

COGENCE Alliance

Owners + Architects + Engineers + Contractors

Inspire. Educate. Unite.

Realize The Strategic Advantage Of Integrating Technology

11 September 2019



Mission + Purpose

Cogence *(Latin)*

“To drive together” or “Thinking that is well organized”

The purpose of the Alliance is to bring Owners and Developers, Architects and Engineers, Construction Managers and Contractors, and Allied Industry Professionals together to **advocate** and be a **resource** for improved project delivery.

For more information visit us at www.cogence.org

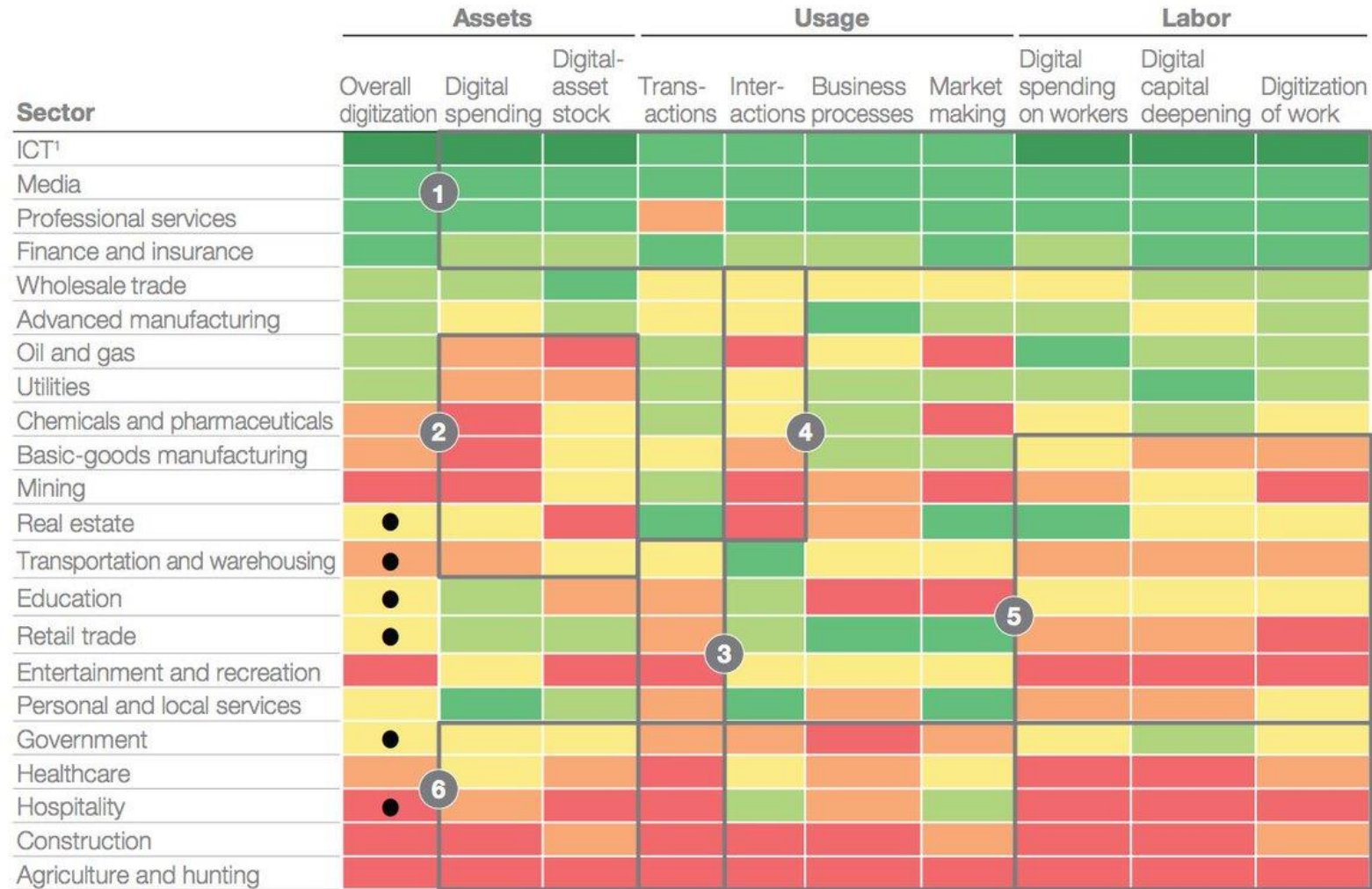
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Agenda

- **Current State – Illustrating the Business Case for Technology**
- **Strategic Decisions – Leadership's Role**
- **Ideal Future State of Industry**



Industry Digitization Index



Relatively low digitization  Relatively high digitization

● Digital leaders within relatively undigitized sectors

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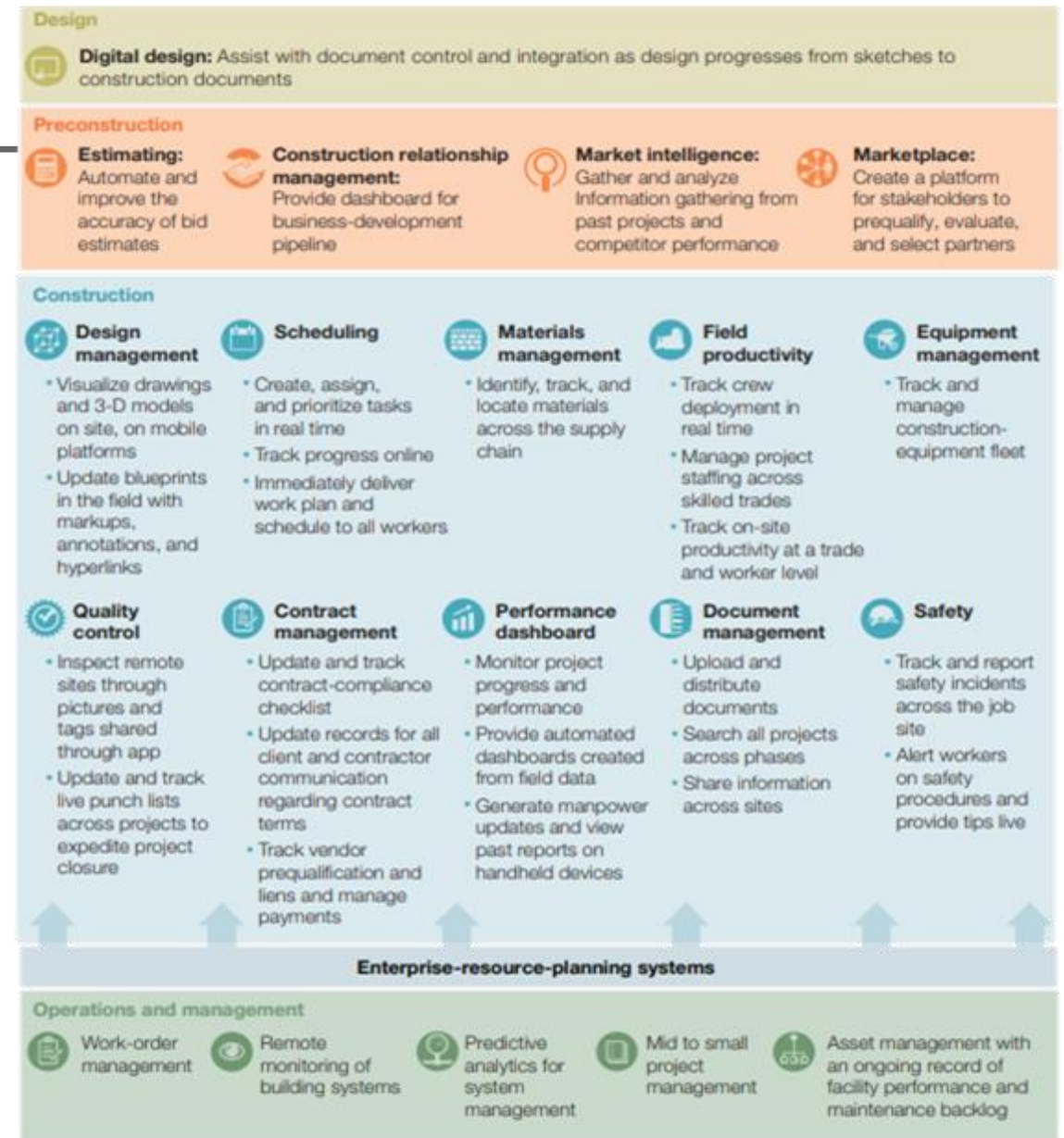
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Construction-Technology

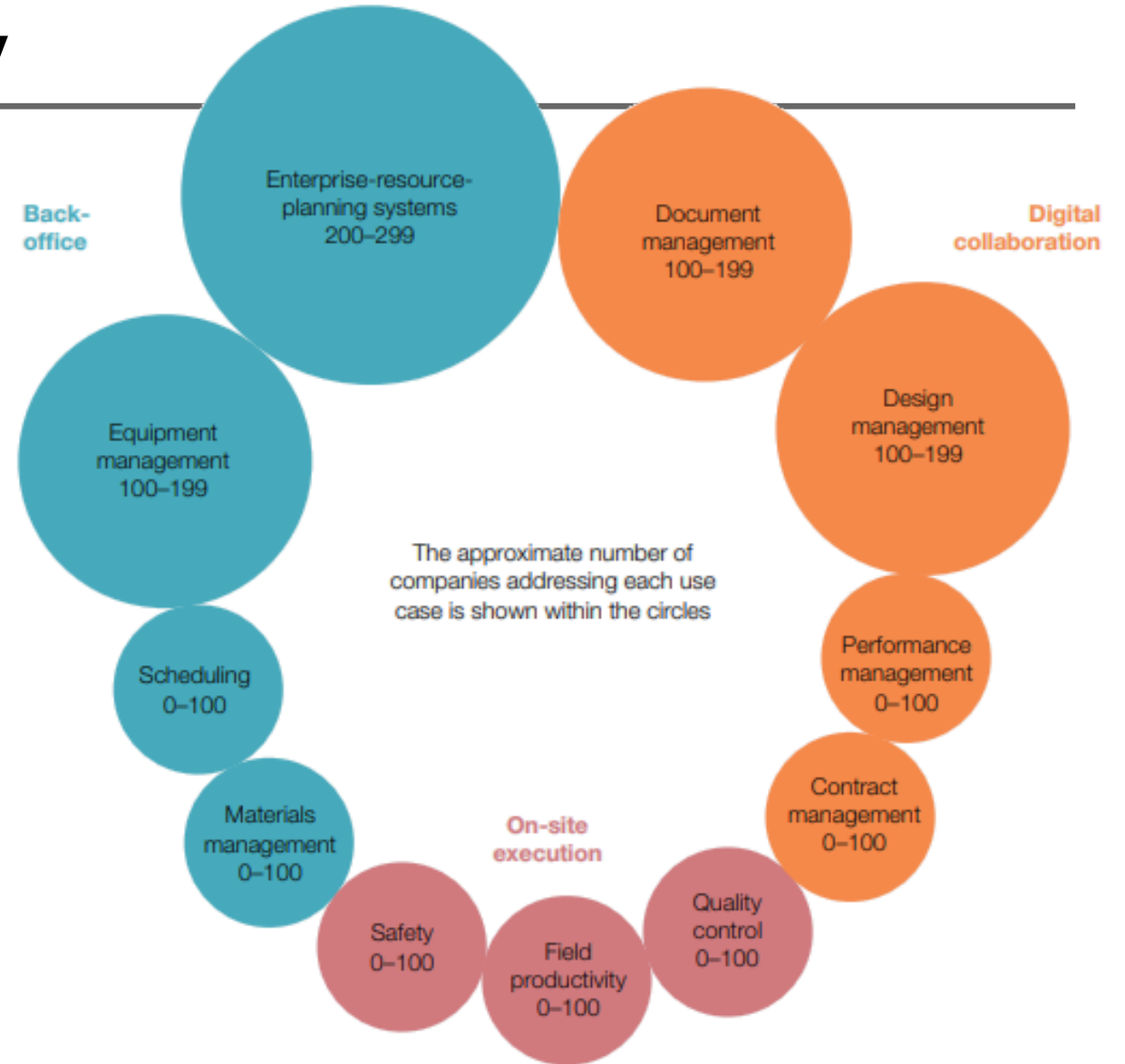
Use Cases Span the Entire Project Lifecycle





Construction-Technology

Use Cases Span the Entire Project Lifecycle

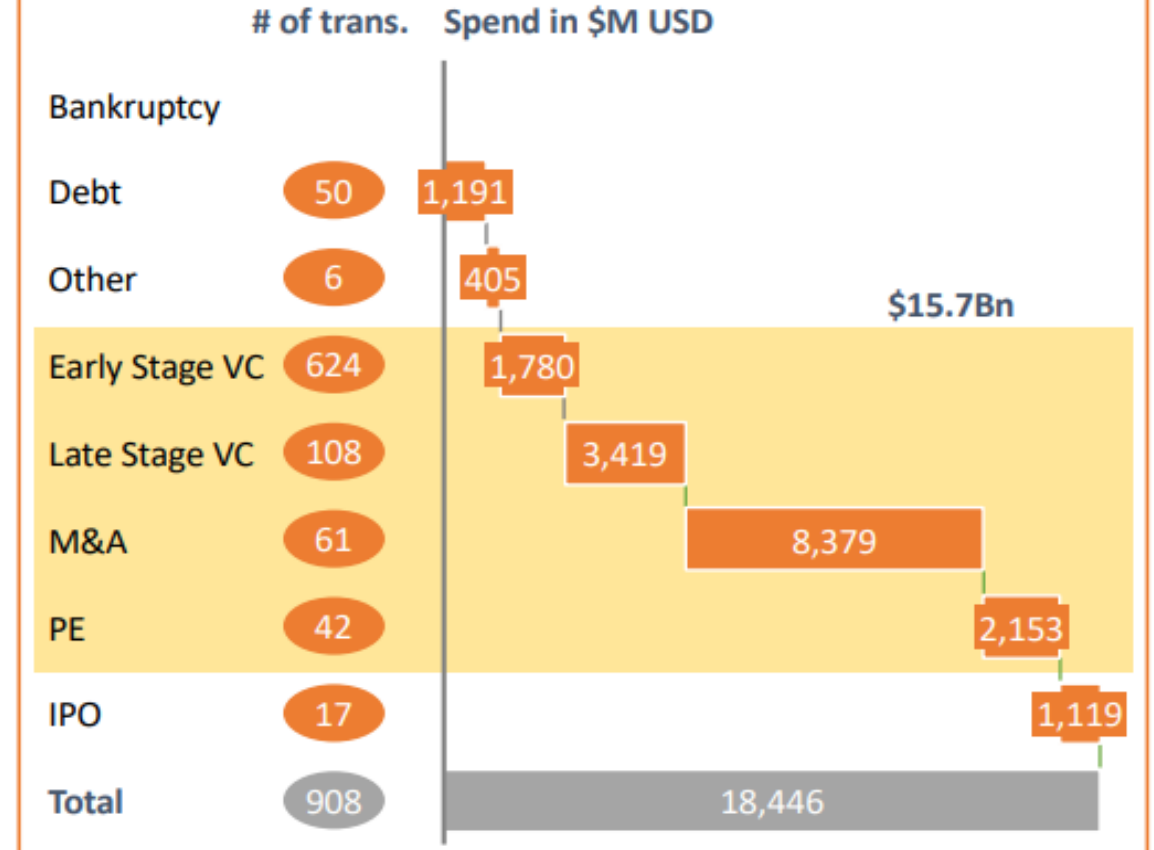
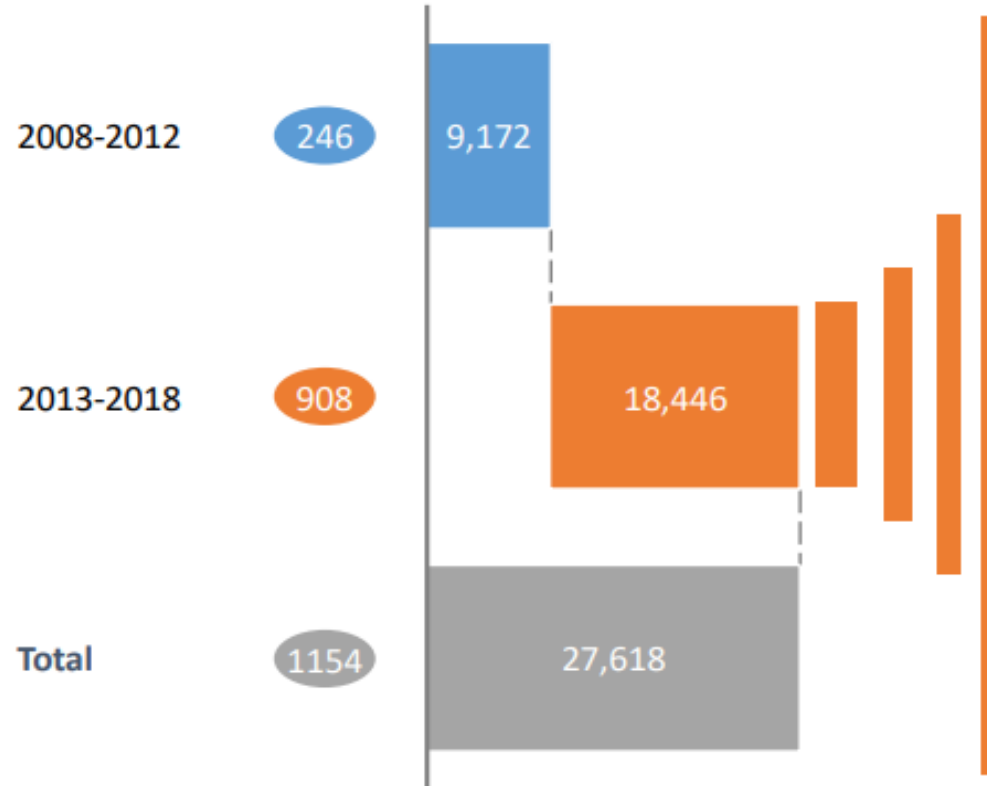




Investment in Construction Technology

Investment – over time and by type

Time period # of trans. Spend in \$M USD



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How has
technology
improved
your
productivity?

Share some
thoughts on
the current
state of
technology?



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STRATEGIC DECISIONS

Leadership's Role To Empower The Team



D-I-K-W



DATA



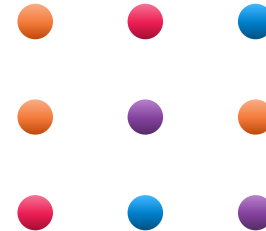
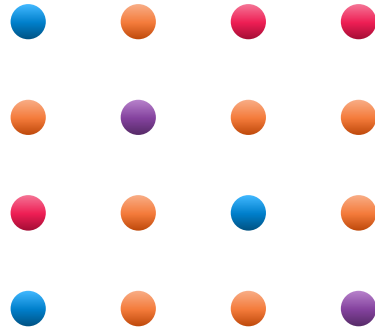
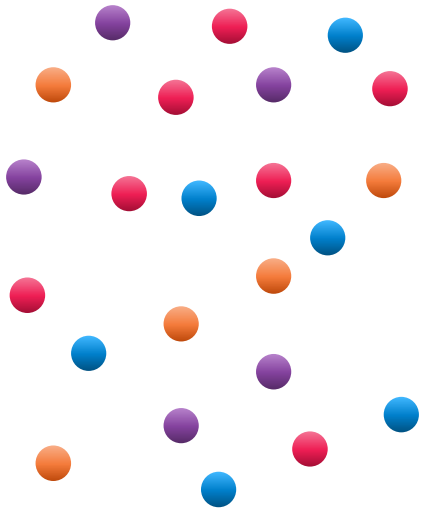
INFORMATION



KNOWLEDGE



WISDOM



INDECISION

DELIBERATION

DECISION

ACTION

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Top Down | Bottom Up



Top Down

- Owner Driven Decisions
- Loudest Voice in the Room

Bottom Up

- Everyone uses their own solution
- Information stays siloed or requires a lot of data manipulation



Evaluation of Technology Solutions

Evaluation of Cost & Benefit Factors of Construction Technology

Cost Factors

Initial
Investments

Operating
Costs

Maintenance
Costs

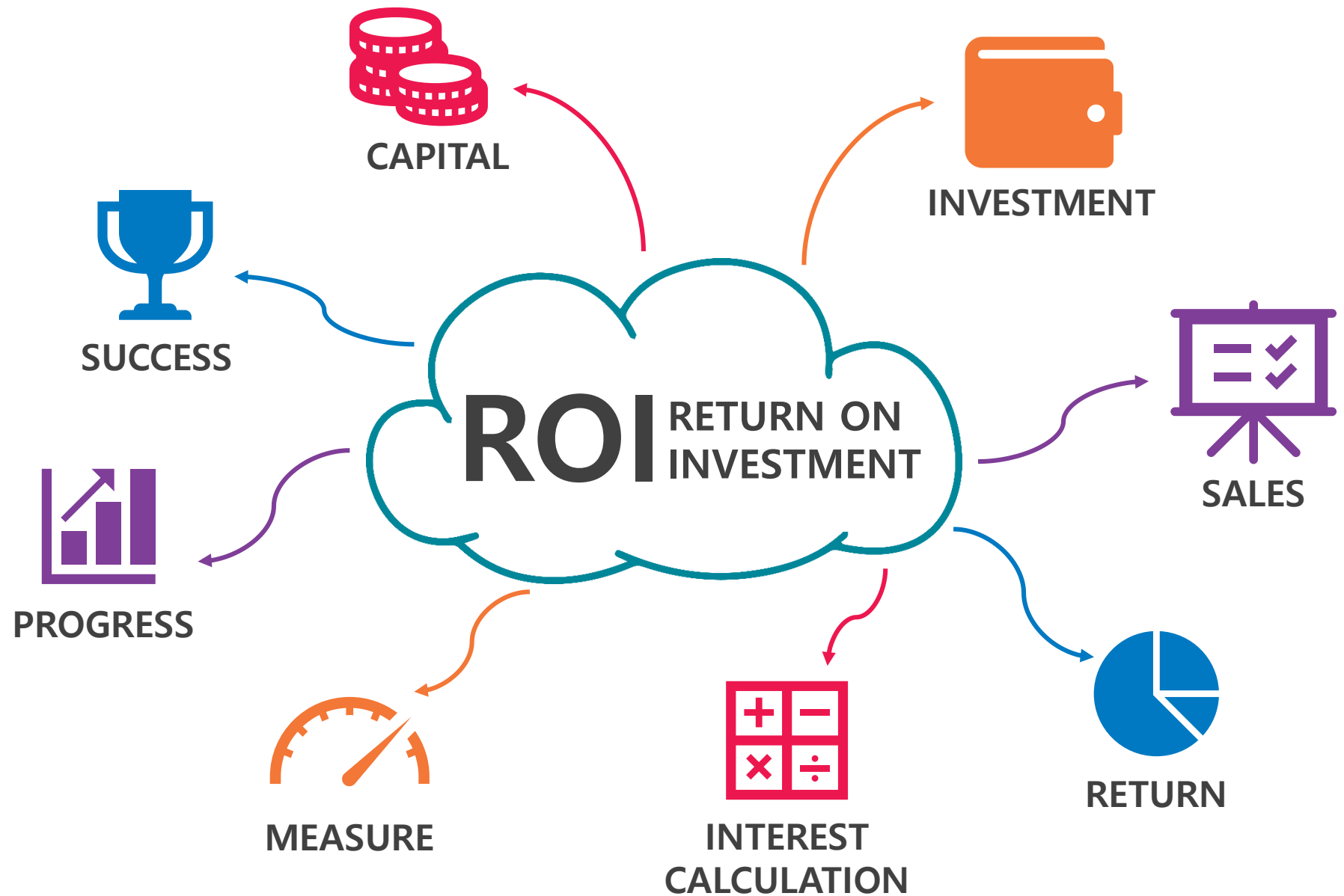
Benefit Factors

Cost Benefits

Operational
Benefits

Strategic
Benefits

How
much
ROI is
needed?





Choosing By Advantage

DECISIONS MUST BE BASED ON THE
IMPORTANCE OF ADVANTAGES

*a beneficial difference
between alternatives*

*how much the stakeholders
care about that difference*



Choosing By Advantage

TOPIC
Choosing by Advantages Study
Mobile Field Applications

Alternative #1
PLANGRID

Alternative #2
AUTODESK BIM 360

Alternative #3
BLUEBEAM STUDIO

Factor #1 - Speed of Drawing Upload - Desktop

Criteria: Time to upload into the application.

ATTRIBUTE	Upload 36 drawings between 5 discipline folders in 5 minutes	Upload 36 drawings between 5 discipline folders in 3 minutes	Upload 36 drawings between 5 discipline folders in 1.5 minutes
ADVANTAGE	SLOWEST	MODERATE	FASTEST
SCORE (10)	0	0	10

Factor #2 - Speed of Drawing Rendering - Mobile

Criteria: Time to display the drawings on the mobile device (Wi-Fi signal assumed)

ATTRIBUTE	46 seconds to sync and open drawing. Seamless after initial download	Varying duration to sync and 1 min to open drawing initially. Seamless after initial download	3 min to sync and 1 min to open drawing initially. Seamless after initial download
ADVANTAGE	FASTEST		
SCORE (10)	10	0	0

Factor #3 - Automatic Creation of Hyperlinks

Criteria: Program automatically creates hyperlinks on plans to elevation, section and detail sheets.

ATTRIBUTE	YES	NO	NO
ADVANTAGE	YES		
SCORE (10)	10	0	0



Choosing By Advantage

Choosing by Advantages Study

Mobile Field Applications

	Alternative #1 PLANGRID	Alternative #2 AUTODESK BIM 360	Alternative #3 BLUEBEAM STUDIO
Factor #1 - Speed of Drawing Upload - Desktop Criteria: Time to upload into the application.			
ATTRIBUTE	Upload 36 drawings between 5 discipline folders in 5 minutes	Upload 36 drawings between 5 discipline folders in 3 minutes	Upload 36 drawings between 5 discipline folders in 1.5 minutes
ADVANTAGE	SLOWEST	MODERATE	FASTEST
SCORE (10)	0	0	10
Factor #2 - Speed of Drawing Rendering - Mobile Criteria: Time to display the drawing on a mobile device with Wi-Fi signal.			
ATTRIBUTE	46 seconds to sync and open drawing. Seamless after initial download	Varying duration to sync and 1 min to open drawing initially. Seamless after initial download	3 min to sync and 1 min to open drawing initially. Seamless after initial download
ADVANTAGE	FASTEST		
SCORE (10)	10	0	0
Factor #3 - Automatic Creation of Hyperlinks Criteria: Program automatically creates hyperlinks on plans to elevation, section and detail sheets.			
ATTRIBUTE	YES	NO	NO
ADVANTAGE	YES		
SCORE (10)	10	0	0



Choosing By Advantage

Choosing by Advantages Study

Mobile Field Applications

Alternative #1
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Factor #1 - Speed of Drawing Upload - Desktop
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FACTOR & CRITERIA

ATTRIBUTE	Upload 36 drawings between 5 discipline folders in 5 minutes	Upload 36 drawings between 5 discipline folders in 3 minutes	Upload 36 drawings between 5 discipline folders in 1.5 minutes
ADVANTAGE	SLOWEST	MODERATE	FASTEST
SCORE (10)	0	0	10

Factor #2 - Speed of Drawing Rendering - Mobile
Criteria: Time to display the drawings on the mobile device (Wi-Fi signal strength)

FACTOR & CRITERIA

ATTRIBUTE	46 seconds to sync and open drawing. Seamless after initial download	Varying duration to sync and 1 min to open drawing initially. Seamless after initial download	3 min to sync and 1 min to open drawing initially. Seamless after initial download
ADVANTAGE	FASTEST		
SCORE (10)	10	0	0

Factor #3 - Automatic Creation of Hyperlinks
Criteria: Program automatically creates hyperlinks on plans to elevating section and detail sheets.

FACTOR & CRITERIA

ATTRIBUTE	YES	NO	NO
ADVANTAGE	YES		
SCORE (10)	10	0	0



Choosing By Advantage

Choosing by Advantages Study

Mobile Field Applications

Alternative #1
PLANGRID

Alternative #2
AUTODESK BIM 360

Alternative #3
BLUEBEAM STUDIO

Factor #1 - Speed of Drawing Upload - Desktop

Criteria: Time to upload into the application.

ATTRIBUTE	Upload 36 drawings between 5 discipline folders in 5 minutes	Upload 36 drawings between 5 discipline folders in 3 minutes	Upload 36 drawings between 5 discipline folders in 1.5 minutes
ADVANTAGE	SLOWEST	Moderate	FASTEST
SCORE (10)	0	5	10

Factor #2 - Speed of Drawing Rendering - Mobile

Criteria: Time to display the drawings on the mobile device (Wi-Fi signal assumed)

ATTRIBUTE	46 seconds to sync and open drawing. Seamless after initial download	Varying duration to sync and 1 min to open drawing initially. Seamless after initial download	3 min to sync and 1 min to open drawing initially. Seamless after initial download
ADVANTAGE	FASTEST	Moderate	SLOWEST
SCORE (10)	10	5	0

Factor #3 - Automatic Creation of Hyperlinks

Criteria: Program automatically creates hyperlinks on plans to elevation, section and detail sheets.

ATTRIBUTE	YES	NO	NO
ADVANTAGE	YES	Moderate	SLOWEST
SCORE (10)	10	5	0

What are
some of
your pain
points?



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Project Management Solution :: Use Cases (Factors)

- Bidding / Financials
- Drawings / Documents
- Models
- Submittals
- Commitments / Tasks
- Quality Assurance
- Sustainability
- Inspections
- Issues in the Field
- Punch List
- RFI's
- Safety
- Change Events
- Photos
- Daily Logs
- Directory



Project Management Solution :: Use Cases (Factors)



Define Criteria

What are the ideal attributes you would like to see?

Prioritize Factors

3 Tier Ranking System – Low, Medium & High



Poll Subject Matter Experts

Reach out to Most Knowledgeable Persons for feedback on specific Criteria



Analyze Results

Finalize optimal combination of solutions



Project Management Solutions

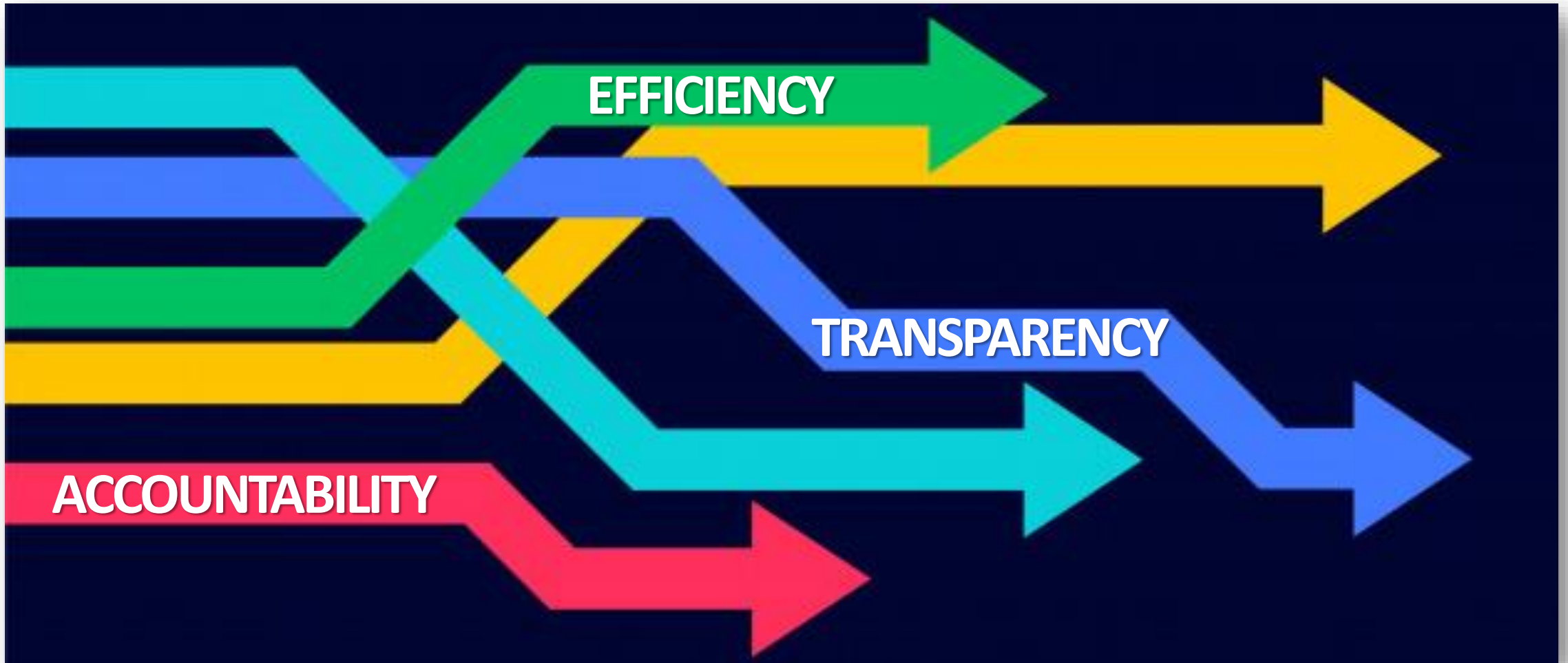
Analysis of Technology Solutions			Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Use Cases for Project Management Technology Solutions		Weight (3 Tiers)	CMiC	ProCore	BIM 360 Build	NewForma	O365	E-Builder	PlanGrid	Constructware
Factor	Bidding / Financials	Tier 1 - High Priority								
Criteria	Bidding & Bid Management (Building Connected, with e-builder notification) - Financials (CMiC) Ease of Use		BEST	GOOD	N/A	N/A	GOOD	GOOD	N/A	GOOD
Factor	Drawings & Documents	Tier 1 - High Priority								
Criteria	Accessible, Simple and Intuitive to look through drawings. Collaborative effort where ALL partners can upload documents to a centralized solution. PlanGrid will be used for Document		GOOD	BETTER	BETTER	GOOD	GOOD	BETTER	BEST	GOOD
Factor	Model Integration	Tier 1 - High Priority								
Criteria	VDC information accessible to team and integrated into project management solution. Super critical integration, all content will be modeled - trade partners might need some coaching.		N/A	N/A	BEST	N/A	N/A	N/A	N/A	GOOD
Factor	Submittals	Tier 1 - High Priority								
Criteria	Create, Send (via workflows across companies) and Track Status. Centralized, seamlessly process. Ease of use, reduce duplication of efforts. Owner requiring use of E-Builder for		GOOD	BETTER	GOOD	GOOD	GOOD	OWNER REQ.	N/A	N/A
Factor	Commitments / Tasks	Tier 2 - Medium Priority								
Criteria	Managing and visualizing commitments with ability to Track Status. Pull planning will continue. Tasks currently being managed with multiple solutions.		N/A	BETTER	BETTER	N/A	GOOD	GOOD	N/A	GOOD
Factor	Quality Assurance	Tier 1 - High Priority								
Criteria	Ease of Use, a lot of stakeholders will be engaged with this effort. Focused group of QC efforts. There could be a lot of overlap between solutions...		GOOD	BETTER	BEST	N/A	GOOD	BETTER	GOOD	GOOD
Factor	Sustainability	Tier 3 - Low Priority								
Criteria	LEED Certified project, material tracking, could be painful... Possible WELL certification.		N/A	GOOD	GOOD	N/A	GOOD	GOOD	GOOD	GOOD
Factor	Inspections	Tier 2 - Medium Priority								
Criteria	Visibility of AHJ Inspections, portion of overall QC program. Field mobility important (iPad accessible).		N/A	GOOD	BEST	N/A	GOOD	BETTER	GOOD	GOOD

Analysis of Technology Solutions			Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Use Cases for Project Management Technology Solutions		Weight (3 Tiers)	CMiC	ProCore	BIM 360 Build	NewForma	O365	E-Builder	PlanGrid	Constructware
Factor	Survey	Tier 2 - Medium Priority								
Criteria	Possible use of Target Zero (WT Safety Observation App). Partnership with OSHA		GOOD	BETTER	BETTER	N/A	GOOD	GOOD	N/A	N/A
Factor	Issues in the Field	Tier 3 - Low Priority								
Criteria	QC/Safety/RFI's -		BETTER	BETTER	BETTER	GOOD	GOOD	OWNER REQ.	BETTER	GOOD
Factor	Punch List	Tier 1 - High Priority								
Criteria	Currently using PlanGrid to manage, reports are lacking functionality.		GOOD	BETTER	BEST	N/A	GOOD	BETTER	BEST	GOOD
Factor	RFI's	Tier 1 - High Priority								
Criteria	Create, Send (via workflows across companies) and Track Status. Centralized, seamlessly process. Ease of use, reduce duplication of efforts. Owner requiring use of E-Builder for		GOOD	BETTER	BETTER	GOOD	GOOD	OWNER REQ.	BETTER	GOOD
Factor	Change Events	Tier 1 - High Priority								
Criteria	Very important.		BEST	BETTER	BETTER	N/A	GOOD	BETTER	GOOD	GOOD
Factor	Photos	Tier 2 - Medium Priority								
Criteria	Photos tied to many other use cases, field mobility important for multiple devices. Documentation, embed capture information within file and be able to recall photos. UPMC investigating		N/A	BETTER	BETTER	N/A	GOOD	GOOD	BETTER	GOOD
Factor	Daily Logs	Tier 2 - Medium Priority								
Criteria	Owner interested RFID tracking jobsite access, automation of collecting this information in a Digital format.		BETTER	BEST	BEST	N/A	GOOD	BETTER	GOOD	GOOD
Factor	Directory	Tier 2 - Medium Priority								
Criteria	E-Builder functionality, mass communication and collaboration through these tools will be important.		BETTER	BETTER	GOOD	BETTER	N/A	GOOD	GOOD	GOOD

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Moving Forward

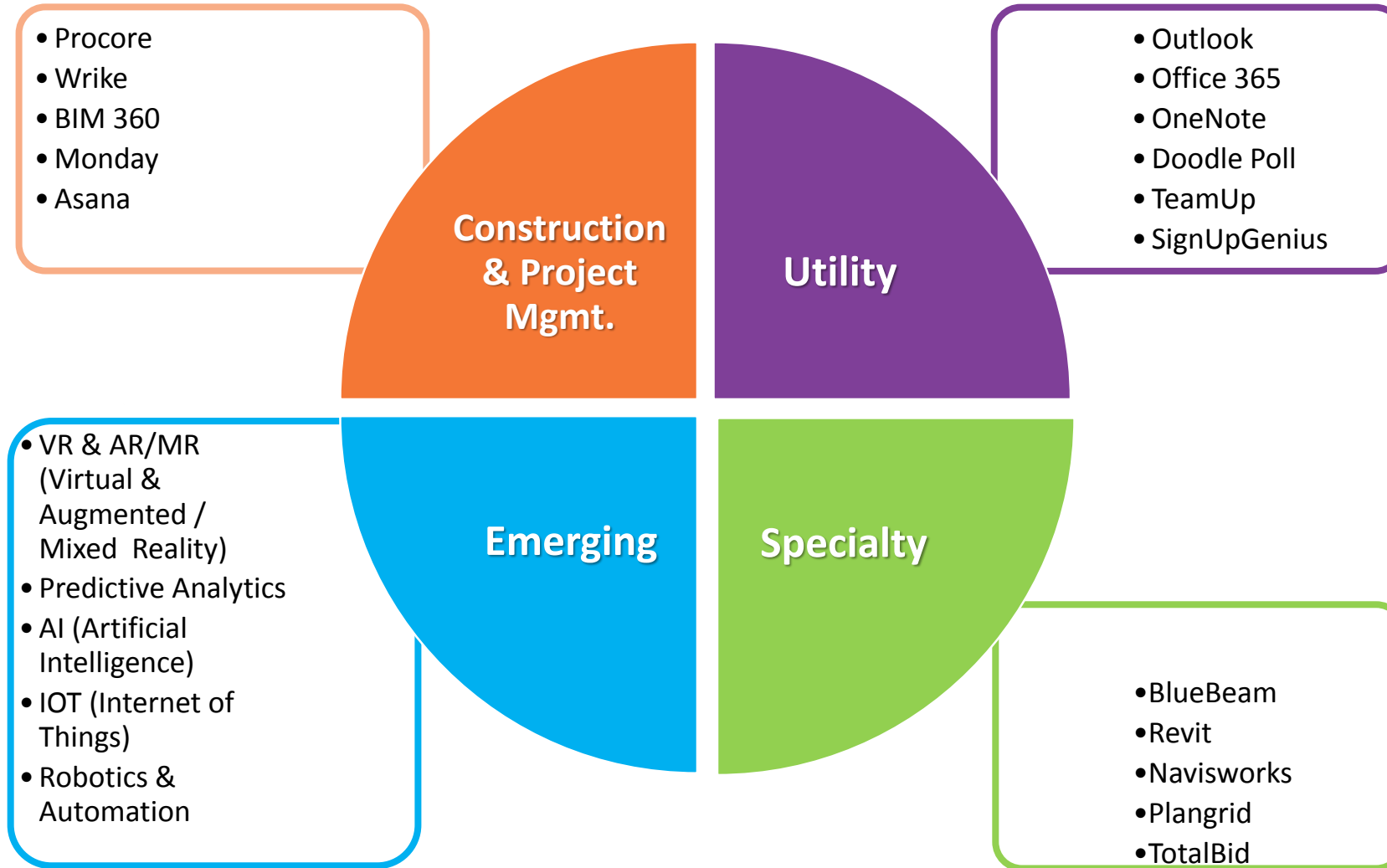


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Ideal Future State



Technology Abounds





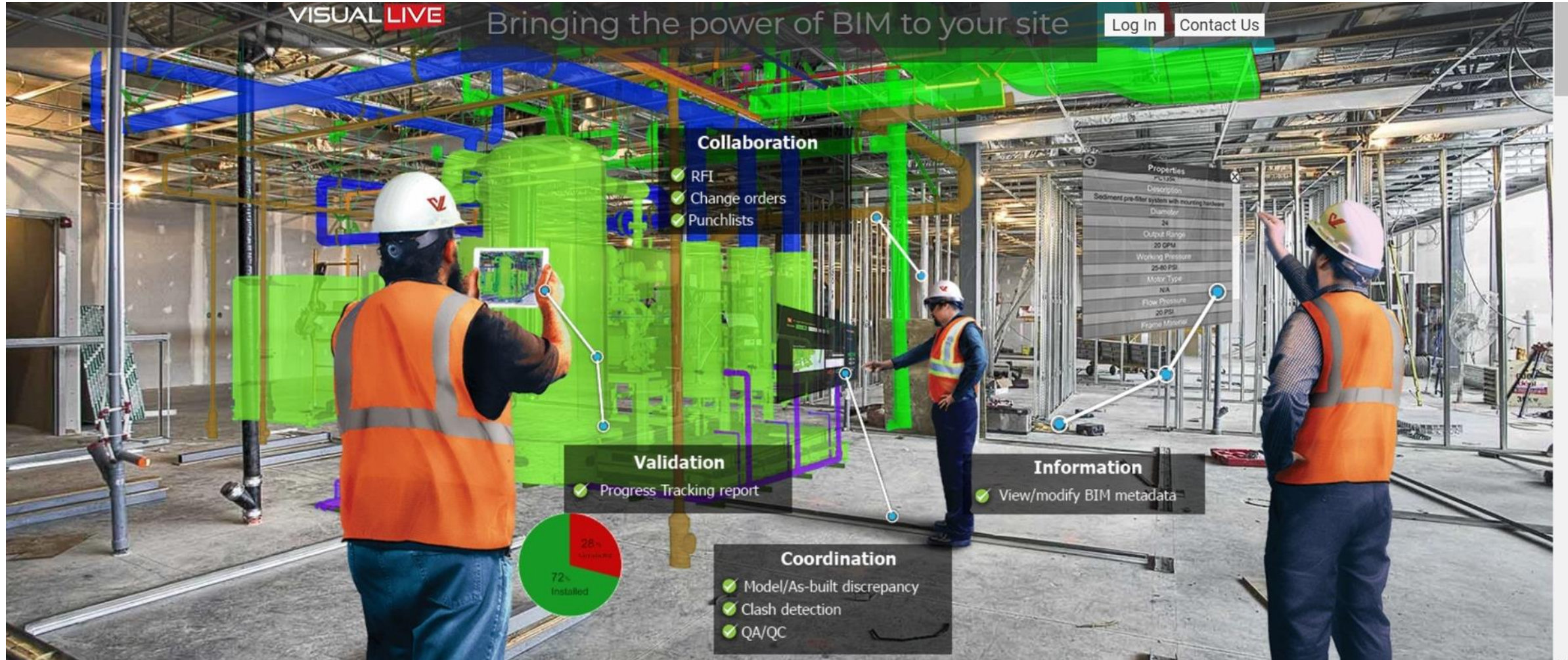
Virtual Reality (VR)



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Augmented/Mixed Reality (AR/MR)



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Hololens



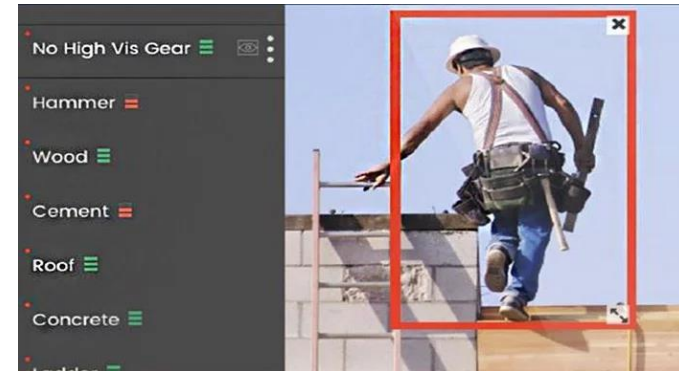
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Internet of Things and Data Collection

The Move to BIG Data is using sensors, cameras and predictive analytics

- Wearable Technology to monitor worker positioning and ergonomics for safety
- Image tagging

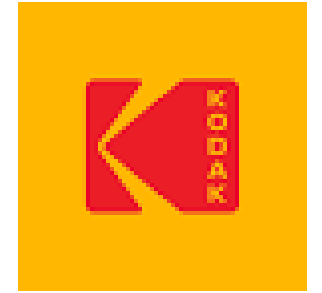


- Robotics & Autonomous/Remote equipment
- Real-time locating service of materials and tools
- Identify hidden infrastructure (plumbing, cables, etc) using RFID tags



How Can Technology Help?

- Generate Cost Savings
- Shorten Timelines
- Increase safety
- Improve quality
- Streamline communication
- Simplify project data
- Reduce employee stress
- Eliminate rework
- Increase safety
- Gain competitive advantage
- Enhance documentation



What are
you excited
to see, but
may be
hesitant to
implement?

What are
you hearing
& reading
about?



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What is
stopping
you?



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Closing Thoughts

Communications Committee Update

- A3 Roundtable Output Template

MEETING: July Round – Waste Free
 DATE: July 10, 2019
 LOCATION: Oswald Conference Centre 1100 Superior Avenue 1st Floor, Cleveland, OH 44114

Organization	1	2	3	4	5	6
ARCHITECTS						
CONTRACTORS						
ENGINEERS						
INDUSTRY AFFILIATES						
OWNERS						
TRADE CONTRACTORS						

Meeting Purpose: (Background)

Meeting goal: Employ "Appreciative Inquiry" principles to "Dream what might be" and seek to find the root cause of success in an effort to influence positive change to remove waste and subsequently add value to the design and construction process.

DISCUSSION: (Current state, Root Cause, Future state)

Over the course of the evening 6 multi disciplinary teams were tasked to find the root cause of success in two of the 12 areas deemed as opportunities for improvement. 12 key area outcomes are below. See attached to greater detail

MANAGING PROJECT SCHEDULE

- Achieve full transparency re. trigger point for project start
- Full transparency & engagement in the design process
- Everyone's expectations are fully expressed thru-out process
- Complete alignment of expectations & delivery
- All information & right people needed to make firm decisions in a timely manner

MANAGING MEETINGS

- * Right # of people, Right People (SME + Decision Maker) in room
- * Separate: Project Update/Check Out Meeting Problem Solving Meeting
- * Utilize technology & better accuracy/efficiency of communicating out to the network
- * Objectives/Goals better communicated
- Simple bullet points
- * Thought - known method of meetings

MANAGING HUMAN RESOURCES

- Transparency of actual project start dates
- Have schedule plan not all schedules are an emergency
- Technology programming design/program check
- Pretag

MANAGING PROJECT COMMITMENTS

- Decision milestones are set & met during design & Owners understand design process
- Everyone full understands why & what is expected of them
- Everyone is transparent & honest about their commitments
- Make them understand budget & performance from the start
- Project complete 10% under budget & 10% ahead of schedule due to efficiency
- Everyone signs the same contract & holds to it.

MANAGING PROJECT DELIVERABLES

- Have standards to set expectations
- set deliverable expectations
- timelines & sequencing of deliverables
- develop team Owner Right Expectations (OPE)
- All stakeholders on same page

MANAGING PROJECT FINANCIALS

- * V/R - Meetings
- Expand and what is reached up
- Spend \$ up front & save on end of network
- * Clearly define goals & Costs/Time
- what can project sustain?
- * Think/Plan/Do
- * IPS - ~~process~~

MANAGING/COORDINATING TRADES

Coord. during design. "Change & time management of design early - three design disciplines". If everyone understood the complexity of time, the team would never do design that bad. "Design meant."

LEVERAGING TECHNOLOGIES ADVANTAGES

- 3D models, monthly build, etc.
- Aggregated reality
- Share

MANAGING CONSTRUCTION LOGISTICS

- Basic Project Early
- Plan, Buy, Check, Do
- Plan, Monitor as part of the design, (monitor)
- Standard, make copies
- Make the Plan, Review, Plan, Review, Review, Plan, Review
- System Time Management is Key, Buy, Do, Plan, Review, Plan, Review
- Have a Working To Record

MANAGING PROJECT QUALITY

- * Same answer to Right Deliverable
- * Expectations
- design for quality & value
- only → Buy on on design with standards (right)
- Do the checks and re-check
- All stakeholders already in thought
- Set expectations early in building

MANAGING PROJECT INFORMATION

- RFI - add by division (only see what you need to see), not add for everything if needed
- Notifications are key
- Resource for RFI

MANAGING PERSONAL ACCOUNTABILITY

- Possibly less but more empowered
- AND EFFICIENT MEETINGS

DISCUSSION cont.: (Current state, Root Cause, Future state)

During the report out period of the Roundtable a couple over arching themes became apparent. The first was to define and set expectations and performance measures up front. One of the tools continually referenced was a robust Kick-off meeting at the beginning of each phase of the project. This would be a meeting that recapped the previous phase and set standards for the following phase.

The second theme that came to light was correctly time and managed communications. Key areas to resolve came from either a lack of communications or incorrectly timed communications.

The last was leveraging technologies at the correct times in the process to aid in adding value by removing wastes (Waste can be found in the July planning announcement). Two key technologies mentioned were a performance tracking tool (Microsoft planner and # are examples) as well as a properly implemented design and construction team management system (Procore and Newforma are examples).

IMPLEMENTATION: Next Steps

- Develop a team to analyze data out put and identify key value add processes.
- Develop a high-level road map to success, applicable to a broad spectrum of project types, that outlines an approach to improve each of the identified processes.

MEETING:
DATE:
LOCATION:

1. MEETING PURPOSE: Goal

Describe meeting purpose

2. DISCUSSION

3. IMPLEMENTATION: Next Steps

How will we execute the countermeasures and implement the change?:
Filler text for now.

Attendance



- Architects
- Contractors
- Engineers

2. DISCUSSION:

Current State	Desired Future State	Root Cause	Proposed Countermeasures
Fill in	Fill in	Fill in	Fill in

Get Involved

- NE OH Partnership Committee
- 2020 Town Hall/ AI Summit
- *2020 Program Committee*

Central OH Roundtable

17 September 2019 @ 4:30

Next Roundtable

13 November 2019 @ 4:30



Plus / Delta

Plus (+)

Delta (-)