularization and Off-Site Fabrication
 - Zero accident techniques
 - And more...

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About CII



History of CII



- 1983: Founded by 28 organizations; now more than 140
 - Organized Research Unit (ORU) of the Cockrell School of Engineering (CSE) at the University of Texas at Austin (UT)
 - First structured owner-contractor-academic research collaboration for the constructed project
 - Global collaboration to advance the capital projects industry
- 2018: Merged Fiatech (technology group) into CII
- 2019: Established the OS2 Industry Affiliates Program (IAP)



CII Member Companies – Owners



CII Member Companies – Contractors

AECOM



Eichleay

JACOBS



WANZEK



KBR



QualEx Engineering

SKANSKA



FLUOR



RICHARD
INDUSTRIAL GROUP



wood.



hargrove



ZACHRY



MCDERMOTT

SAMSUNG



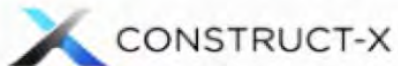
HATCH



CII Member Companies – Service Providers

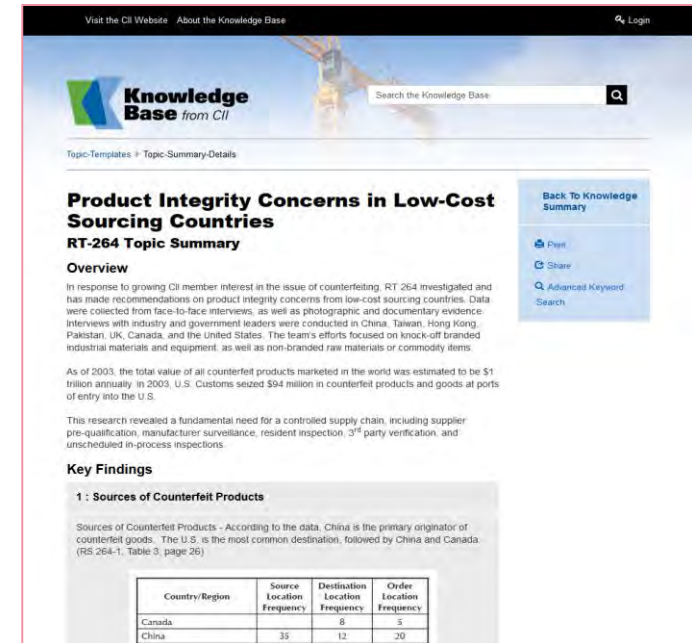
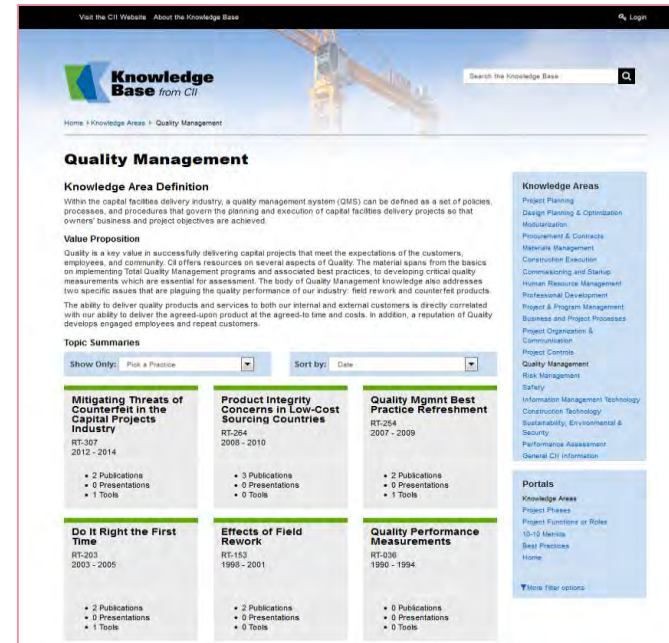


Design + Construction Strategies



CII: Research and Development

- History of Industry Best Practices Leadership
- Zero Accident Techniques, Constructability, PDRI, Advanced Work Packaging, Planning for Startup

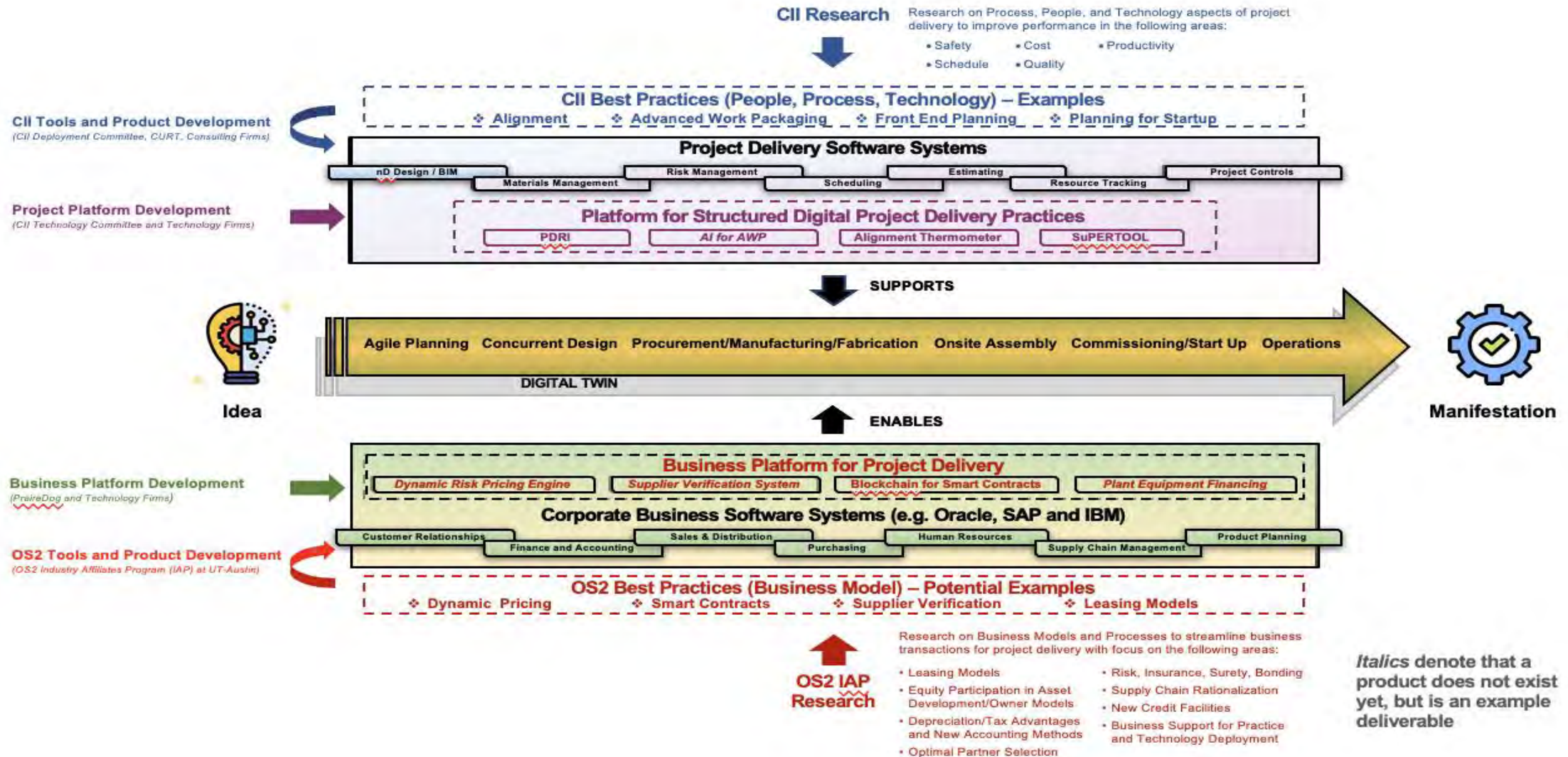


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Desired Future State of the Industry



OS2 Roadmap: Harmonizing Project Delivery and Business Support



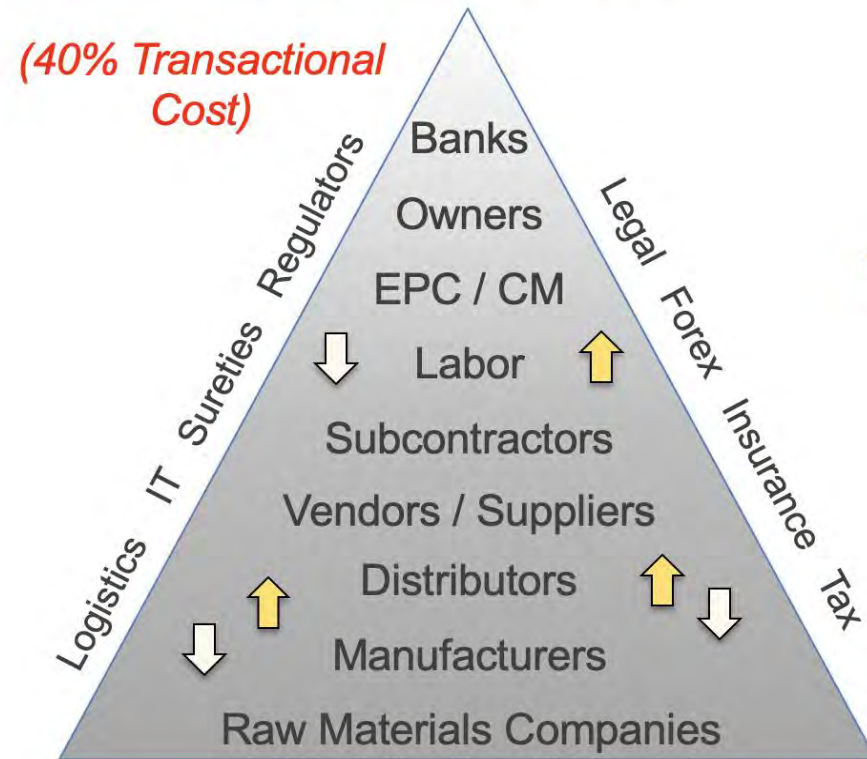
OS2 Defined



- OS2 is a new business and commercial model for the capital projects industry
 - How can we use the capital project to enhance business outcomes?
 - How do we accelerate our organic growth by using our capital better?
- OS2 will enhance the health and stability of the industry
 - Intelligent finance, accounting, tax, legal platform for a globally-distributed industry
 - Participating companies will leverage their own capital
 - Provide enabling environment for technology point solutions to thrive
- Key Words: Distributed, Speed, Agility
 - Reverse the trends toward costly vertical integration (distributed risk, finance)
 - Dramatic reduction in time for planning, selecting, engaging, integrating, executing

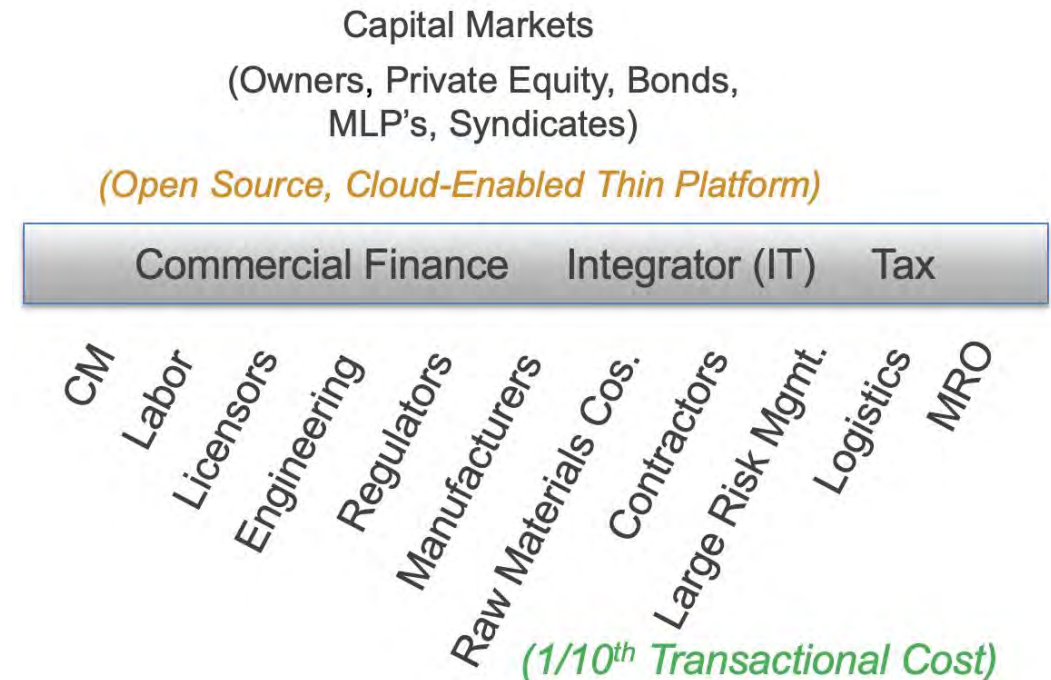
OS2 Business Model Comparison

TODAY'S "OS1" BUSINESS MODEL



VS.

OS2

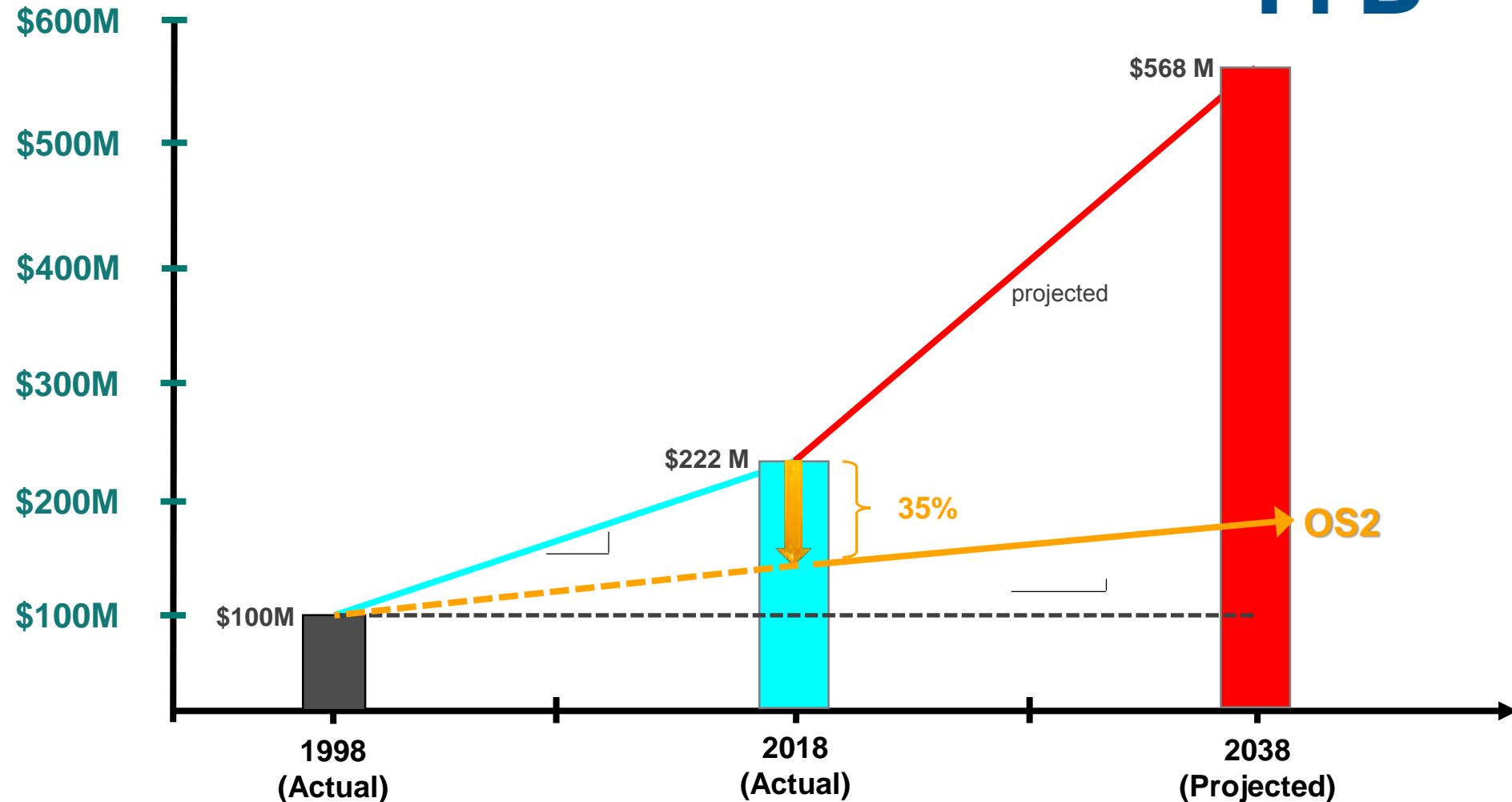


OS2 Aims to Mitigate Escalating Costs

Nominal \$100M
Heavy Industrial
Project

Data Averaged
Across
Multiple Capital
Projects

(1998 Baseline,
adjusted for inflation)



Call For Action



- Transformation is needed. If we don't do it, someone will do it for us!
- We (the Owners) need to address the business value of capital spending – we are not in the business of building projects.
- We (the Contractors) need to focus on providing value, not spending man-hours.
- Need to engage our legal, accounting, supply chain, etc. counterparts in the solution.
- We cannot be afraid of change: Uber, Airbnb and Tesla have revolutionized their industries. We need to as well!



The OS2 Industrial Affiliates Program (IAP)



Operating System 2.0 (OS2)

OPERATING
SYSTEM 2.0



RESEARCH
SUPPORTED
REDESIGN



JOINT
INDUSTRY

COLLABORATION



DESIGNED TO
ACCOMMODATE
CHANGE



OS2 Research and Development

RESEARCH



DEVELOPMENT



OS2 IAP Benefits to Affiliates



- Opportunities to recommend specific lines of research
- Collaborate in research projects
- Access to “ahead-of-publication” research results aimed at:
 - Enhancing capital efficiency and the business value of developed assets
 - Reducing significant transactional waste
 - Leveraging advanced computing power to improve project outcomes
 - Investigating better options for funding projects

CII OS2 IAP Initial Research Areas

1

Goal Congruency and Alignment

The “Capital Projects Game” has known and unknown players where nobody is declared the winner. Instead of trying to “win,” how do companies show up to advance a cause – something bigger than themselves? They don’t have competitors, just worthy rivals. Hallmarks include the capacity and willingness to make profound strategic shifts and the courage to lead.

2

Supplier Engagement

Suppliers are working at the leading edge of innovation. How do they concurrently engage with others to create novel solutions for capital projects? How can they efficiently acquire work?

3

Dynamic Risk Model

More than financial strength, projects must continually assess the capability of companies to perform. Can models be developed to assess project risks considering the risks of key players? Can a “FICO” score be created to reflect organizational, project, and business risk?

4

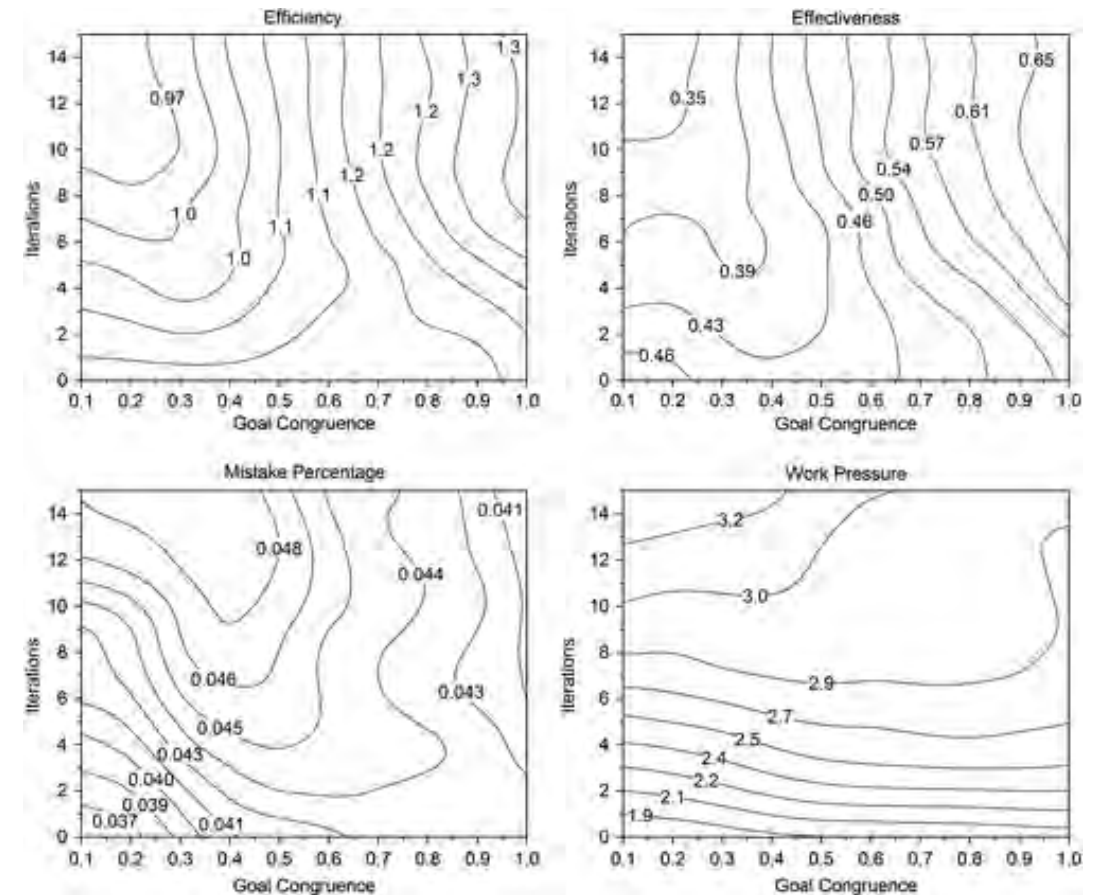
Contracting via Blockchain

Can permissioned digital ledgers and technologies reduce transactional costs and durations? Can the contracting environment change the “Capital Projects Game” for the better?

1

Goal Congruency and Alignment

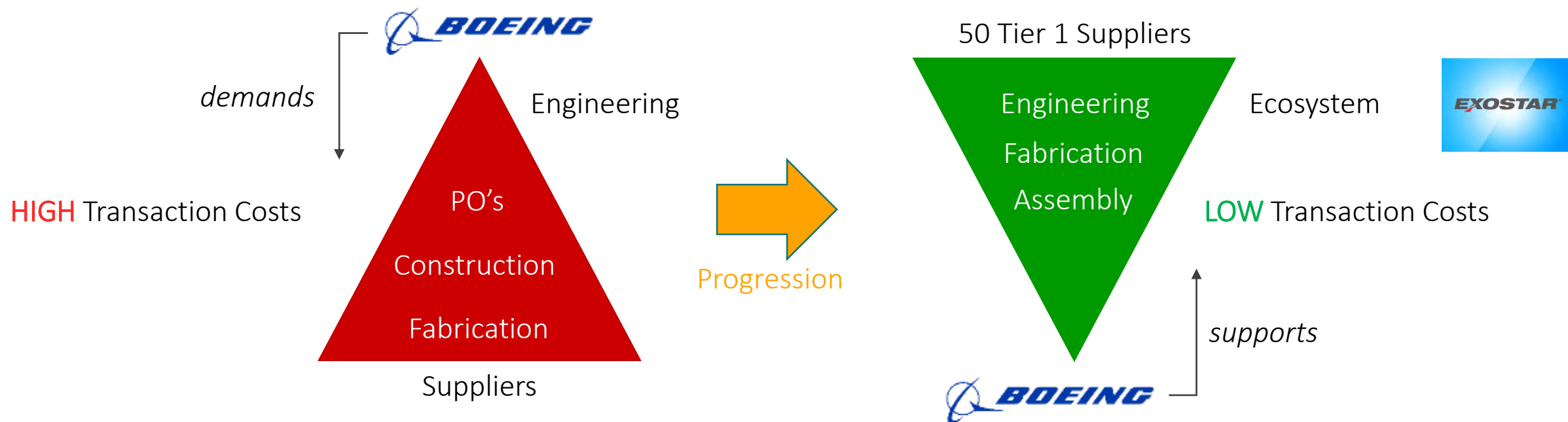
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2 Supplier Engagement

Suppliers are working at the leading edge of innovation. How do they concurrently engage with others to create novel solutions for capital projects? How can they efficiently acquire work?

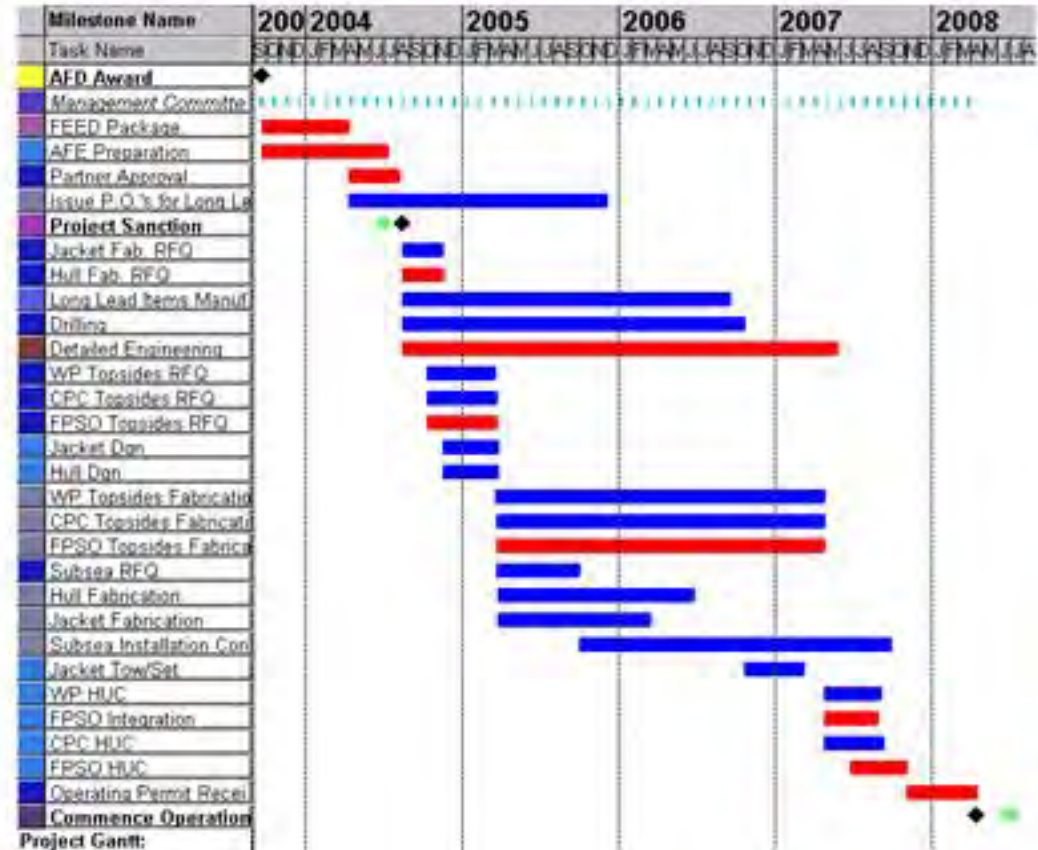
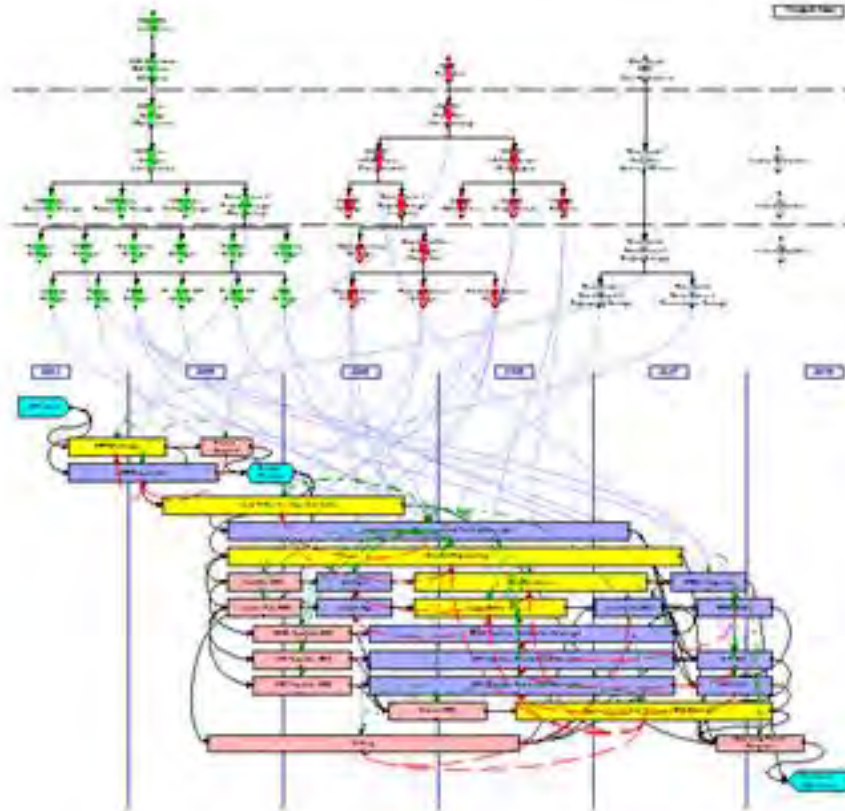
- Boeing 787 Development Cost – From \$10B to \$6B (-40%)
- Boeing 787 Development Time – From 6 Years to 4 Years (-33%)



3

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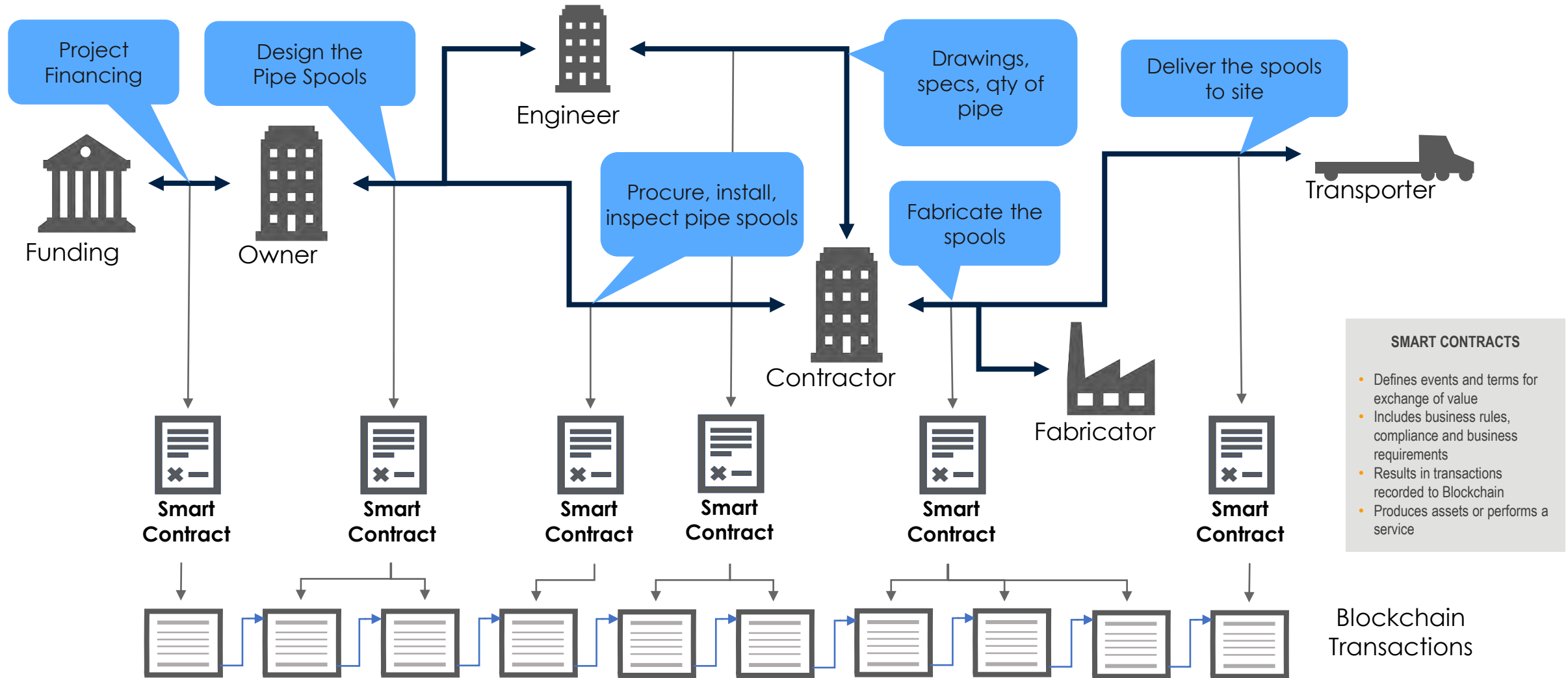


Modeling & Simulation (Stanford University & ePM)

4

Contracting via Blockchain

Can permissioned digital ledgers and technologies reduce transactional costs and durations? Can the contracting environment change the “Capital Projects Game” for the better?



CII OS2 IAP Affiliates



ExxonMobil



سابك
sabic

BHP

SUNCOR



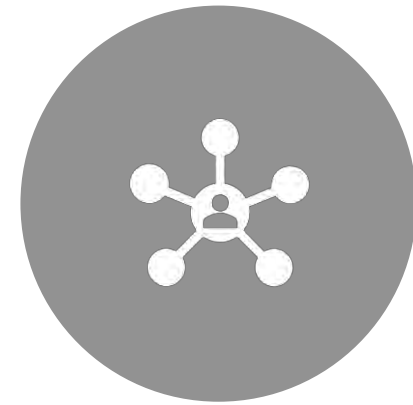
Recap and Next Steps



WHAT IS HAPPENING WITH OS2
IN THE NEXT YEAR?



HOW CAN I CONTRIBUTE?



IS THERE SOMEONE FROM MY
TEAM OR PEERS WHO WOULD
BE A GREAT FIT?



Questions?

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