

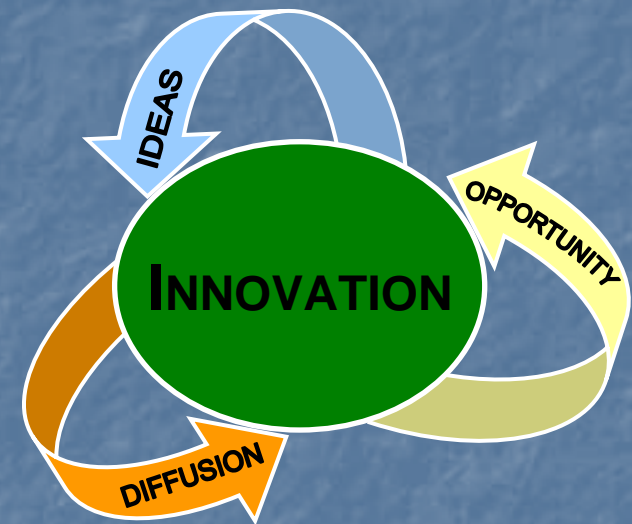
Energizing Innovation in Integrated Project Delivery

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For:

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Presentation Outline

- Background
 - What is “Innovation”
 - Why focus on innovation in the construction industry
- A Study of Innovation in the Construction Industry
- Putting Research into Practice
 - How to enhance innovation on construction projects

Innovation is...

- The actual use of a non-trivial change or improvement in a process, product, or system.
 - A significant change or improvement
 - Results in a positive impact to success in meeting goals and objectives



Innovation is...(continued)

- Different than *invention*.
 - Invention includes:
 - Idea generation and development
 - Innovation includes:
 - Invention, and
 - Implementation and diffusion of the new idea



Innovation is...(continued)

- Different than *problem solving* on a single project.
 - Innovation occurs when unique problem solving is diffused to other projects and firms.
 - Diffusion confirms the utility and value of the innovation.



Innovation is...(continued)

- New to the organization adopting it.
 - The idea for the change can come from within, or from outside, the organization.
 - May be the transfer of a product, process, or system from one industry to another.



Why Focus on Innovation in the Construction Industry

- A perception that it does not exist
 - Construction is viewed as slow to change
 - The world is changing around us, yet “we do it the same way today as we did 100 years ago.”
- New ways of building are needed
 - Greater and different client demands
 - Larger and more complex projects



Why Focus on Innovation in the Construction Industry (continued)

- But...
 - Many instances of innovation have been documented; and
 - Innovation must occur in a competitive market.
- The real issue...(?)
 - Innovation occurs, but at a lower rate than in other industries
 - Efforts are needed to enhance innovation
 - Metrics are needed to measure innovation

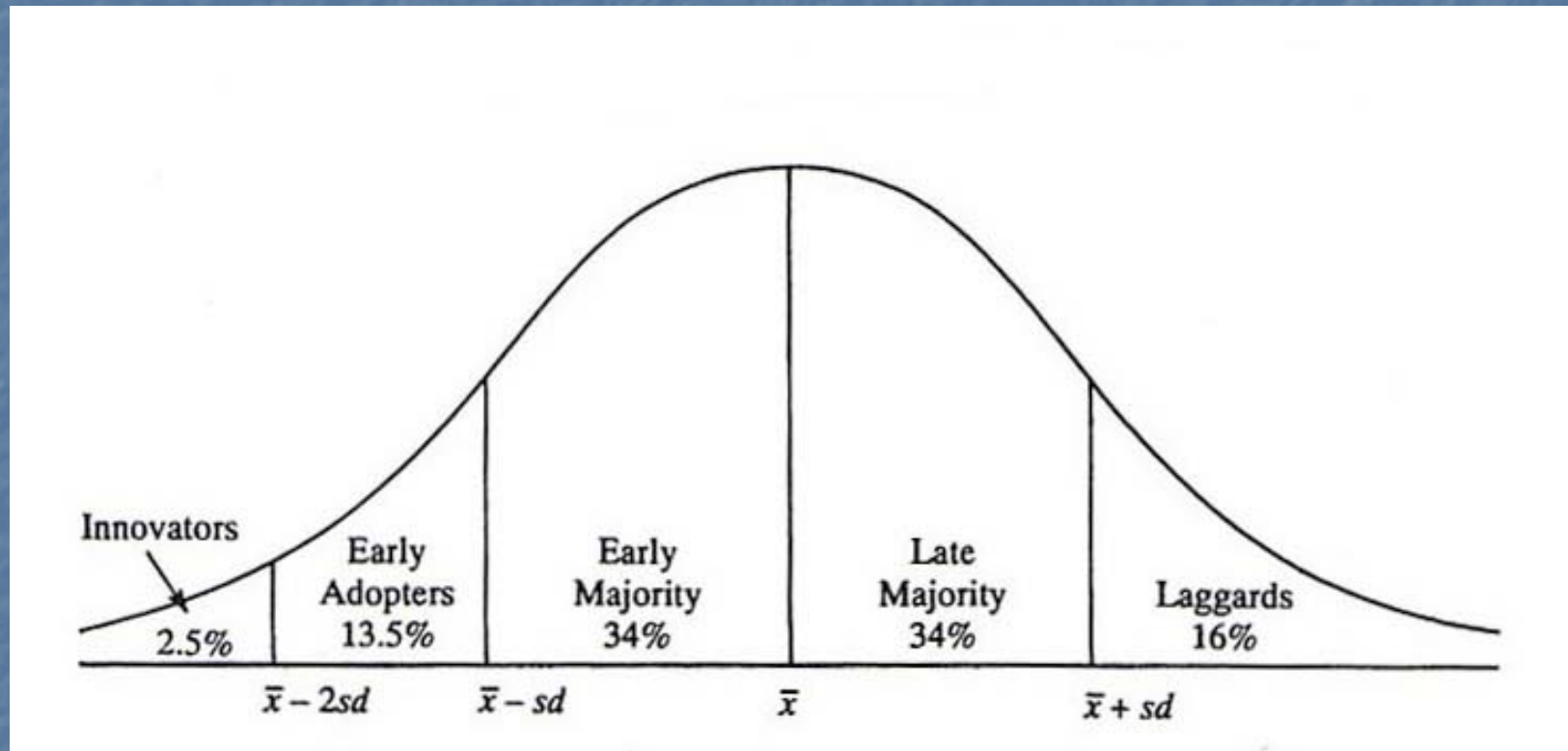


Why Focus on Innovation in the Construction Industry (continued)

- Many new processes and technologies are available and being created.
 - Integrated project delivery
 - Lean Construction
 - High strength materials
 - Electronic sensing
 - And many others...
- They just need to be adopted and new ideas developed.

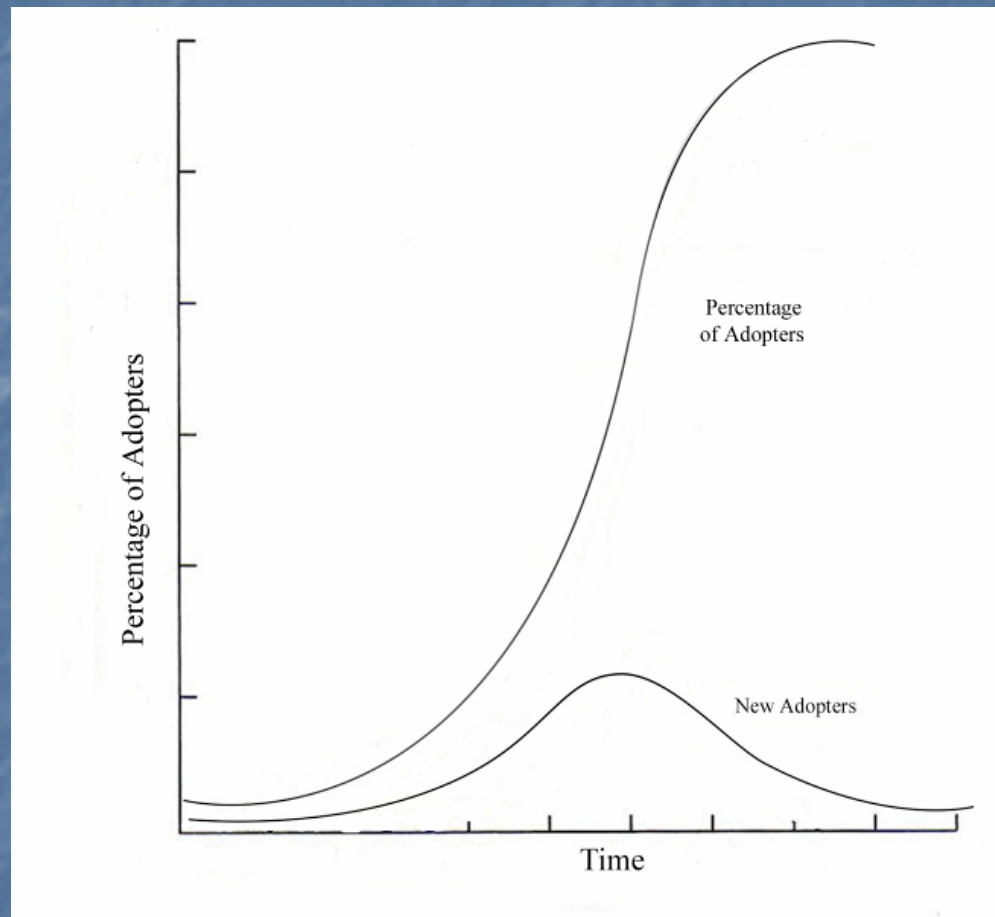


Who Adopts Innovations?



Source: Rogers, E.M. (1995). *Diffusion of Innovations (4th Ed)*. New York, NY: Free Press

Innovation Adoption Over Time



Source: Rogers, E.M. (1995). *Diffusion of Innovations (4th Ed)*. New York, NY: Free Press.

Ryan, B. and Gross, N.C. (1943). "The Diffusion of Hybrid Seed Corn in Two Iowa Communities." *Rural Sociology*, 8(1): 15-24.

A Study of Innovation in the Construction Industry

- Goal:

Enhance the ability of the construction industry to innovate in its delivery of construction projects through integrated project delivery processes.



A Study of Innovation in the Construction Industry (continued)

■ Objectives:

1. Determine the current extent of innovation within the construction industry.
2. Identify incentives that encourage the generation and implementation of innovative ideas.
3. Identify barriers to exploring and implementing new ideas.
4. Identify means for encouraging innovation and overcoming the barriers to innovation.
5. Determine how innovation can be measured and interpreted using a variety of metrics.
6. Create practical guidelines for enhancing innovation on a project.



A Study of Innovation in the Construction Industry (continued)

- Focus on projects:
 - Located in the U.S.
 - Completed in the last 3-5 years
 - All project types
(buildings, industrial, manufacturing, residential, heavy civil, etc.)
 - All project delivery methods
(design-build, design-bid-build, CM, CM-at-risk, etc.)



A Study of Innovation in the Construction Industry (continued)

- Survey and interviews of 79 members of:
 - Design-Build Institute of America (DBIA)
 - Associated General Contractors (AGC)
- On-line survey of 34 innovative product developers
- Case studies of 10 diverse projects across the U.S.



Case Study Projects

Proj. ID	Location (state)	Size (\$)	Designation ¹	Type	Delivery Method
1	OR	Small	Award	New	DB
2	MI	Large	Award	New	CM/DB
3	NV	Medium	Regular	New	DBB
4	CA	Large	Award	New	DB
5	FL	Medium	Regular	New	DBB
6	WA	Large	Award	New	DBB
7	GA	Small	Regular	Renovation	DB
8	MD	Medium	Award	Renovation	DBB
9	MA	Large	Award	Renovation	CM/DB
10	CA	Medium	Award	New	DBB

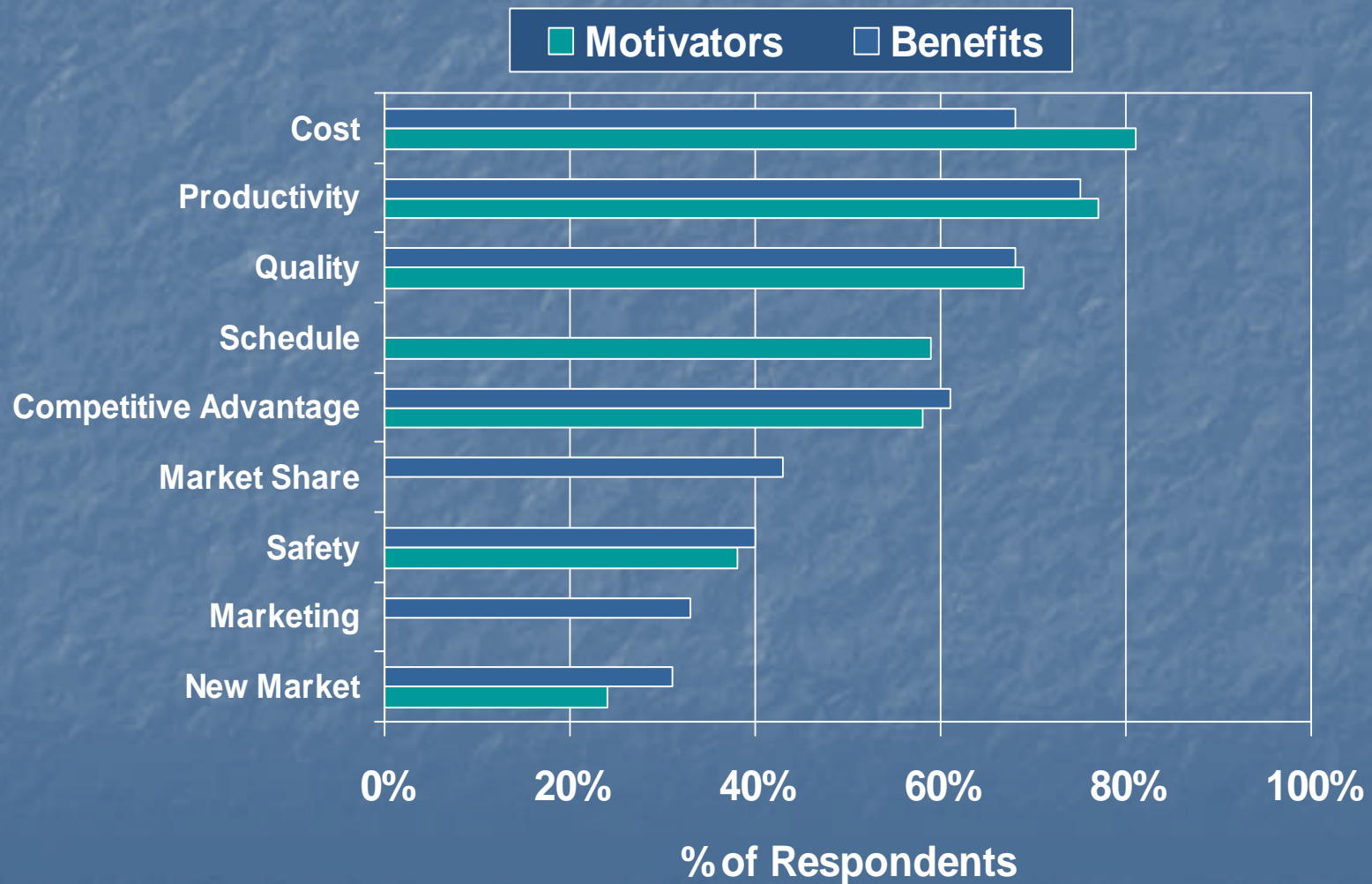
¹ Award-winning or non award-winning (regular) project.

Sources of Innovation

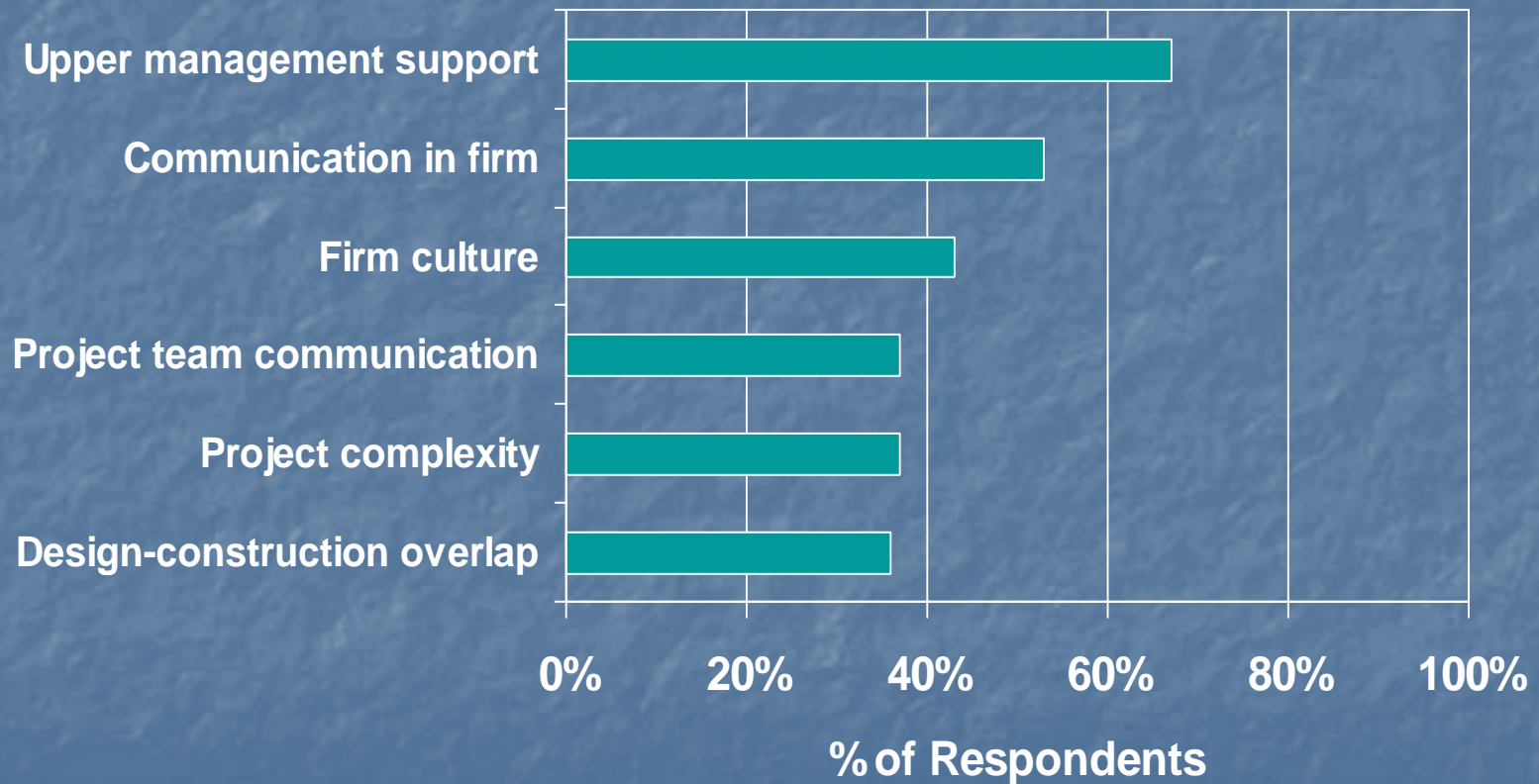
- From within the firm
 - Primary source of innovations
 - PM, upper management, superintendent
- From outside the firm
 - Suppliers



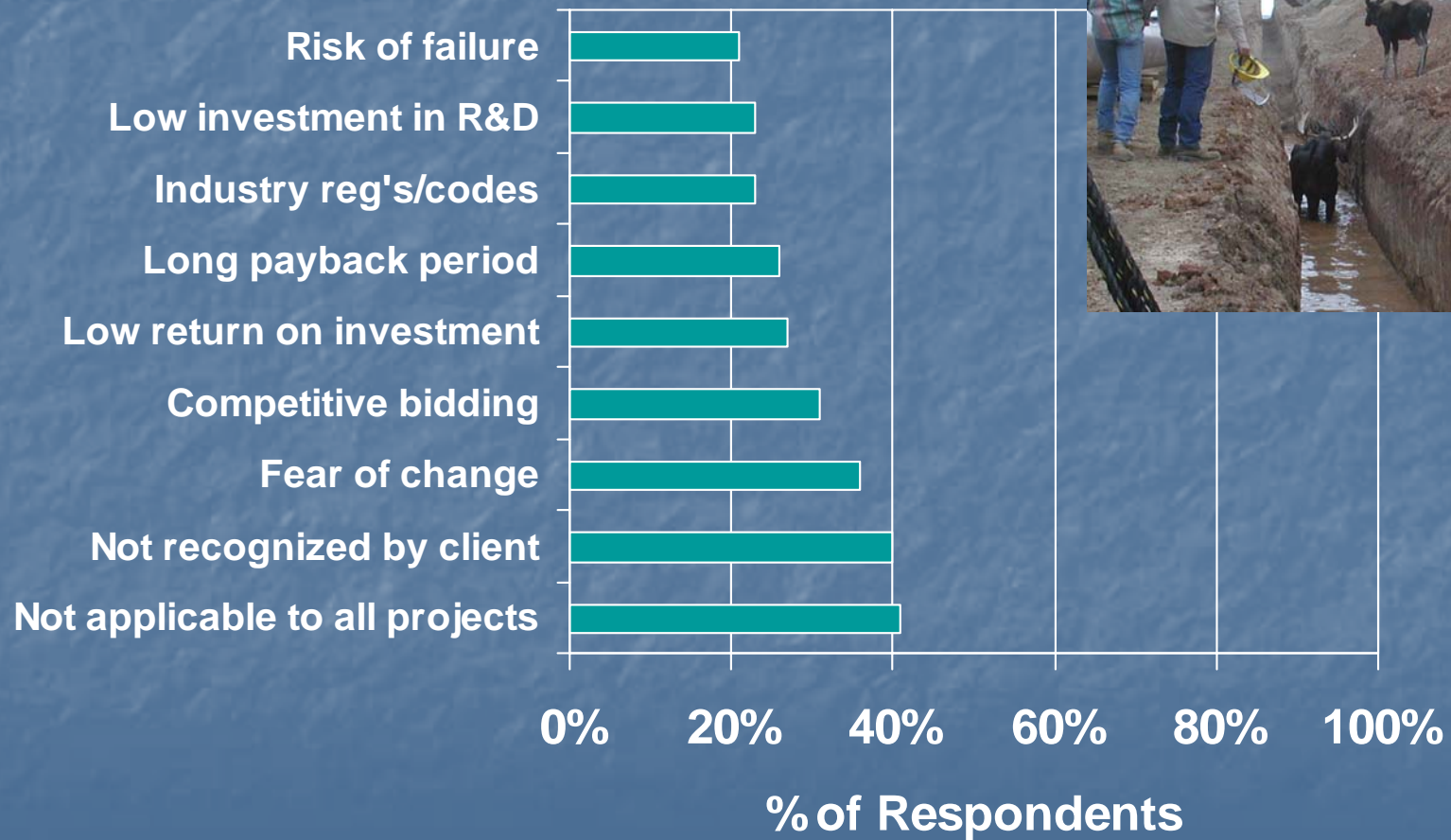
Motivators and Benefits of Innovation



Enablers of Innovation

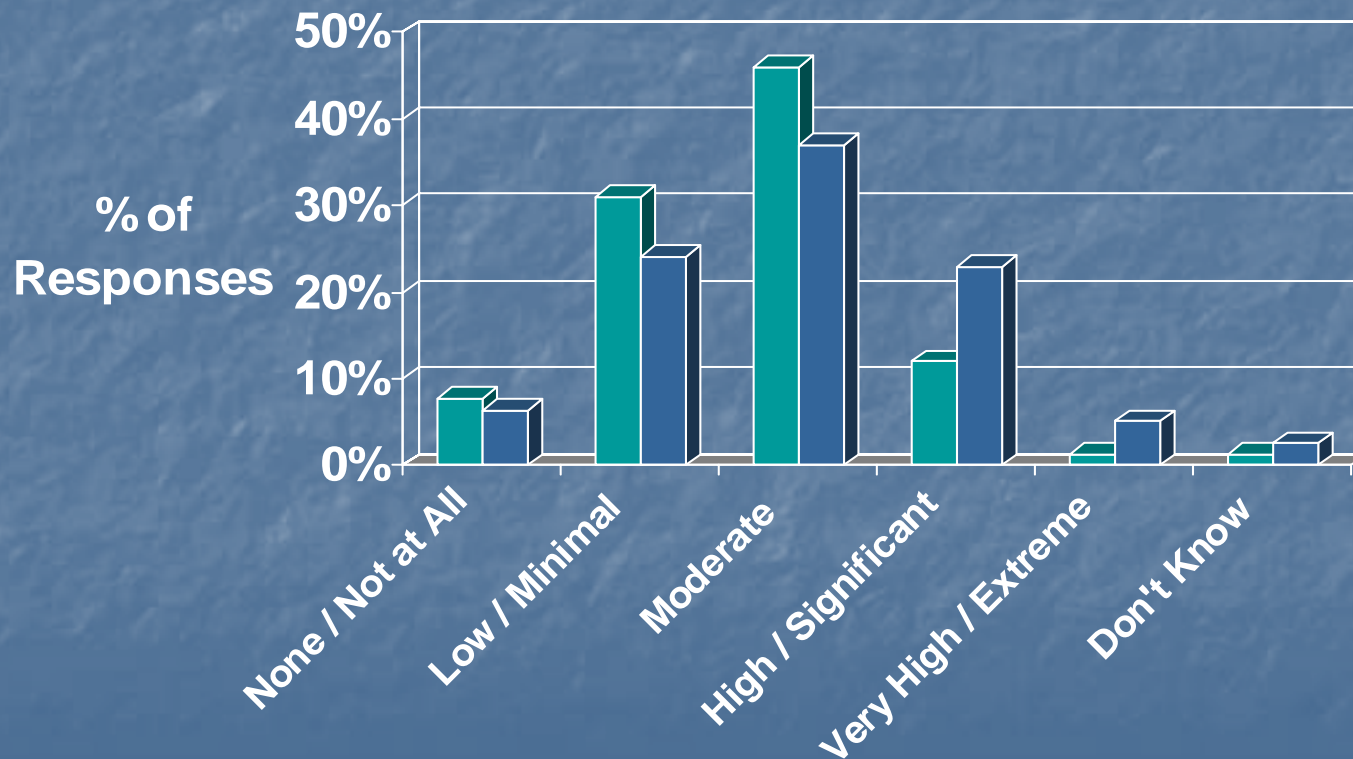


Barriers to Innovation



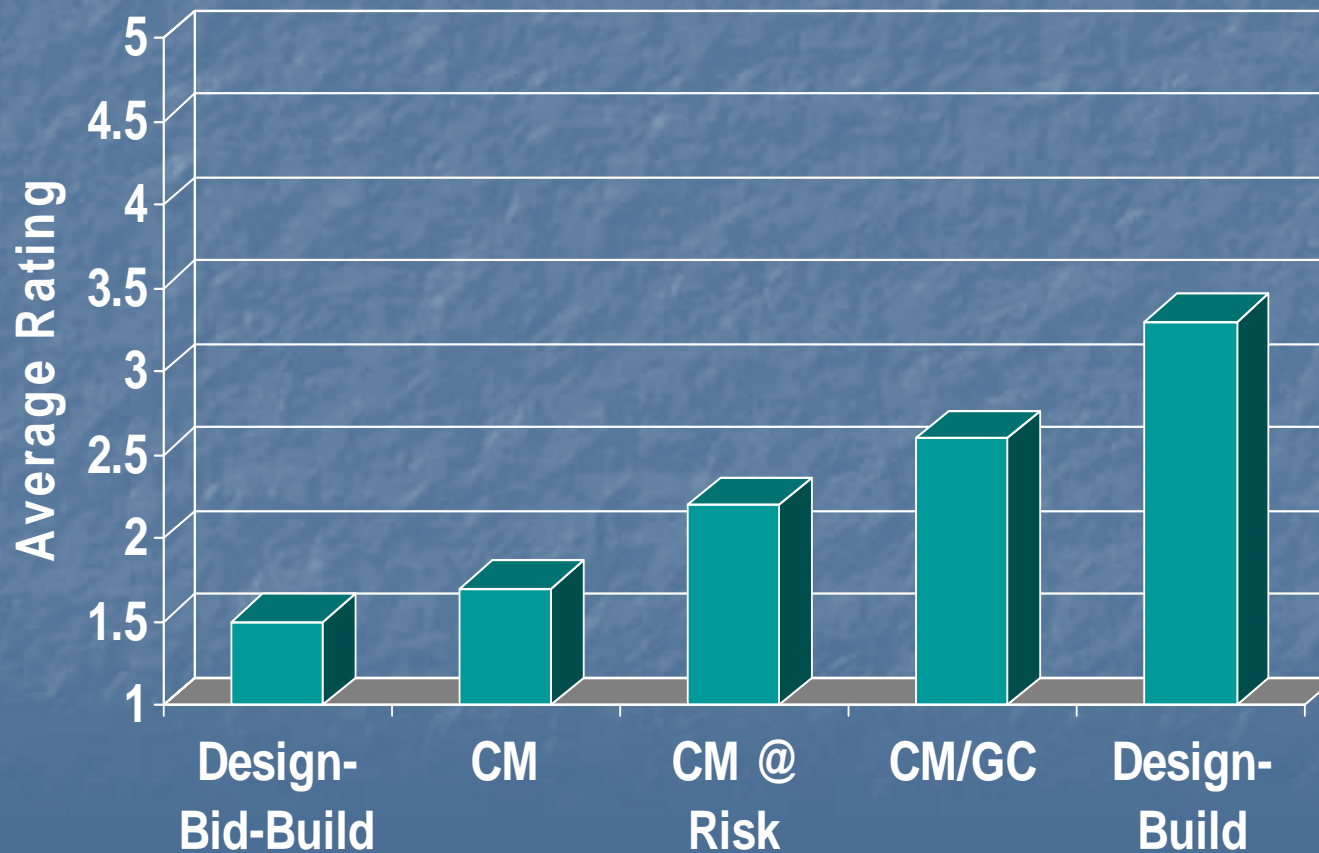
Measuring and Tracking Innovations

- Ability to measure and track innovations
- Importance of measuring and tracking innovations



Ability to Innovate within Project Delivery Method

(Rating: 5 = **high** ability to innovate; 1 = **low** ability to innovate)



Innovation Components

- Idea Generation
- Opportunity
- Diffusion

Innovation Components

- Idea Generation

Generating new ideas for ways to solve problems and improve performance.

- Opportunity

- Diffusion

“The best way to have a good idea is to have lots of ideas.”

– Linus Pauling,
only winner of two
unshared Nobel Prizes

Innovation Components

- Idea Generation

- Opportunity

A *need* and *support* for developing, implementing, and testing a new product, process, or system.

- Diffusion

Innovation Components

- Idea Generation

- Opportunity

- Diffusion

Transfer of the innovation to other projects and firms.

Confirms its *value* and leads to *positive change*.

Steps to Innovation



Steps to Innovation



■ People

- Innovation vision of the Owner
- Innovative visionaries within firm
- Presence of a champion / sponsor

Steps to Innovation



■ Environment

- Innovation as an Owner's goal for the project
- Centralized project office
- Active communication

Steps to Innovation



■ Resources

- Owner investment & commitment of resources
- Time for creativity and exploration
- R&D budget

Steps to Innovation



- **Systems and Processes**
 - Integrated functional areas
 - Overlapping phases
 - Project delivery method

Steps to Innovation



- **Monitoring and Management**
 - Risk tolerance and management
 - Employee recognition and rewards
 - Upper management support
 - Lessons learned program

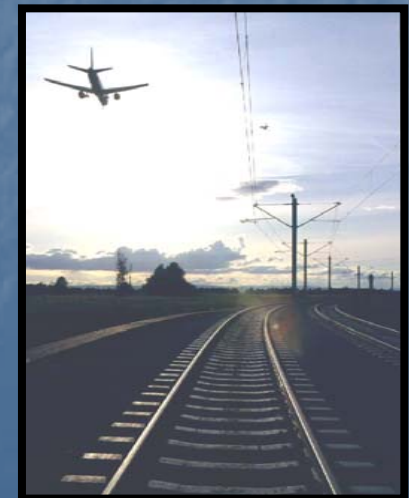
Steps to Innovation



- Improved productivity
- Reduced costs
- Higher quality
- Competitive advantage
- Increased market share

How to Measure Innovation

- Amount and impact of change
- Ideas generated, tested, and implemented
- Training and continuing education required
- Diffusion to other projects and industry
- Profit, cost, schedule, safety, quality, market share, etc.



Additional Resources

- *Innovation Manual of Practice*
 - A practical guide for how to enhance innovation in a firm.
- *Final Research Report*
 - A comprehensive report of the research project activities, results, conclusions, and recommendations.
- *Research Monograph*
 - An extract of the salient results of the research study for further study and implementation.
- *Annotated Bibliography*
 - A consolidated resource to assist in studying, exploring, and learning about innovation in the construction industry.
- *Resources available at:*
 - Pankow Reports webpage under Publications on the SPUR (San Francisco Planning & Urban Research Association) website (www.spur.org/pankowreports/)

Energizing Innovation in Integrated Project Delivery

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