

**The European Construction Institute,
McKinsey & Company and Shell
Client Round Table**

2nd October 2018

Introductions

Don Ward, Chief Executive, ECI



building a better world together

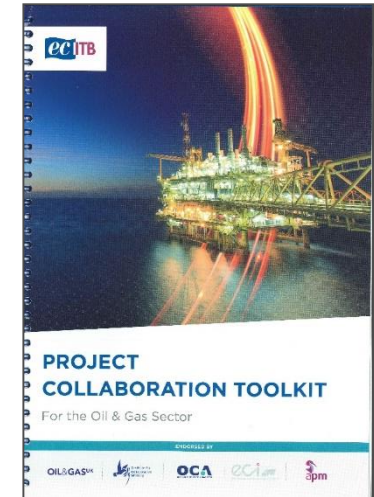
www.eci-online.org

Members



Core activities

- Establish the Evidence
 - Industry-focussed research
 - Task forces
- Share the Knowledge
 - Conferences
 - Workshops
 - Site Visits
- Apply the Practice
 - Publications, reports
 - ACTIVE
 - In-house support



Part of the BRE Trust group of companies, sister organisation to Constructing Excellence

BRE making a
positive difference
in the built environment
since 1921

Our mission:

To build a
better world
together

Our vision:

To make an
unmistakable
imprint on
a highly
regarded built
environment

At a glance

working in
67 countries

- BRE Office
- BREEAM Presence
- LPCB Presence
- BREEAM and LPCB Presence
- Innovation Park
- BREEAM National Scheme Operator
- BRE Trust Centre of Excellence

5
innovation
parks
established
or
underway

143 PhDs funded
by BRE Trust
University Centres
of Excellence

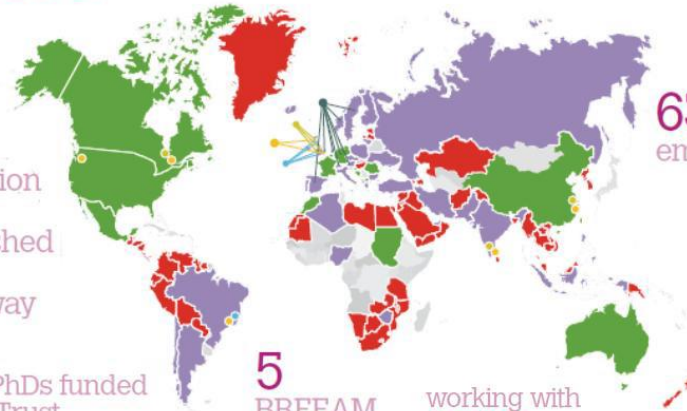
20,000⁺ people trained by BRE

5
BREEAM
National
Scheme
Operators
in Europe

working with
2796
BREEAM and
code assessors

630 people directly
employed by BRE

over **10,000**
products and
services certified
by LPCB



**A roundtable for Owner Operators
and Investors in the European
engineering & construction sector**

McKinsey&Company

A senior executives' roundtable 2018

- discuss the challenges faced, as well as the radical changes required to move the industry forward
- address how leaders can embrace the opportunities afforded by digital technology
- jointly identify the necessary actions for owner operators and investors to improve capital project outcomes

Our agenda today

- **Introductions**
 - Setting the scene - Output from previous ECI client round table forum
 - John Fotherby and Don Ward, ECI
 - Time for a different way of thinking about capital project delivery
 - Prairie Dog / OS2 - Stephen Mulva, CII
- **12:30 Lunch**
- Digitalisation – is engineering construction exploiting the benefits?
 - Frank von Willert, McKinsey
- What is ECI & CII doing?
- Where do we go from here?
- **15:00 Close**

Setting the scene - Output from previous ECI client round table forum

John Fotherby, Chair, ECI

Introductions


- Name, organisation, role


- ‘Chatham House’ rule

”How can the supply network work together better to address capital efficiency as the Number 1 challenge facing the industry?”

Building on our similar event in 2016

- Surviving and Prospering after the Perfect Storm: Challenges in Delivering Capital Projects
 - Legacy of failing projects
 - Plant costs doubled in ten years
 - Oil & commodities price crash
- Capital efficiency is an issue – clients' incomes are insufficient to absorb “excessive” plant costs



eci 
European Construction Institute
Working for and with the European Engineering Construction Industry

Surviving and Prospering after the *Perfect Storm*

Legacy of failing projects

Plant costs doubled in ten years

Oil & commodities price crash


Capital efficiency is an issue
– clients' incomes are insufficient to absorb “excessive” plant costs

Challenges in Delivering Capital Projects
Output from the ECI Round Table Forums 2015 / 2016


European Construction Institute
May 2017

The key issues affecting the use of capital

- Failings on mega projects
- Poor performance, productivity and HSE
- Inadequate innovation
- Insufficient integration, collaboration and early supply chain involvement


Working for and with the European Engineering Construction Industry

Surviving and Prospering after the *Perfect Storm*



Legacy of failing projects
Plant costs doubled in ten years
Oil & commodities price crash

Capital efficiency is an issue
– clients' incomes are insufficient to absorb "excessive" plant costs

Challenges in Delivering Capital Projects
Output from the ECI Round Table Forums 2015 / 2016

European Construction Institute
May 2017

“How can the supply network work together better to address capital efficiency as the Number 1 challenge facing the industry?”

“What changes have you observed or experienced over the last three years regarding these key issues affecting the efficient use of capital?”

**Are you satisfied with the present situation?
If yes, why? If no, what in your view needs to happen?**

**Time for different way of thinking
about capital project delivery –
Prairie Dog / OS2**

Stephen Mulva, CII

Operating System 2.0

Time for a Different Way of Thinking about Capital Project Delivery



ECI, McKinsey and Shell Client Roundtable

Stephen P. Mulva, Ph.D.

Director, Construction Industry Institute (CII)
The University of Texas at Austin

Operating System 2.0 Defined

- OS2.0 is a new business and commercial model for the capital projects industry
 - “How can we use the capital project to enhance business outcomes?”
 - Owners: “How do we accelerate our organic growth by using our capital better?”
- OS2.0 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
- Key words: Distributed, Quick
 - Reverse the trends toward costly vertical integration (distributed risk, finance)
 - Create quick wins such as in leasing

Operating System 2.0 (OS2) will transform the global engineering and construction market in the way that facilities are conceived, evaluated, planned, delivered and operated (theories).

PrairieDog will implement the results of OS2 research & development through commercialization of innovative technology and services (platform).

TOMORROW

Desired Future State of the Industry



Key Questions

“How can the project better enhance business value?”

“How can we make projects a preferred investment choice for the C-suite?”

“Can we eliminate significant transactional waste through better contracting & collaboration?”

“Can we procure materials and services based on ROI/ROCE instead of just initial cost?”

“Can we leverage advanced computing power to improve project outcomes?”

“Can we better take advantage of global trade & tax regulations?”

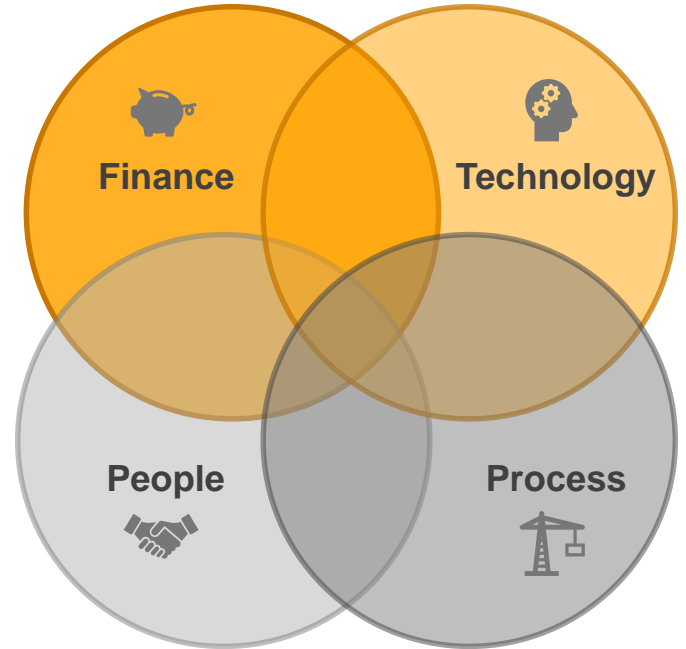
“Can leasing provide a better option for funding capital projects?”

“Can we improve the overall financial health of the industry?”

OS2's "Big Ideas"



*17 Transformational
Concepts*



Research & Development Thrust Areas

	Research & Development Thrust Area	Priority	Finance	Technology	Process	People
1	Leasing Model	1	✓			
2	Equity Participation in Asset Development	1	✓			
3	Depreciation / Tax Advantages	1	✓			
4	New Accounting Methods	1	✓			
5	Cloud-Enabled Thin Platform	2		✓		
6	Optimal / Real-time Partner Selection	2		✓		
7	Risk, Insurance, Surety, Bonding	3			✓	
8	Supply Chain Rationalization	3			✓	
9	Sourcing Globally / Buying / Transfer Pricing	3			✓	
10	Contract Simplification	3			✓	
11	Work Force of the Future, HR, Training, Safety, Skills, Qualifications	4				✓
12	Flexible Approach Capital Markets / Investment	5	✓			
13	New Credit Facilities	5	✓			
14	Asset Crowdsourcing (Different Owner Models)	5	✓			
15	Agile Planning & Generative Design	6			✓	
16	Design Modularization & Re-Use / Process Simplification	6			✓	
17	Modular Production Methods / Miniaturization	6			✓	

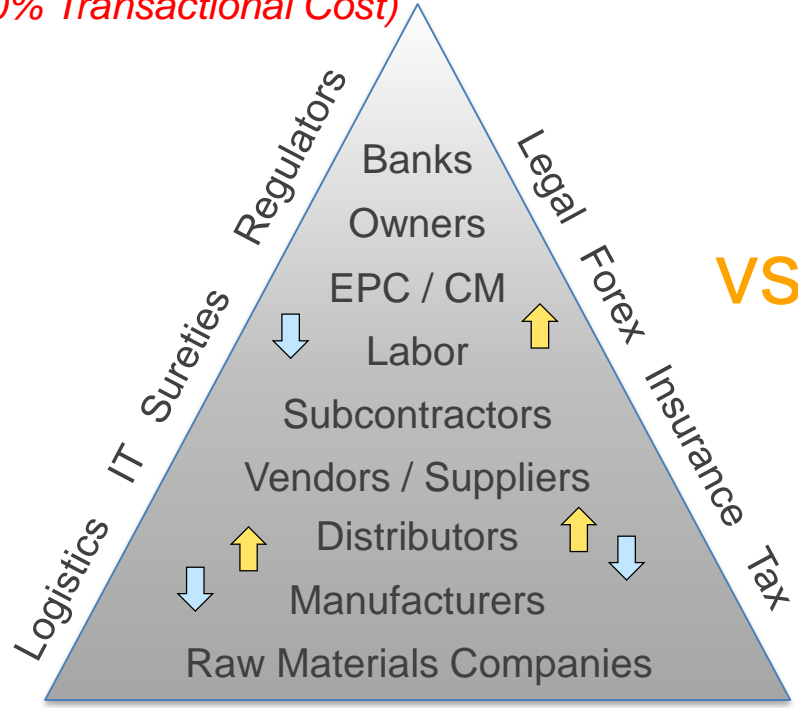
Small Modular Infrastructure (Economics and Philosophy)

- “Bigger is better” vs. “the Case for Small”
 - Historically, we’re already too big (‘60’s to ‘80’s: 50MW avg. (coal-fired))
 - Tipping point: 1994 supercomputers vs. distributed PC / cloud
- Economies of unit scale (capacity efficiency vs. structural integrity)
- Economies of mass production
- Operating costs
 - Labor efficiency vs. automation
 - Remote operation
 - Centralized (factory) maintenance
- Flexibility and diversification
 - Capacity and service area (market implications)
 - Continual investment / shorter lead time (SMR: -35% capital, -45% time)
 - Operations (match demand) and uptime (99.94% Google)



Cloud-Enabled, Thin Platform

(40% Transactional Cost)

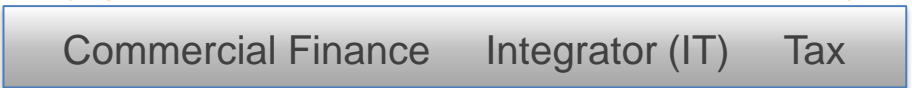


VS.

Capital Markets

(Owners, Private Equity, Bonds, MLP's, Syndicates)

(Open Source, Cloud-Enabled Thin Platform)



- CM
- Labor
- Licensors
- Engineering
- Regulators
- Manufacturers
- Raw Materials Cos.
- Contractors
- Large Risk Mgmt.
- Logistics
- MRO

(4% Transactional Cost)

RESULTS

Expected Impact

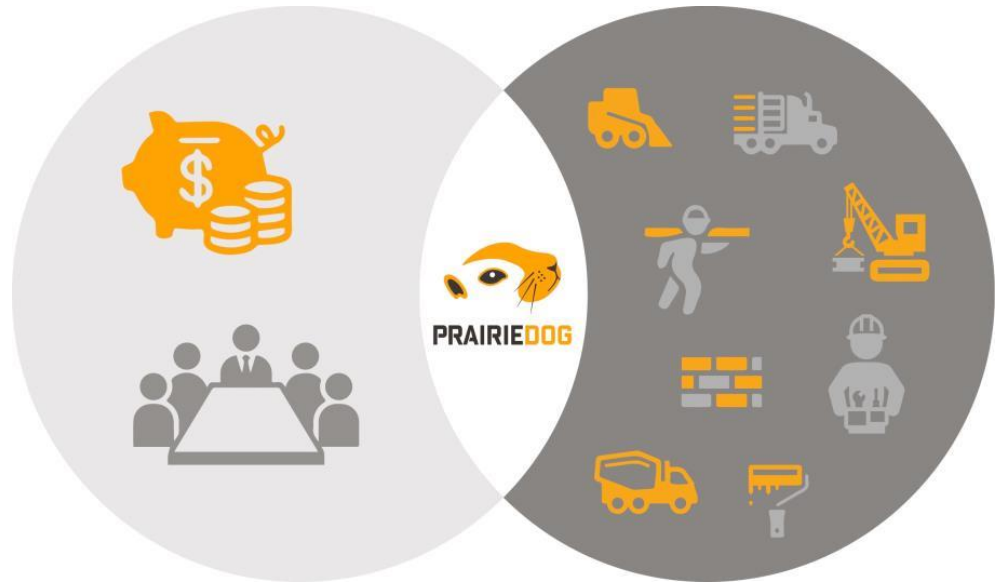


Owner's Total Cost of Ownership (TCO) Impact

- **35%** cost reduction
- **50%** cycle time reduction
- **60%** better ROCE
- **250%** more projects

Plus...

- **300%** more profit for OS2 providers





PRAIRIEDOG


Construction Industry Marketplace and Communication Nexus

Development Plan

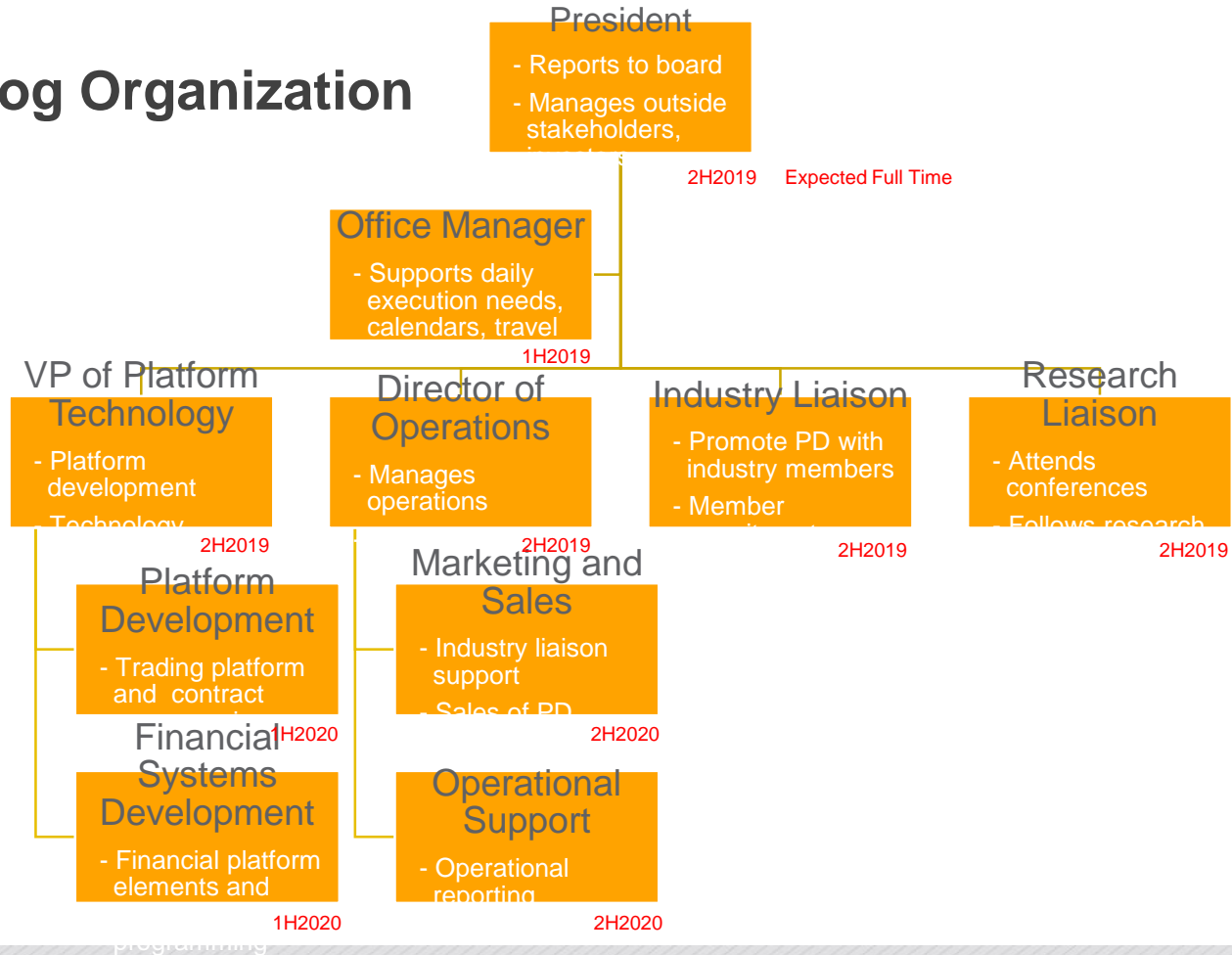
Initial 3-Year Term



PrairieDog Product Development Road Map

	2H 2018	1H 2019	2H 2019	1H 2020	2H 2020	1H 2021
Milestone	<ul style="list-style-type: none"> Summit / Launch IAP 		<ul style="list-style-type: none"> Report RT progress at CURT and CII Annual Conferences 		<ul style="list-style-type: none"> Platform "Live" testing Launch Announcements PrairieDog "presence" at industry events 	
Research	<ul style="list-style-type: none"> Fund PD and IAP Set research priorities 	<ul style="list-style-type: none"> Add RTs and topics Launch first RTs 	<ul style="list-style-type: none"> Active RTs in all four research thrust areas 	<ul style="list-style-type: none"> RTs publish Update research priorities 	<ul style="list-style-type: none"> Expand and continue research 	<ul style="list-style-type: none"> Expand and continue research Update research priorities
Funding	<ul style="list-style-type: none"> Initial IAP-PD member commitments 	<ul style="list-style-type: none"> Increase membership and IAP-PD funding 	<ul style="list-style-type: none"> IAP-PD new member recruiting and funding 	<ul style="list-style-type: none"> IAP-PD new member recruiting and funding 	<ul style="list-style-type: none"> IAP-PD new member recruiting and funding 	<ul style="list-style-type: none"> IAP-PD new member recruiting and funding
Organization	<ul style="list-style-type: none"> Stewardship of PD Partial professional leadership of PD 	<ul style="list-style-type: none"> PD recruiting and hiring Grow RTs Create partnerships 	<ul style="list-style-type: none"> Full professional leadership at PD 	<ul style="list-style-type: none"> Technical team growth Product sales team growth 	<ul style="list-style-type: none"> Full organizational capability 	<ul style="list-style-type: none"> Growth organization Partnering, allied organizations 
Platform	<ul style="list-style-type: none"> Investigate platforms and technology boundaries 	<ul style="list-style-type: none"> Research essentials Develop Functional Requirements Document (FRD) 	<ul style="list-style-type: none"> Initial platform testing (Alpha) Evolve FRD 	<ul style="list-style-type: none"> User testing (Beta) First test project Feature development 	<ul style="list-style-type: none"> Go "Live" PD Platform 	<ul style="list-style-type: none"> Industry capability development 

PrairieDog Organization

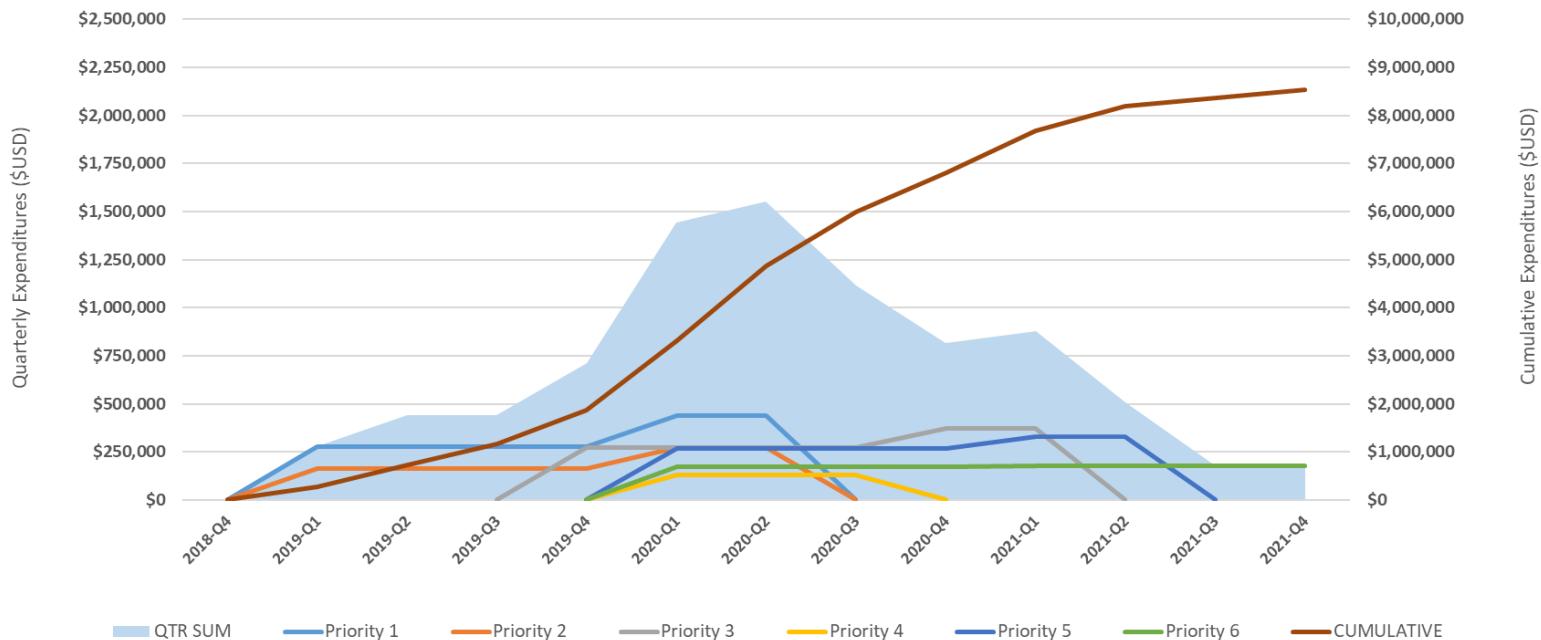


Start-Up Budget ≈ \$22 Million (Initial 3-Year Term)

	2019	2020	2021	Total
R&D and Incubation	\$2.3M	\$6.8M	\$5.9M	\$14.9M
PDVP Management & Staffing	\$0.8M	\$1.2M	\$1.3M	\$3.3M
Commercial Platform Development	\$0	\$0.3M	\$1.9M	\$2.2M
Travel / Legal / Insurance / Other	\$0.3M	\$0.4M	\$0.4M	\$1.1M
Marketing / Communications	\$0.1M	\$0.2M	\$0.2M	\$0.5M
Total	\$3.5M	\$8.9M	\$9.7M	\$22M

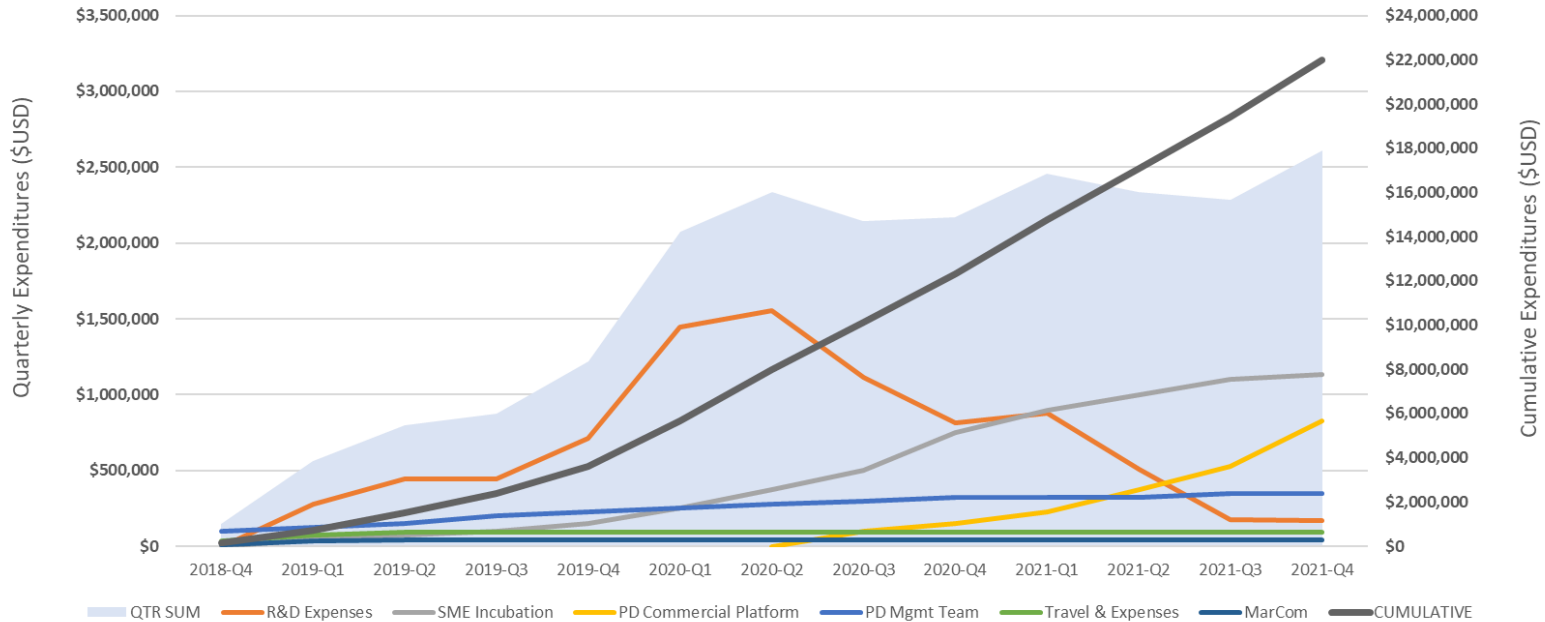
R&D Cash Flow Forecast (Initial 3-Year Term)

OS2 R&D Plan
Cash Flow Requirements by Research Priority
(Initial 3-Year Term)



Overall Cash Flow Forecast (Initial 3-Year Term)

OS2 Overall Development Plan
Cash Flow Requirements
(Initial 3-Year Term)

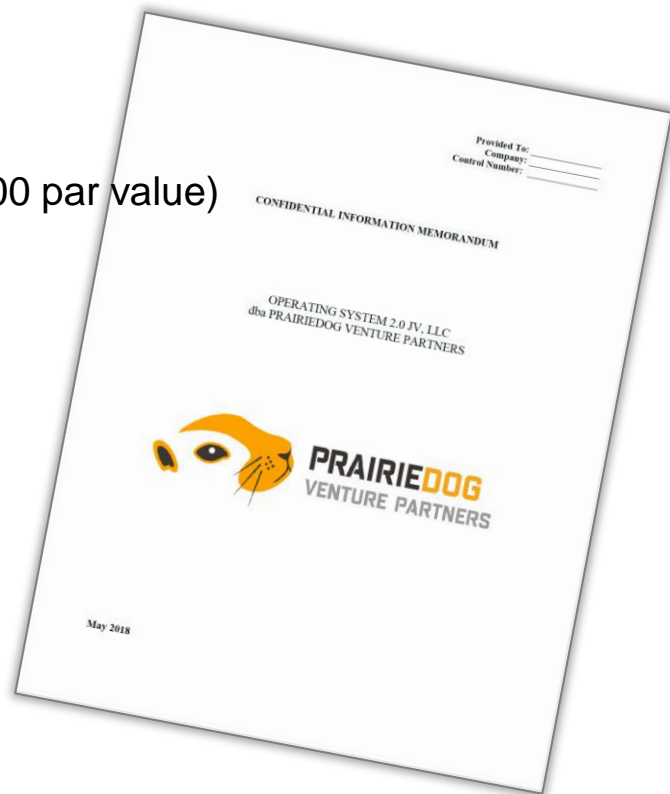


Investor Prospectus

- ❑ The Confidential Information Memorandum is furnished on a confidential basis to a limited number of sophisticated investors for providing certain information about investing in units in Operating System 2.0 JV, LLC.
- ❑ The Confidential Information Memorandum contains confidential, proprietary, trade secret and other commercially sensitive information and should be treated in a confidential manner.
- ❑ It is essential for the OS2 JV to be funded early and fully. This offering is designed to encourage early investment and commitment to the effort.

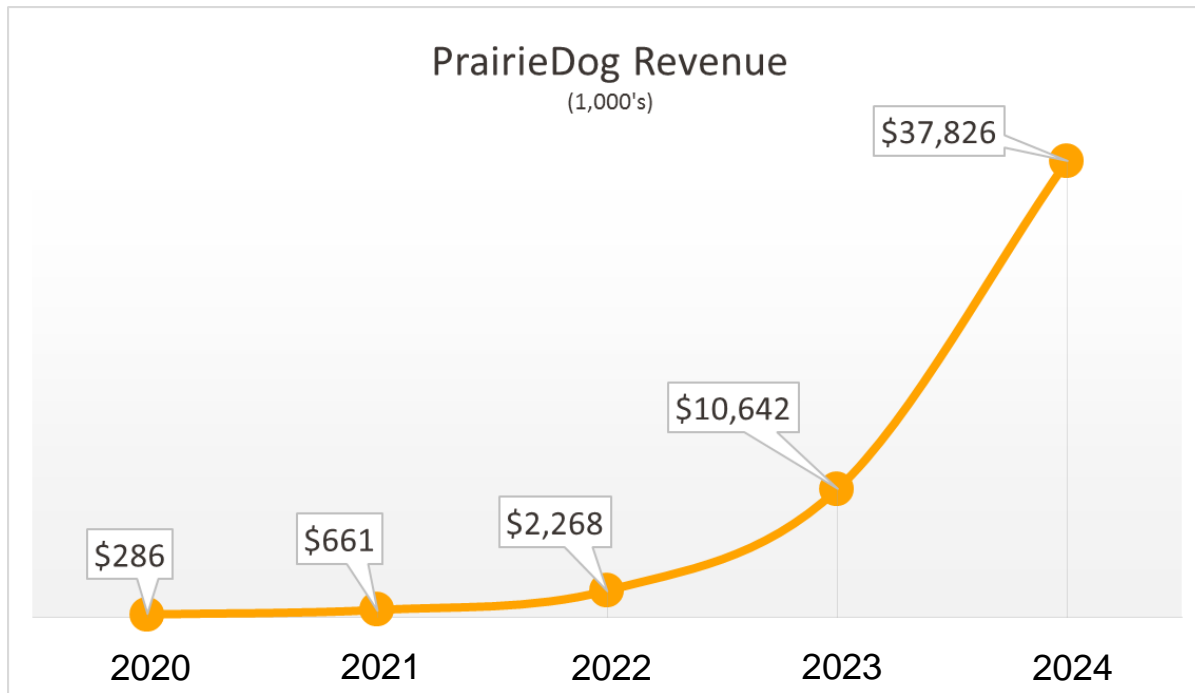
Initial Offering = \$22M USD

- ❑ Preferred Units held by the Founders (CII & CURT)
- ❑ Class A Common Units held by Industry investors (\$1.00 par value)
- ❑ The Company is Board of Managers managed
- ❑ Multiple Investment Levels
 - \$100,000 – Option for certain small organizations
 - \$750,000 – Option for certain small companies
 - \$1.5 Million – Base investment for Owners, EPCs, etc.
 - > \$1.5 Million – Preferred investment
- ❑ Multi-year payment option (minimum 1/3 PMT in 2018)
- ❑ Round 1 Fundraising (currently underway)
- ❑ Minimum Commencement Threshold is \$7.5M USD



Anticipated Revenue Sources

1. Platform Registrations
2. Transactions
3. Royalties
4. Commercial Finance
5. Underwriting
6. Analytics
7. Consulting
8. Other



OS2 Industrial Affiliates Program (IAP)

- ❑ IAPs are a commonly used vehicle to facilitate research in areas of common interest to academia, business, and industry.
- ❑ Supported by multiple companies through a membership fee approach.
- ❑ The OS2 IAP is based at The University of Texas at Austin and is directed by Stephen Mulva, PhD.
- ❑ This particular IAP is focused exclusively on OS2 to support and advance the various OS2 initiatives.
- ❑ PrairieDog Venture Partners is primarily responsible for commercializing the research of the IAP, as applicable.

IAP Benefits

- ❑ First access to industry leading trends in the OS2 research.
- ❑ Access to UT and other university researchers.
- ❑ Pre-Competitive forum to exchange ideas with industry colleagues.
- ❑ Potentially an easier way for companies to invest in OS2.
- ❑ IAP benefits vary by investment level as outlined in the OS2 IAP Commitment Letter.

Declaration of Commitment



Companies & Consortiums Interested / Supporting OS2

OS2 Consortiums

- 1 ABC
- 2 AGC
- 3 AIA
- 4 BRE
- 5 CII
- 6 COAA
- 7 CPF
- 8 CURT
- 9 ECI / CE (EU)
- 10 ECITB (UK)
- 11 EDRC (RSK)
- 12 IMPACT
- 13 LCI
- 14 NAC
- 15 NCCER
- 16 PPI
- 17 Project Norway
- 18 RAPID (DoE/AICHe)

OS2 Companies

- | | | |
|----------------------------|---------------------------|--------------------------------|
| 1 Air Products & Chemicals | 23 ExxonMobil | 45 Mitsubishi Heavy Industries |
| 2 Alberici | 24 General Electric | 46 Odebrecht |
| 3 Andeavor | 25 General Motors | 47 Oneok |
| 4 Autodesk | 26 Gray Construction | 48 Petronas |
| 5 Baker Concrete | 27 Fluor | 49 Pillsbury Law |
| 6 Barton Malow | 28 Hargrove | 50 Procter & Gamble |
| 7 BASF | 29 Haskell | 51 Pioneer |
| 8 Bechtel | 30 Hatch | 52 Praxair |
| 9 Bentley | 31 Hexagon | 53 PTAG |
| 10 BHP | 32 Honeywell | 54 Rockefeller Group |
| 11 Black & Veatch | 33 IBM | 55 Roeslein |
| 12 BMW Constructors | 34 Intelliwave | 56 Rosendin Electric |
| 13 BP | 35 Jacobs | 57 SABIC |
| 14 Brick & Mortar Ventures | 36 Kajima | 58 Saudi Aramco |
| 15 Burns & McDonnell | 37 KBR | 59 Shell |
| 16 Cenovus | 38 Kiewit | 60 Skanska |
| 17 Concord Technologies | 39 LyondellBasell | 61 Southern Company |
| 18 Day and Zimmerman | 40 MAMMOET Canada Western | 62 Suncor |
| 19 Dow | 41 Matrix Service Co. | 63 Stevens Engineering |
| 20 Duke Energy | 42 McKinsey | 64 Tecnimont SpA |
| 21 DuPont | 43 Metrolinx | 65 Victaulic |
| 22 Enbridge | 44 Milestone Capital | 66 WorleyParsons |
| | | 67 Zurich |



*“By the industry,
for the industry”*

Owner Summit #1 – September 13, 2018 (Chicago, IL)

Operating System 2.0 – A Declaration of Commitment

The leaders of the built environment recognize a need to revolutionize the way our industry delivers capital projects and programs. As the custodians of society's infrastructure, we have a responsibility to drive massive improvements in cost, schedule, quality, and safety performance which support the needs of our citizens. This must be done in way that creates value rather than erodes it.

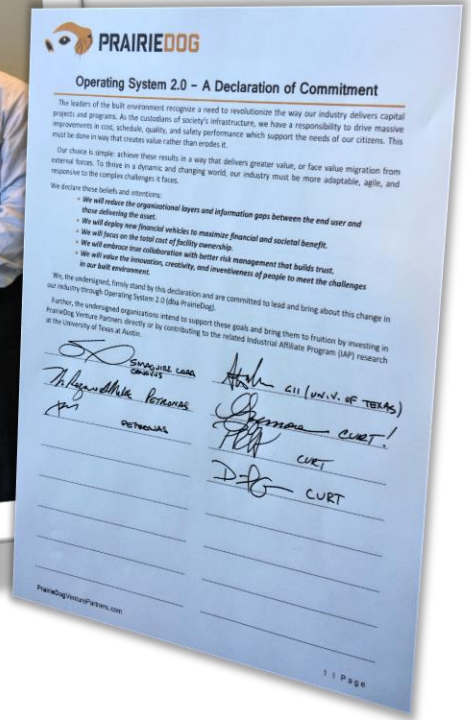
Our choice is simple: achieve these results in a way that delivers greater value, or face value migration from external forces. To thrive in a dynamic and changing world, our industry must be more adaptable, agile, and responsive to the complex challenges it faces.

We declare these beliefs and intentions:

- ***We will reduce the organizational layers and information gaps between the end user and those delivering the asset.***
- ***We will deploy new financial vehicles to maximize financial and societal benefit.***
- ***We will focus on the total cost of facility ownership.***
- ***We will embrace true collaboration with better risk management that builds trust.***
- ***We will value the innovation, creativity, and inventiveness of people to meet the challenges in our built environment.***

We, the undersigned, firmly stand by this declaration and are committed to lead and bring about this change in our industry through Operating System 2.0 (dba PrairieDog).

Further, the undersigned organizations intend to support these goals and bring them to fruition by investing in PrairieDog Venture Partners directly or by contributing to the related Industrial Affiliate Program (IAP) research at the University of Texas at Austin.

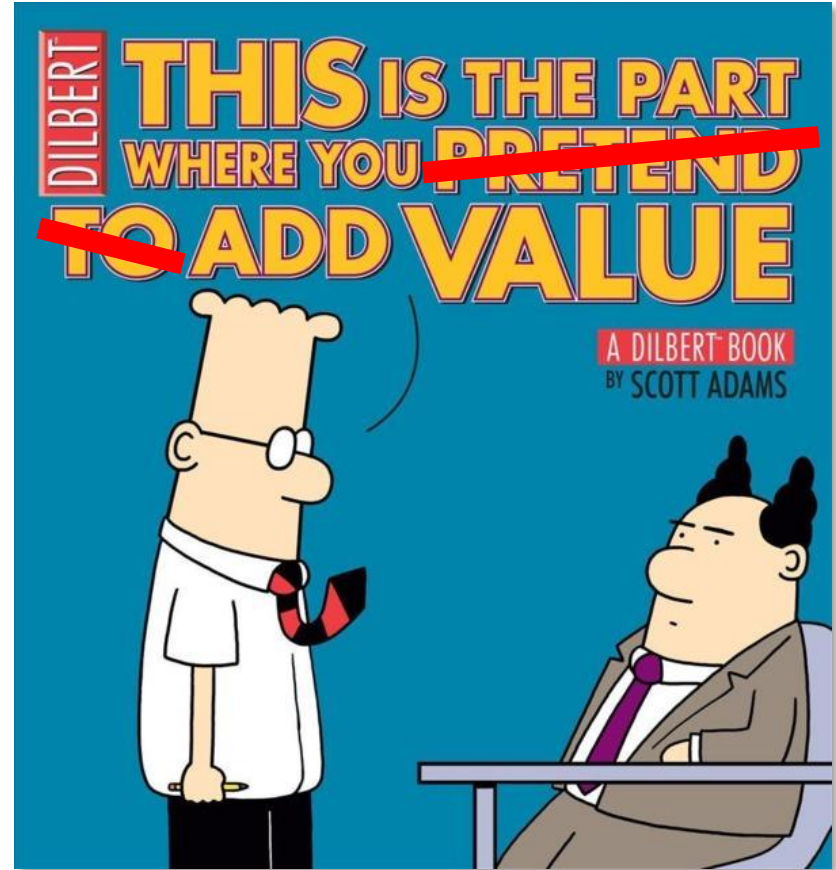


September 13, 2018

Call to Action (Get Involved)!

Questions?

Stephen Mulva, Ph.D.
Director, CII
smulva@cii.utexas.edu
(512) 232-3013



**What benefits might this approach
hold for your businesses?**

**Do you see any downsides to this (OS2)?
If so, what are they?**

Lunch

**A roundtable for Owner Operators
and Investors in the European
engineering & construction sector**

McKinsey&Company

A digital wave in construction – can we ride it to better productivity and outcomes?

BY:

FRANK VON WILLERT, SENIOR PRACTICE MANAGER MAJOR PROJECTS
MCKINSEY & COMPANY

Have we lost critical skills over the past 80 years?

Empire State Building (1931)

- 102 floors
- 381m
- 209.000 m²

Costs

- \$350-600 million
- \$2.000-3.000/m²

Construction time

- 410 days



~~Computer,
3D model,
P6, BIM, PDF,
email~~

1 World Trade Centre (2013)

- 104 floors
- 415m
- 270.000 m²

Costs

- \$3.900 million
- \$14.000/m²

Construction time

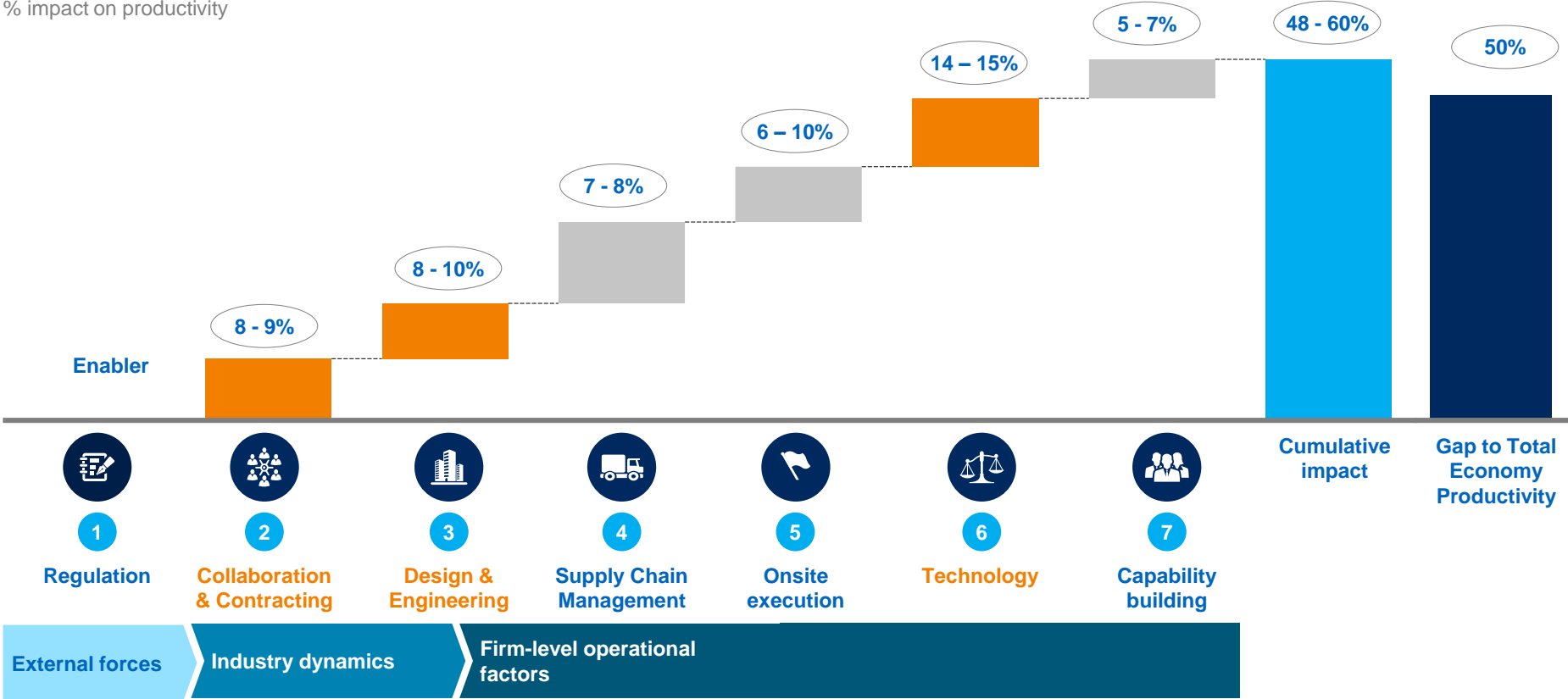
- 3112 days

Computer,
3D model,
P6, BIM, PDF,
email

7 key levers were identified that could improve productivity by 50-60% - Technology being the biggest

Potential global productivity improvement¹ from implementation of best practice

% impact on productivity

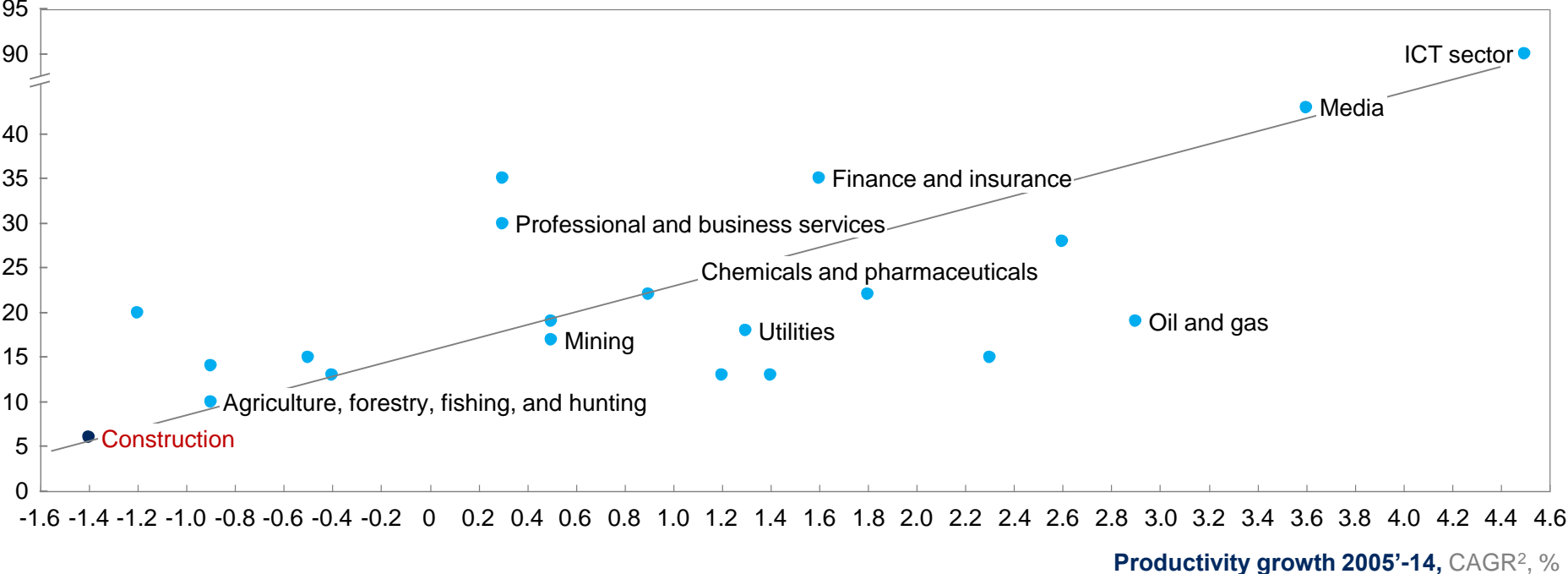


¹ The impact numbers have been scaled down from a best case project number to reflect current levels of adoption and applicability across projects, based on respondents to the McKinsey & Co Global Construction Industry Productivity survey who responded agree or strongly agree to the questions around implementation of the solutions

Productivity and digitization are correlated – and construction is at the low end

Digitization (2015 or latest) vs. Productivity of US industries, %

Digitization index¹, %

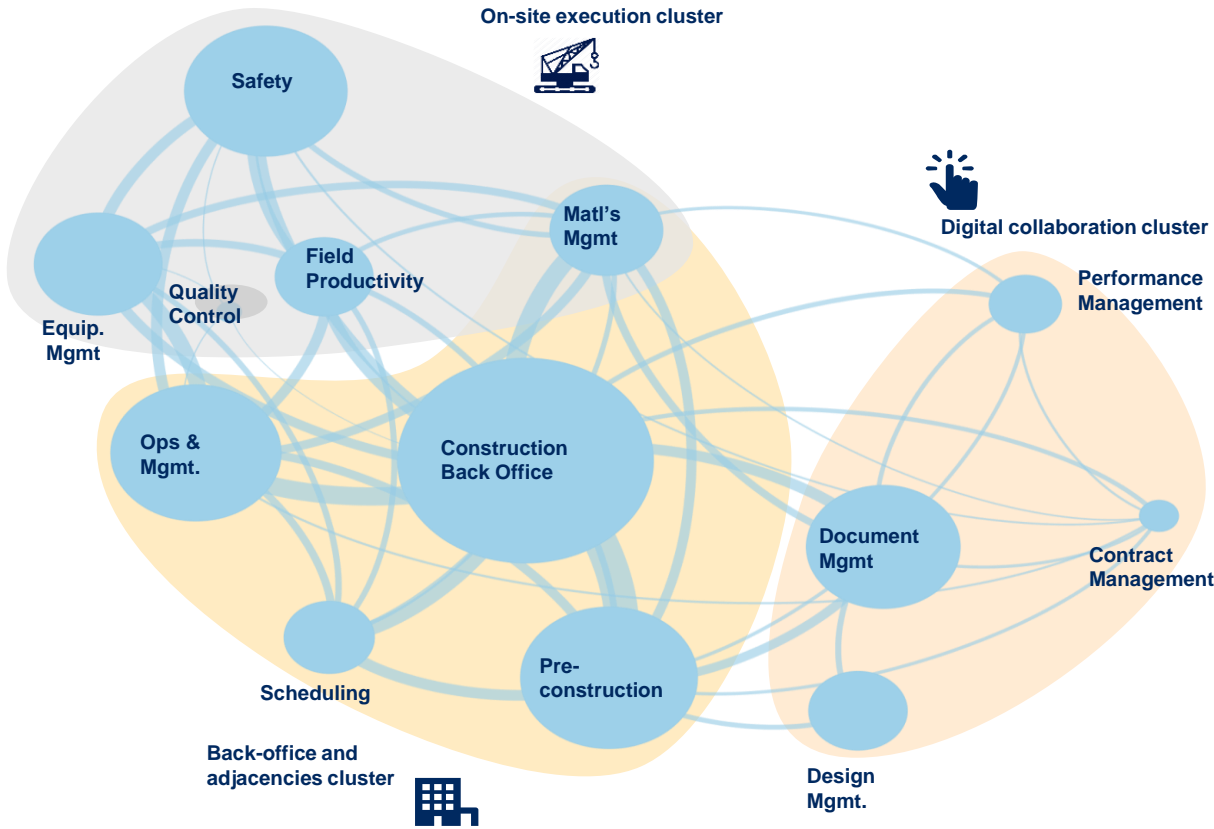


1 Based on a set of metrics to assess digitization of assets (8 metrics), usage (11 metrics), and labor (8 metrics) 2 Compound annual growth rate, 3 Based on data of top 20 E&C companies by market value globally

SOURCE: BEA; BLS; US Census; IDC; Gartner; McKinsey social technology survey; McKinsey payments map; Livechat customer satisfaction report; Appbrian; US contact center decision – makers guide; eMarketer; Bluewolf; Computer Economics; industry expert interviews; McKinsey global institute analysis, Capital IQ, Gartner IT key metrics data 2012

A year ago we mapped the construction technology landscape uncovering 3 clusters of innovation ...

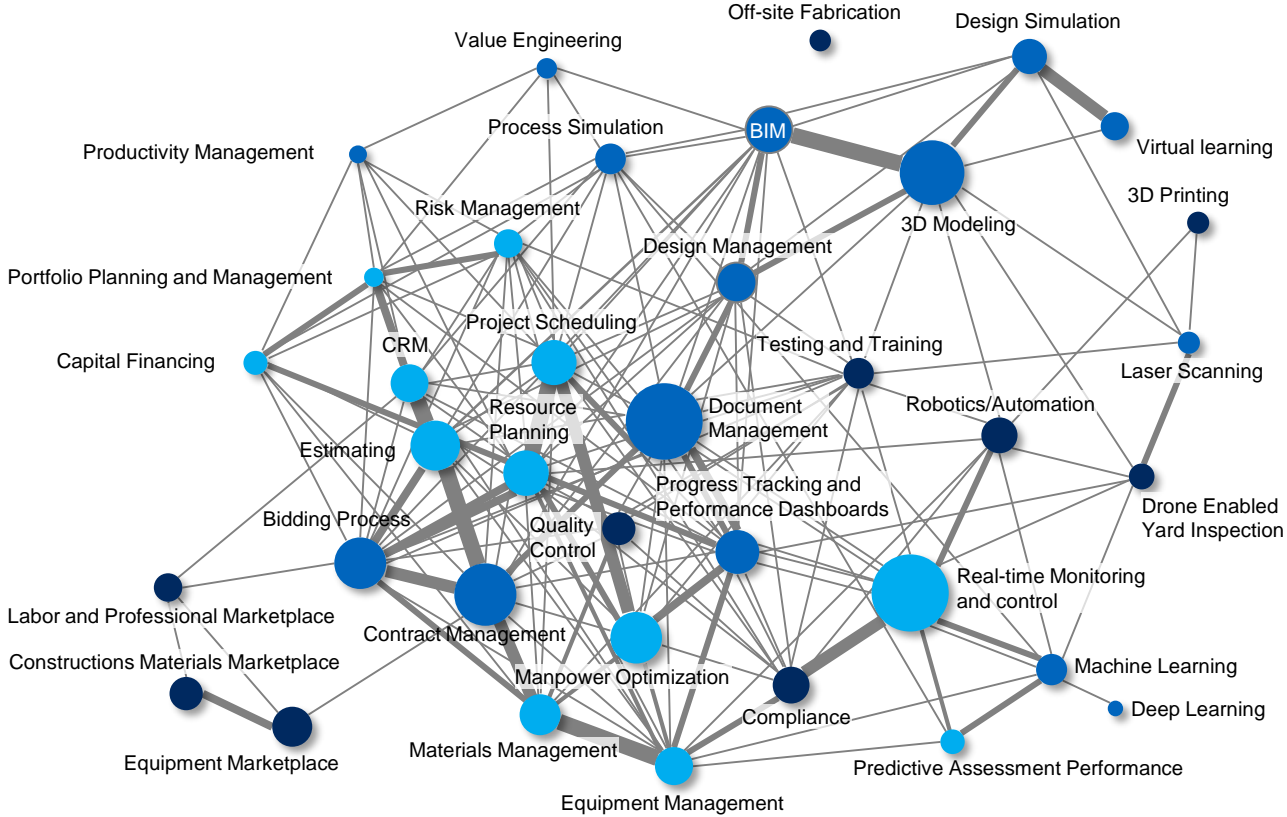
~1,000 firms in the construction phase



Firms		1000
Clusters		3
Investment		\$10B
Geo center of gravity		North America 70%

A year later, the ecosystem looks very different with exciting movement

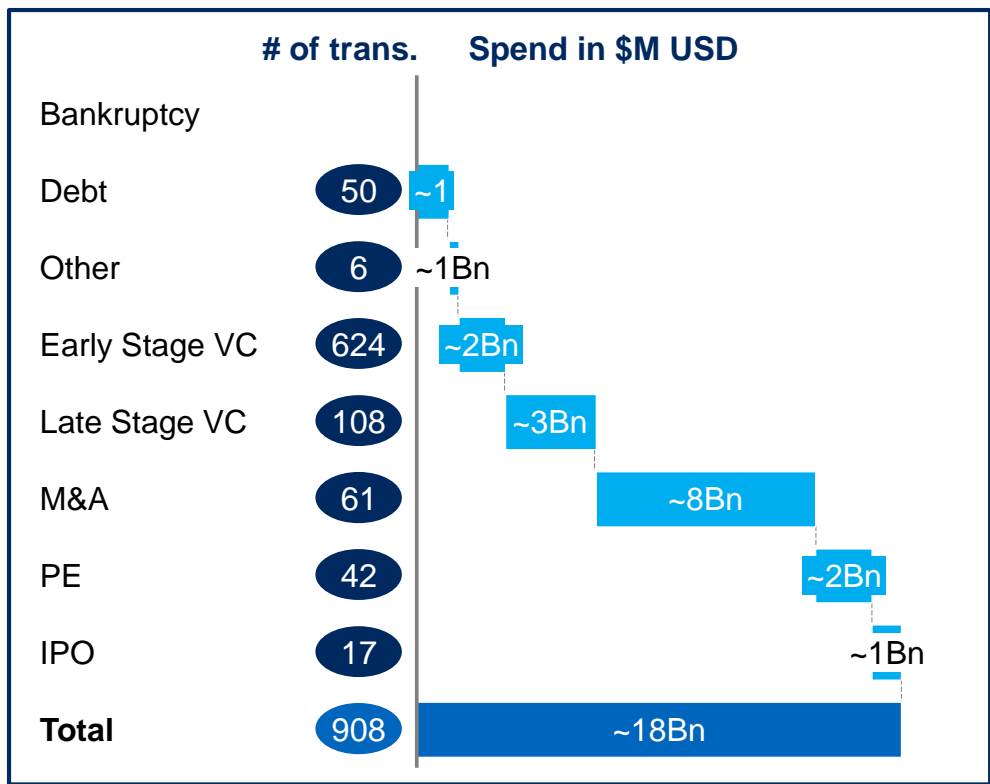
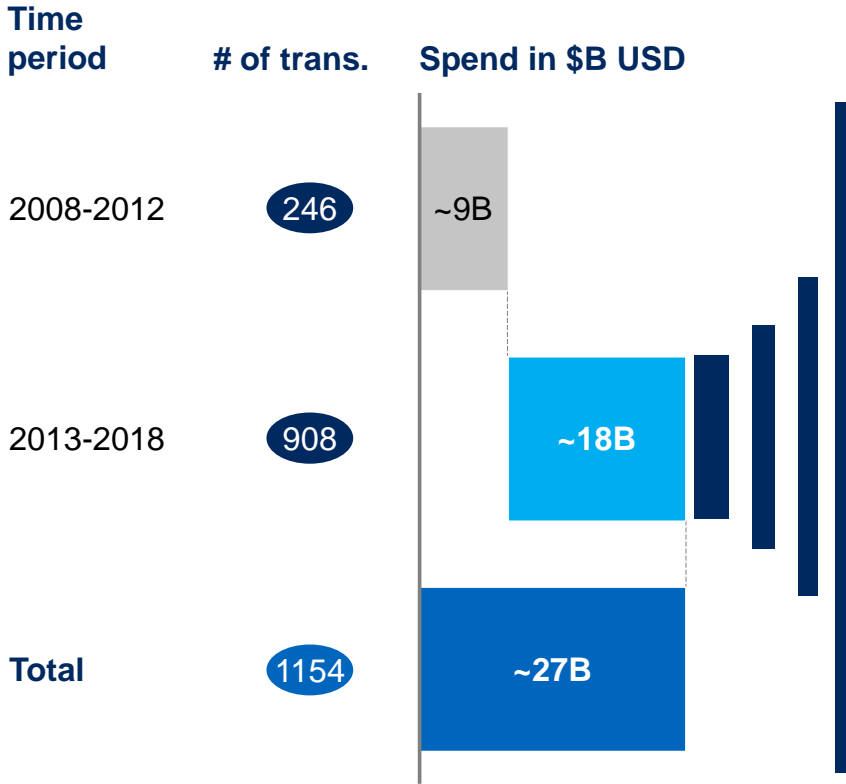
~2,400 firms across the full project lifecycle



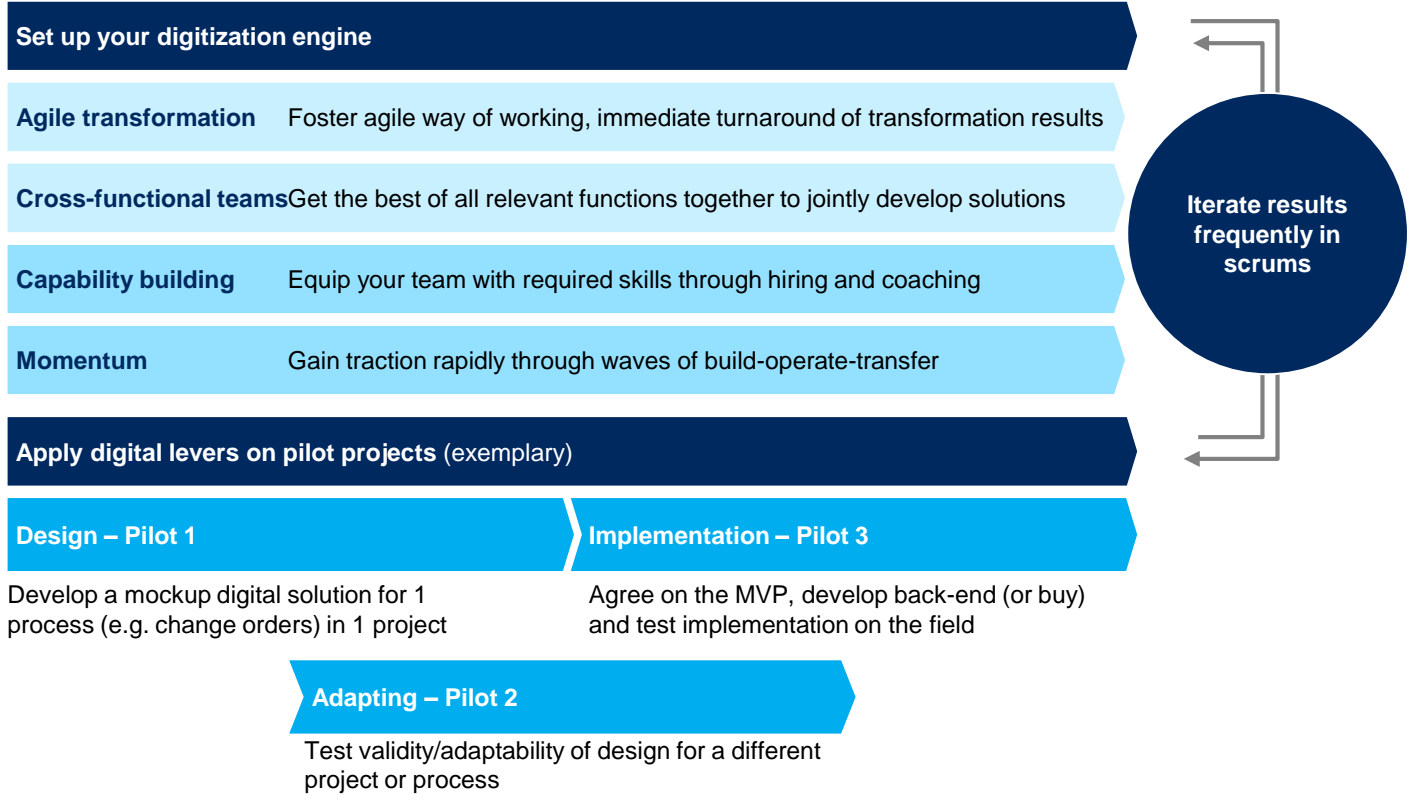
2018
Firms  2400
Clusters  Constellations
Investment  \$18B
Geo center of gravity  North America 85%

Investment in space has doubled over the past decade

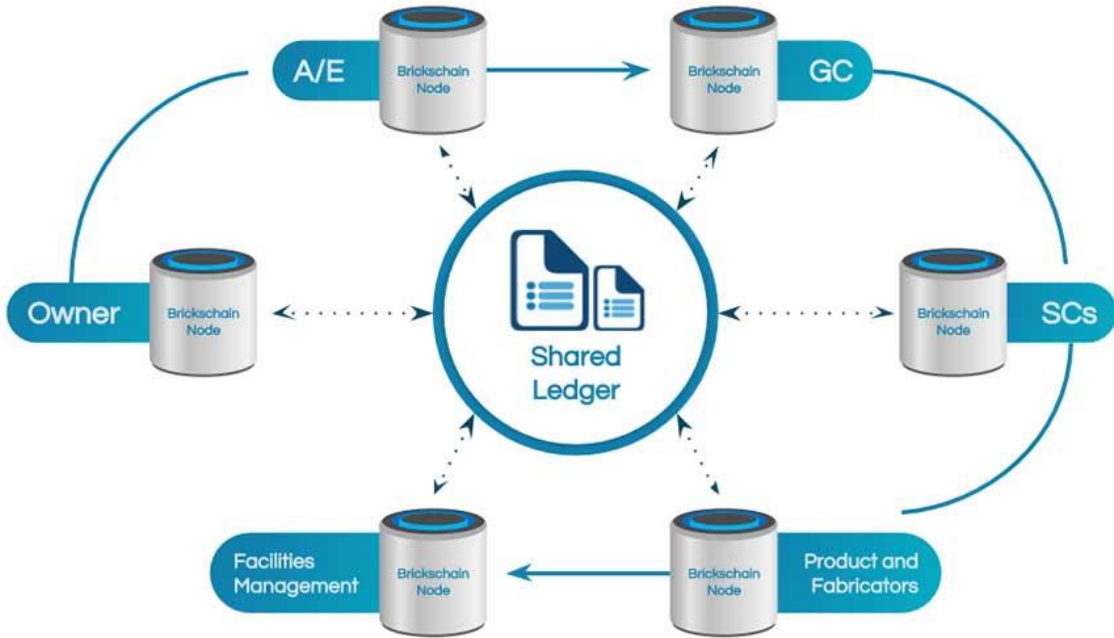
Investment – over time and by type



Digitizing engine and pilot run in parallel to iterate and improve results in an agile transformation approach



A small US based contractor found a possible use case for blockchain and just tried it on a small project



- Collecting project data took a week
- Brickschain nodes were installed on the project's Dropbox and Procore accounts
- The system automatically scraped IFC data about objects contained in the electronic files of the project's 2D plans
- It also captured all submittal transactions using software APIs.



McKinsey & Company



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Frank von Willert

Senior Practice Manager

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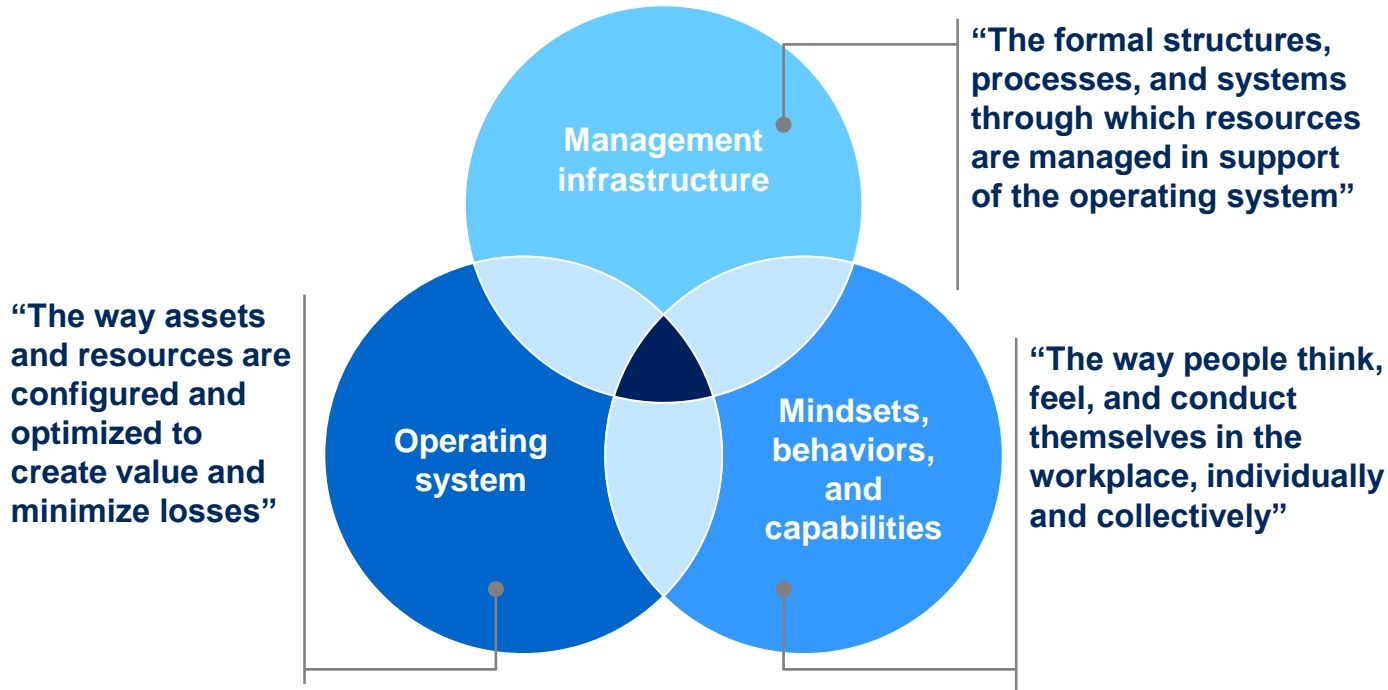
[@McKinsey_CPI](https://twitter.com/McKinsey_CPI)

Latest insights:






<https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights>

Sustainable transformation requires commitment and change across all aspects of the organization



There are a few enablers that will make digital successful in construction delivery

Strong data foundation 	Integrated project management 	Supportive contract strategies 
<ul style="list-style-type: none">▪ Implement one shared data backbone in one system▪ Ensure at least 3D BIM from the start, otherwise amount of later rework will be prohibitive▪ Make data available to all project participants, with upfront agreement from all	<ul style="list-style-type: none">▪ Clarify roles of management of the project, as these will shift with a move to digital▪ Specify owner of, and responsibilities for, the core data and system configuration	<ul style="list-style-type: none">▪ Make digital participation part of the bidding contracts for all project participants▪ Digital project emulates a collaborative contracting setup; leverage in contracts to prevent emergence of claim culture



10 'hard truths' from other sectors for construction

01

Digital transfers disproportionate economic value to customers

02

Barriers between industries are breaking down

03

Winner-takes-all dynamics will spread

04

Stop looking at competitors and focus instead at how supply and demand are changing

05

Fast-following is becoming too slow as agile learning widens the gap

06

Traditional trade-offs are obsolete as transaction costs are going to zero and transparency is increasing

07

Digital natives attack fast, but **incumbents** can respond at scale **to drive disruption even faster**

08

Strategy and execution (especially culture) need to be co-created

09

Incumbents can't choose between transforming the **core or innovating new business models – they need to both**

10

Digital transformations should also be about **operational excellence**, and require cultural and technical transformations at the same time



**“So what are you doing to drive the
digital transformation of your
projects?”**

What is ECI & CII doing?

CII considerations in developing a new business model for our industry (OS2.0)

- 1) Transitioning to a leasing model
- 2) Making tax laws work for the industry's advantage
- 3) Global sourcing and transfer pricing
- 4) New accounting methods
- 5) Flexible approach to capital markets and investment
- 6) Equity participation in asset creation
- 7) Large risk insurance / reinsurance / surety and bonding
- 8) New credit facilities
- 9) Agile approach to design / digital twin / generative design and process simplification
- 10) Workforce of the future
- 11) Modern production methods including miniaturization
- 12) Optimal and real-time partner selection
- 13) Supply chain rationalization
- 14) Contract simplification
- 15) Asset crowdsourcing
- 16) Cloud-enabled, thin platform

ECI priorities in support of 'Prairie Dog'

Output of the May 2018 members forum held in London:

- Investors' views
- Digitalisation
- Sustainability



Where do we go from here?

“How can the supply network work together better to address capital efficiency as the Number 1 challenge facing the industry?”

“During this workshop, what if anything has changed regarding your views about changes to the way capital projects are delivered”

**“Who would like their company to be
involved in the ECI / CII
programme?”**

Contact us

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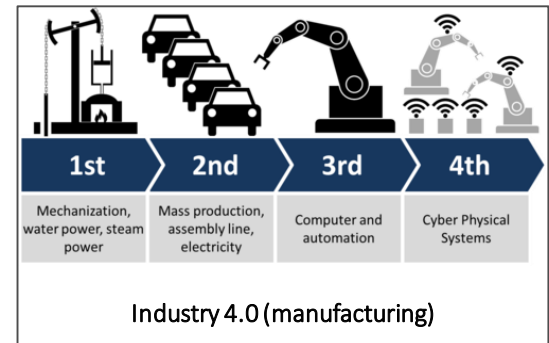
**A roundtable for Owner Operators
and Investors in the European
engineering & construction sector**

McKinsey&Company

Close

Introducing OS2.0 ('Prairie Dog')

- Initiated by our partner organisation CII (Construction Industry Institute of Texas University)
- A major applied research and development programme
- Emulating Industry 4.0 for the engineering construction sector



“Rethinking how capital programmes are delivered”

Amsterdam, Feb 2018

Operating System 2.0 from CII (OS2.0 or ‘Prairie Dog’)

86% of participants supportive or strongly supportive

45% unsure whether their organisations are well placed to take advantage

Commercial model was most critical aspect (56%)



Opportunities

- **Owners:** 50% cost saving needed. Data and transparency across supply chain is key.
- **EPCs:** collaboration, standardisation and efficiency as well as focus on whole life value rather than just operating costs.
- **Manufacturers and vendors:** greater standardisation and innovation alongside a share in both risk & return. Also leasing proposals.
- **Demand-side consultants:** greater reward for industry based on long-term project success and rewards for innovation. Long-term relationships, continuity of work, portfolio so that lessons learned can be applied on future projects
- **Supply-side consultants:** reduced friction and lower costs of entry, transparency and fit and greater organisational memory.
- **Academics:** Align industry to small number of key success factors and then work together on these. Create space for academic involvement. Robust baseline and measurement over time



What will it take to make a difference?

- **Finance** - create a demonstrable platform to show what people will get when they invest.
- **Behaviours** – need to build trust across the supply chain from the top down, existing hierarchies often prohibits trust.
- **Trust** – create an industry structure that supports move to more granularity and transparency e.g. the way Amazon has done in the grocery sector.
- **Shared Gains** - common targets & incentivisation with a single integrated project team sharing risk and reward – the current contractual model does not support this.
- **Big Data** – effective data management and sharing will create transparency and enable new entrants into the industry and create more investment. There is an opportunity to explore and de-mystify activities such as block-chain.
- **Mindset** – more than a procurement framework, it needs to include a contractual, legislative and collaborative framework. This requires client leadership to deliver and drive.
- **Leadership** – needs to be defined and often comes from crisis.
- **Collaboration** – projects such as Heathrow T5 and the Olympic Park demonstrate the value of collaboration. Owners need to be educated to mandate change and not drive down costs and create an adversarial environment.
- **Receptiveness** – collaborative leadership is the right leader at the right time, who is receptive to change. Have companies contracted out too much leadership?
- **Benchmarking** – Look at the business context, careful not to misuse benchmarking data, especially on project costs.



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