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Management
Technical Section



Business and
Leadership Committee

Leading Complex Projects: A Data-Driven Approach to Mastering the Human Side of Project Management

February 20, 2023,
10:00 AM (CT, GMT-6)



**Neeraj
Nandurdikar**
Sr. VP
Wood Mackenzie

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Appoint leaders to guide discussion on breakout group networking session

Leading Complex Projects

Attributes of Successful Project Leaders

Neeraj Nandurdikar

February 20, 2023

Acknowledgement



- I would like to thank Independent Project Analysis, Inc. (IPA), and Wood Mackenzie, for the use of data and research that is the basis and part of this presentation
- Much of the material presented here is drawn from the research on Leadership of Complex Projects that I conducted, with my colleagues, while employed with IPA.
- This research is also published in a book, *Leading Complex Projects*, that I co-authored alongwith Mr. Edward Merrow of IPA.



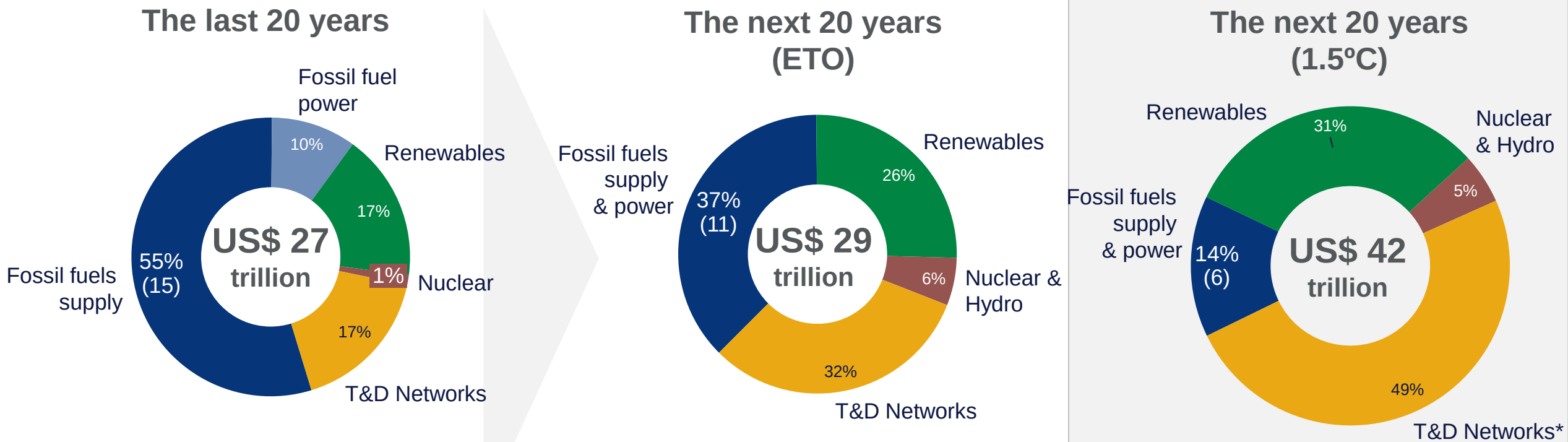
Our Basic Thesis for The Research

- As projects become more complex, the top project manager role shifts from that of a manager to that of a leader
- Unfortunately, the manager and leader skillsets and personality requirements are not the same
- Yet complex project leaders are mostly selected based on their success with middle-size projects
- We believe that the mismatch of requirements contributes very substantially to the poor track record the Industry has accumulated in large complex projects



With the energy transition, investments in energy supply are poised to grow significantly going forward, with a shift of spend towards electricity

Cumulative investment spend (2000-2020 vs. 2021-2040)



Denotes estimated CAPEX spend / Investment Spend in the last 20 years in Energy supply, vs. in the next 20 years up to 2040

Source: International Energy Agency (2021), World Energy Investment 2021, IEA, Paris

Wood Mackenzie ETO Outlook and Wood Mackenzie Analysis

* - T&D Networks includes investments in Hydrogen, CCUS and Energy Storage

Management v. Leadership

The need for leadership is generated by complexity



Project Management

vs.

Project Leadership

- | | |
|---|---|
| – Good and clear planning of deliverables | – Articulating a clear vision for the project |
| – Proper allocation of work to the right people and contractors | – Getting all stakeholders to agree and cooperate |
| – Sequencing all work correctly to ensure smooth flow | – Generating strong followership from the team |
| – Holding everyone accountable through good controls | – Being a leader of leaders |



Complexity Occurs in 3 Dimensions

Most energy infrastructure projects are complex in all three dimensions

Scope Complexity

When a project has three or more distinct sub-projects, the scope is too complex for the project director to supervise all

Organizational Complexity

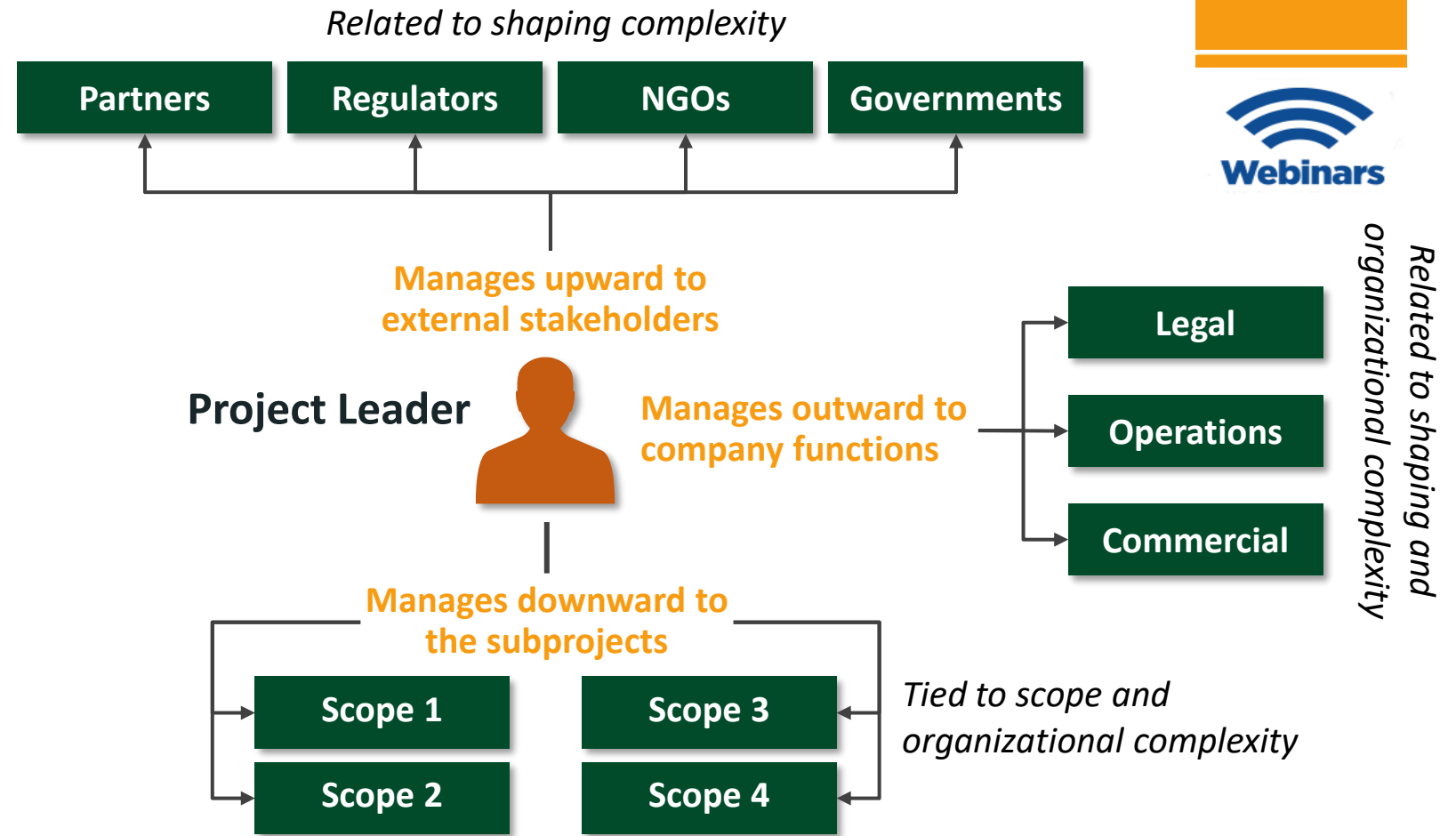
When a project's organization requires a central hub that supports work but does not directly manage the work

Shaping Complexity

When a project has a significant number (4 or more) external and/or internal stakeholder organizations, e.g., partners, government agencies, NGOs, local communities

Leadership Is Difficult in a Complex Project

Managing Up, Over, and Down



- In a complex project, many of the key players do not report to the project director
- Many “out rank” the project director
- Many functions are not incentivized to cooperate
- Leadership is all about generating “followership”—getting people to voluntarily cooperate for project success
- ***The skillset needed to generate voluntary cooperation is not the same as management***



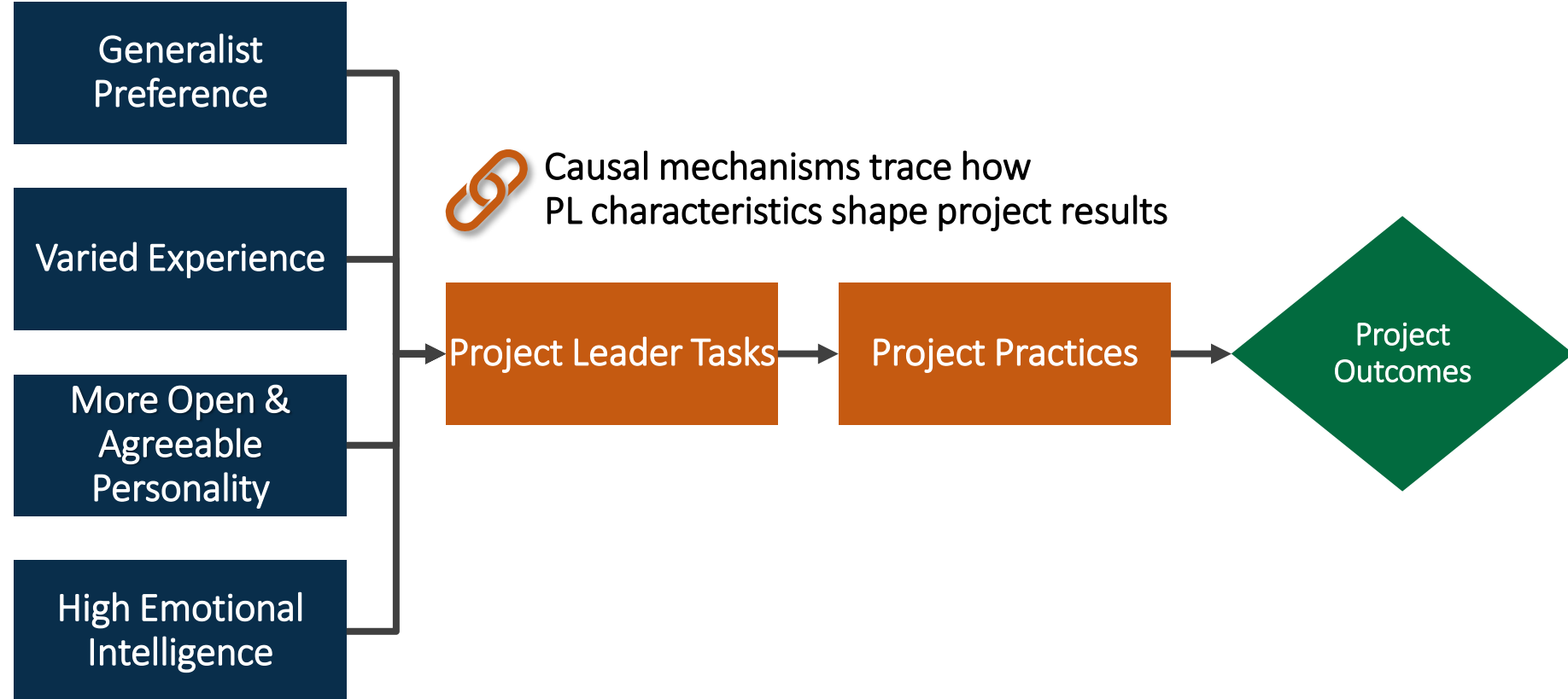
Project Director Selection Primarily Based on Experience

- Based on an IPA survey, leadership selection processes appear largely ad hoc
- Companies lack a career path specifically designed for complex project leaders
- “Experience” was the overwhelming reason provided for project leader selection
- Personality traits were rarely mentioned in the selection process of project directors



From Traits to Tasks and Practices

Project Leader Traits that Matter



Fox and Hedgehog Measure

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

“A Fox knows many things, but a Hedgehog knows one important thing”

-Archilochus c.680-645BC

- This distinction, popularized by Isaiah Berlin, is useful for understanding characteristic ways of thinking
- We used a series of questions to understand the preferences our project leaders displayed in this regard:

Foxes



Generalists, eyes-to-the-horizon types that do not like to spend too much time on a single issue

Hedgehogs



Focus on a particular subject and know it extremely well

They specialize and are truly experts

As a group, engineers tend toward being Hedgehogs

Complex Project Leaders are Mostly Foxes

Generalist Orientation

Varied Experience

Personality

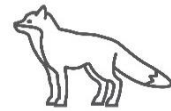
Emotional Intelligence

Leadership Style and Preference



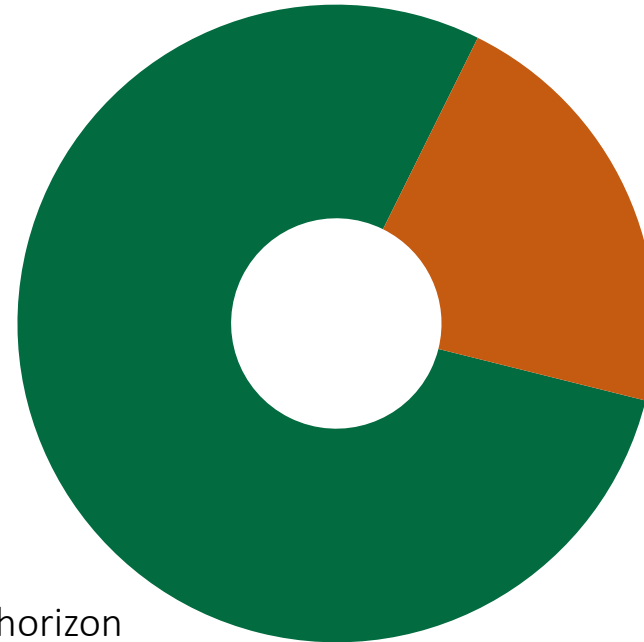
Source: Independent Project Analysis, inc.

Almost all of our respondents are engineers and engineers tend to be hedgehogs...



Foxes
78%

Are generalists, eyes-to-the-horizon types that do not like to spend too much time on a single issue



Hedgehogs
22%



Focus on a particular subject and know it extremely well; they specialize and are truly experts

...But our respondents are overwhelmingly foxes

Project Leaders Must be Foxes to Cope With Project Complexity

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

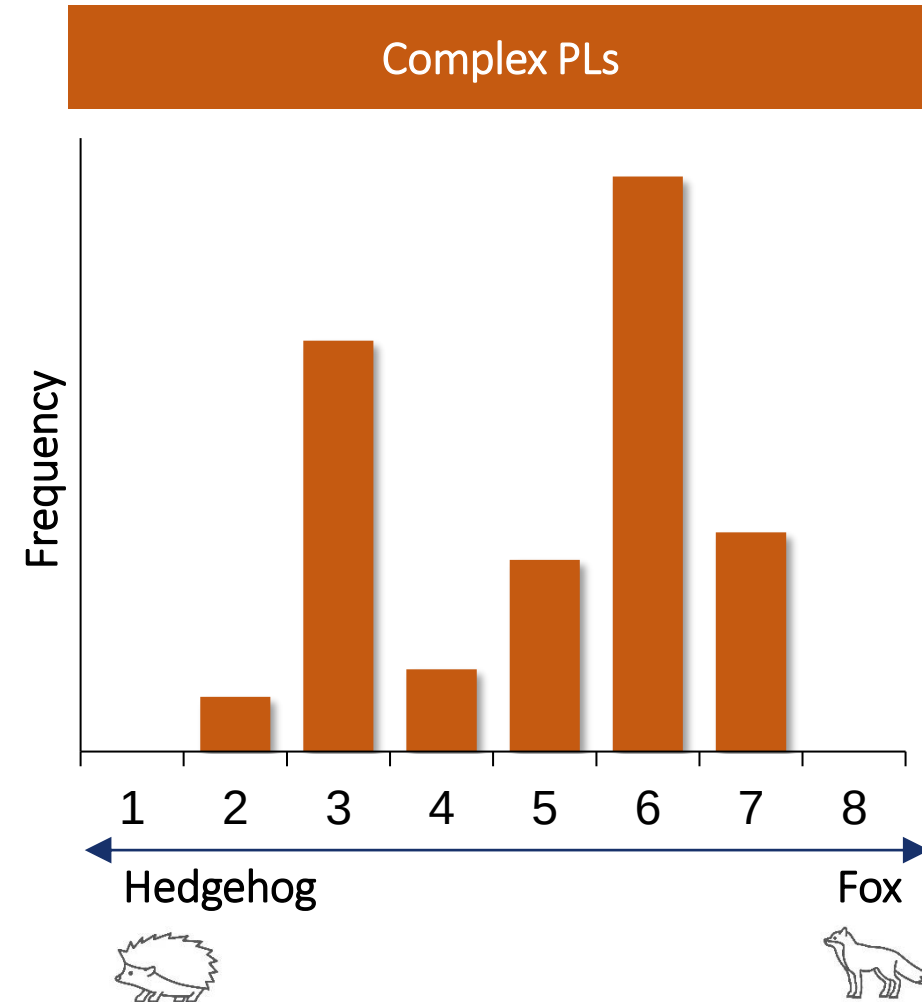
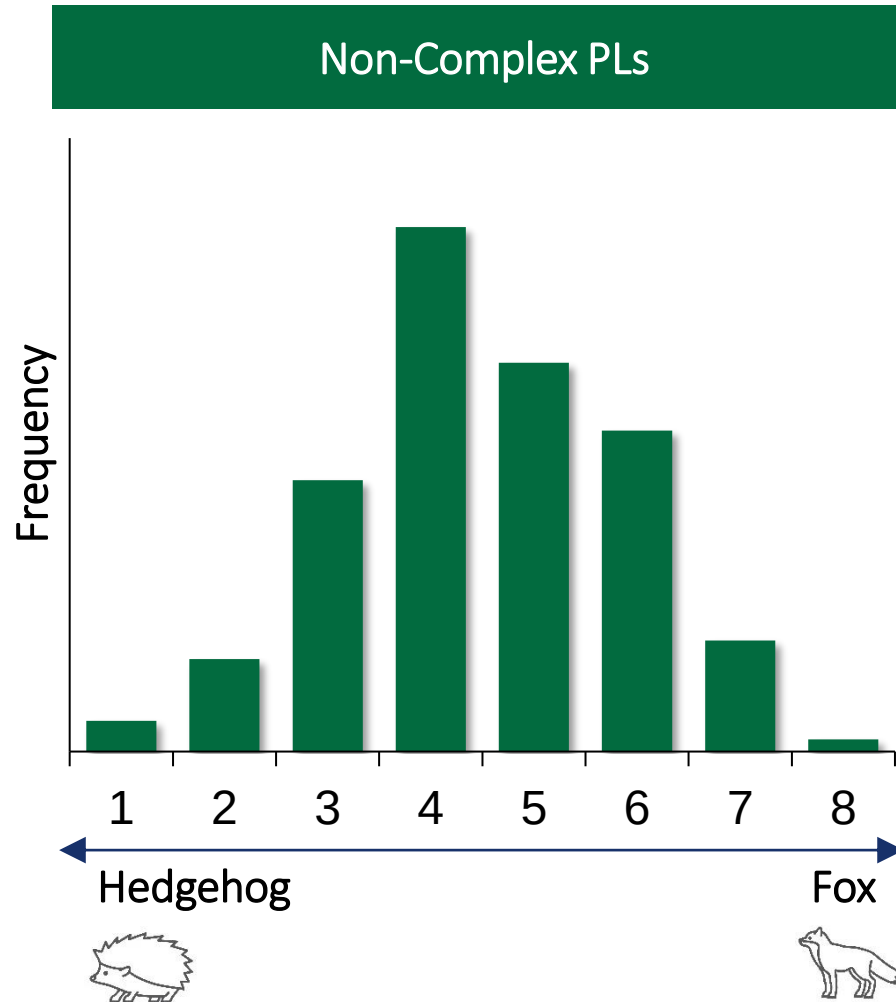
Leadership Style and Preference



Source: Independent Project Analysis, inc.



Complex project leaders are more likely to be foxes than project leaders of simpler projects



Why Foxes?

Generalist Orientation

Varied Experience

Personality

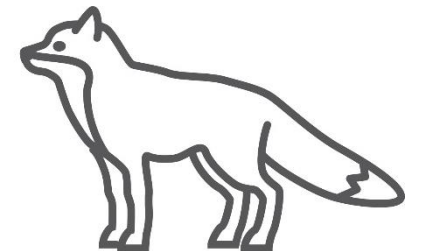
Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

- We find this result unsurprising; in our study of non-complex project leaders we found that “foxiness” increased with project size and complexity
- The projects being executed by our respondents are large and complex and require the ability to look over and juggle a wide variety of tasks successfully
- The basic profile of the megaproject leader is a generalist
- Generalist orientation clearly relates to better projects in our sample



Fox vs. Hedgehog

Difference in project results

Generalist Orientation

Varied Experience

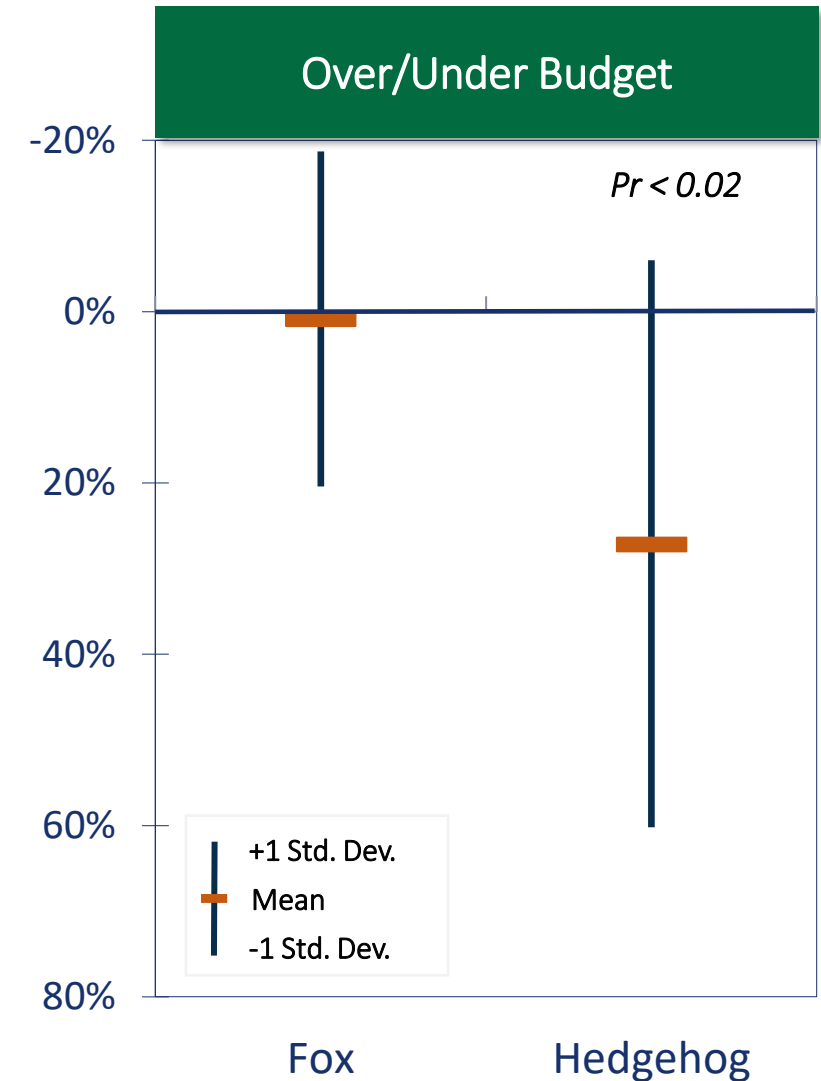
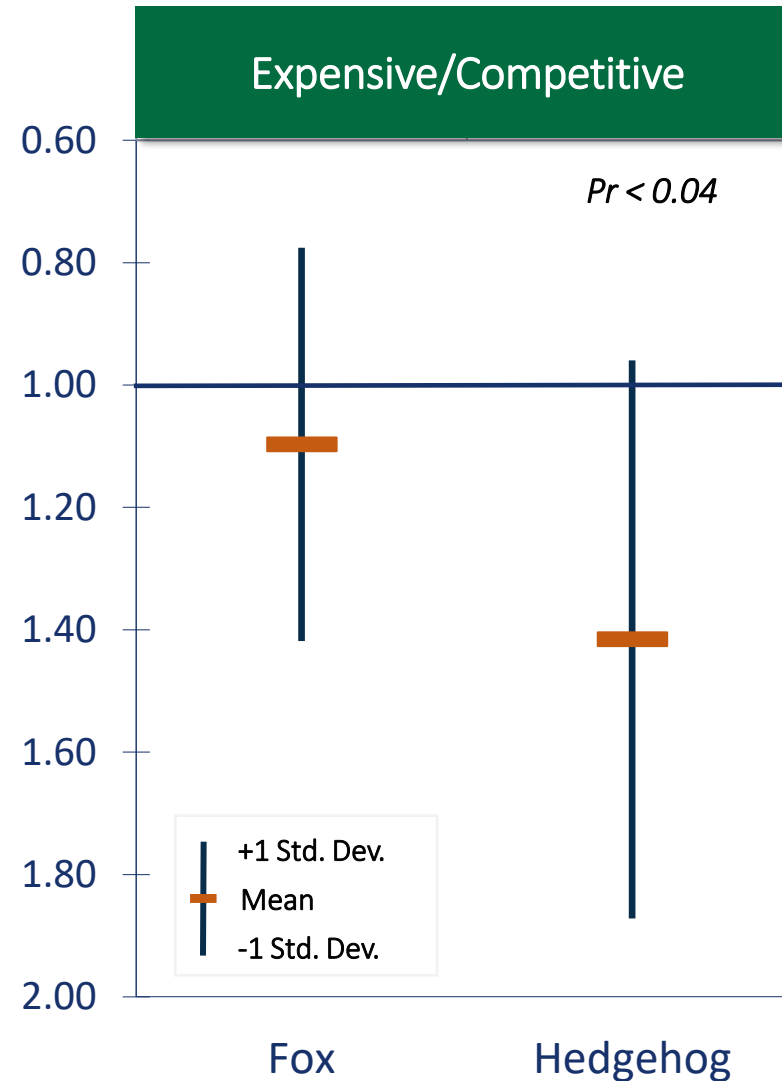
Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



The Foxes Were More Experienced

- Experience does not cause any movement on this scale
- Instead, because foxes are more likely to be successful and enjoy complex projects while hedgehogs are not, the effect of time is to winnow out the hedgehogs

Generalist Orientation

Varied Experience

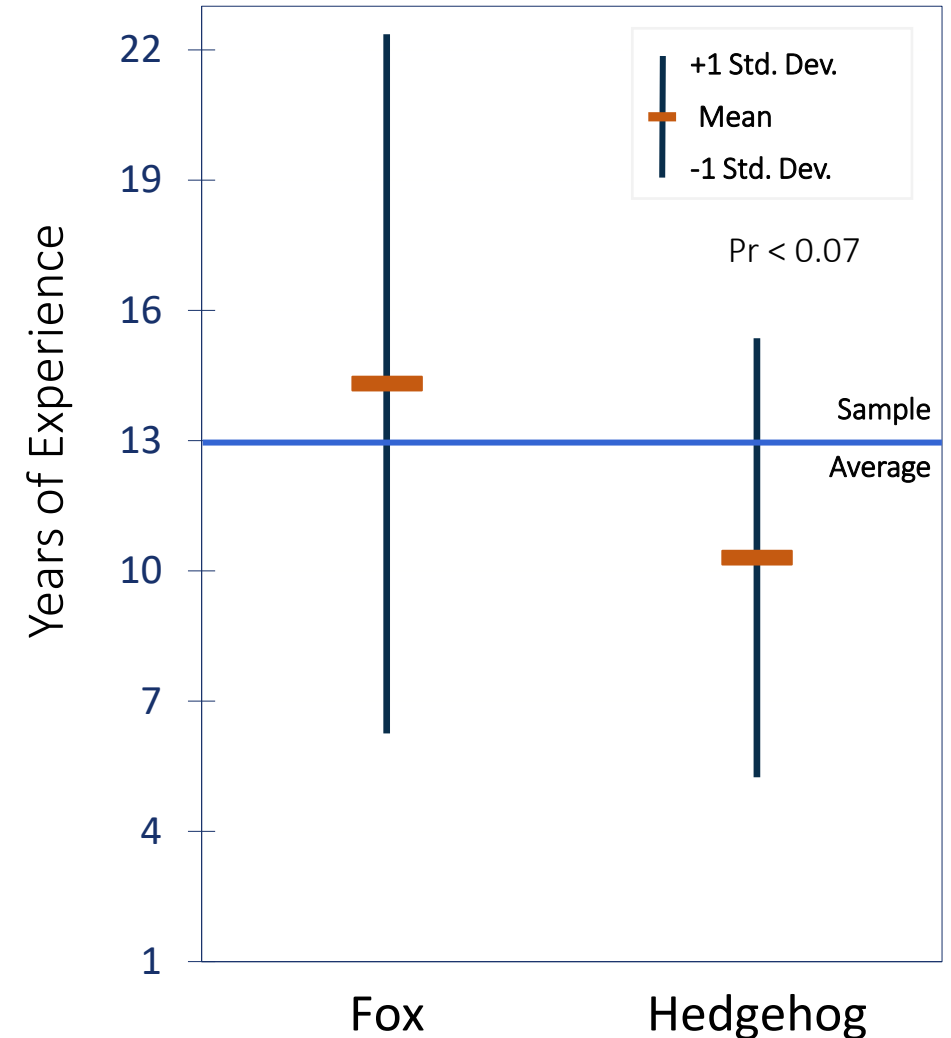
Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



Developing a Generalist Mindset Through Experience

Generalist Orientation

Varied Experience

Personality

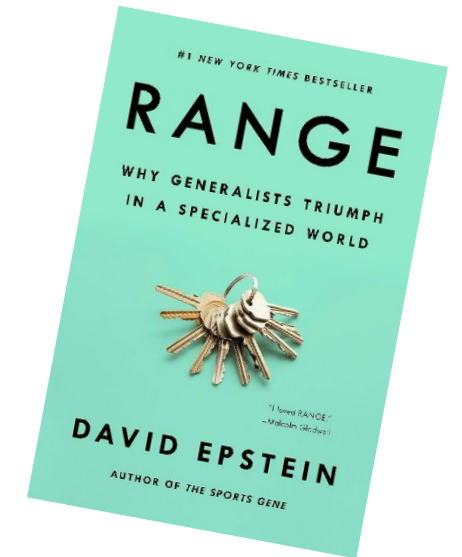
Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

- Preference for more of big picture thinking certainly supports leaders in their role
- However, generalist preference alone certainly will not make someone successful; there is more to being a true generalist and that lies in experience
- In *Range*, David Epstein describes how the most successful individuals in their field, especially those that are complex and unpredictable, tend to be generalists as defined by diversity of interest and experience
 - Generalists find their path later in life, juggling many interests rather than focusing on one
- Research done by IPA, supports this for complex project leaders; those with more varied experiences are more likely to produce successful projects



Experience

Generalist Orientation

Varied Experience

Personality

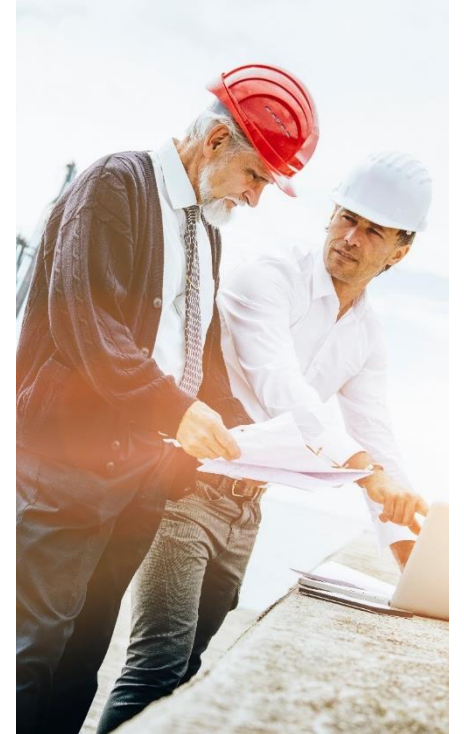
Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

- Should be more than getting old
- Career path and progression
- Experience in other industries
- We expect some backgrounds are more helpful to leaders of complex project than others
- But remember, experience is only valuable if one has the capacity to learn



Experienced Leaders Fill All Roles

Generalist Orientation

Varied Experience

Personality

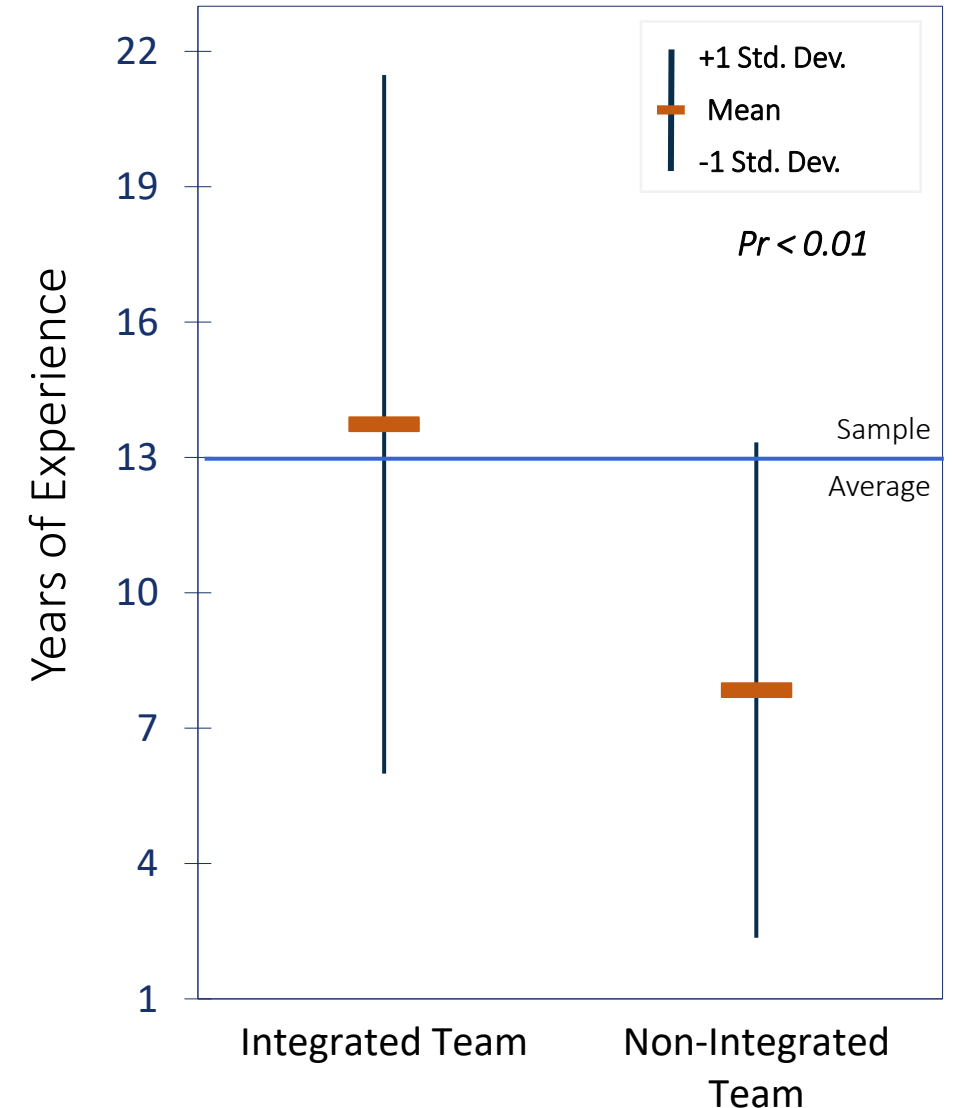
Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

- We believe this is an example of learning
- When teams are missing one or more key functions, projects fail
- Experienced project leaders know this and push for the right team members from the moment they join the project
- Experienced leaders review the team makeup as one of their first activities on a new project



The Effects of Varied Backgrounds

- We hypothesized that more diverse experiences for our project leaders would generate better ability to diagnose and fix problems
- We examined work in other industries and different jobs within the energy company's as indicators of more diverse backgrounds

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.

Experience Across Varied Industries Relates to Improved Performance

Even if it was early in career

Generalist Orientation

Varied Experience

Personality

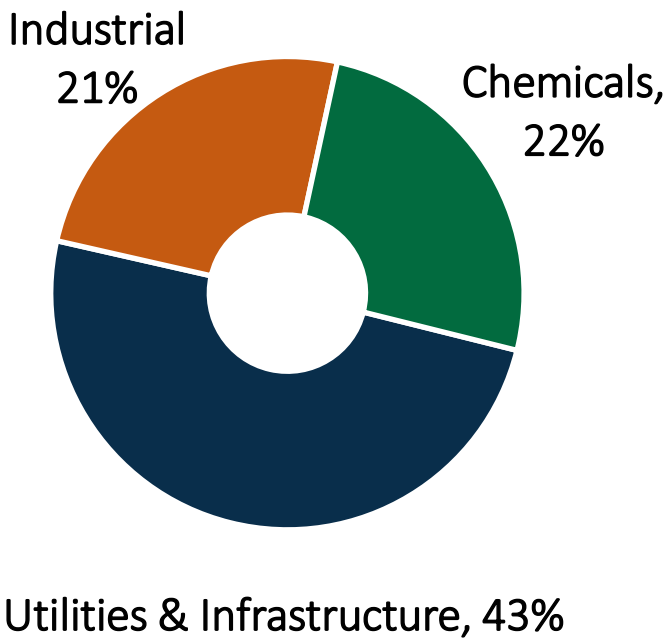
Emotional Intelligence

Leadership Style and Preference

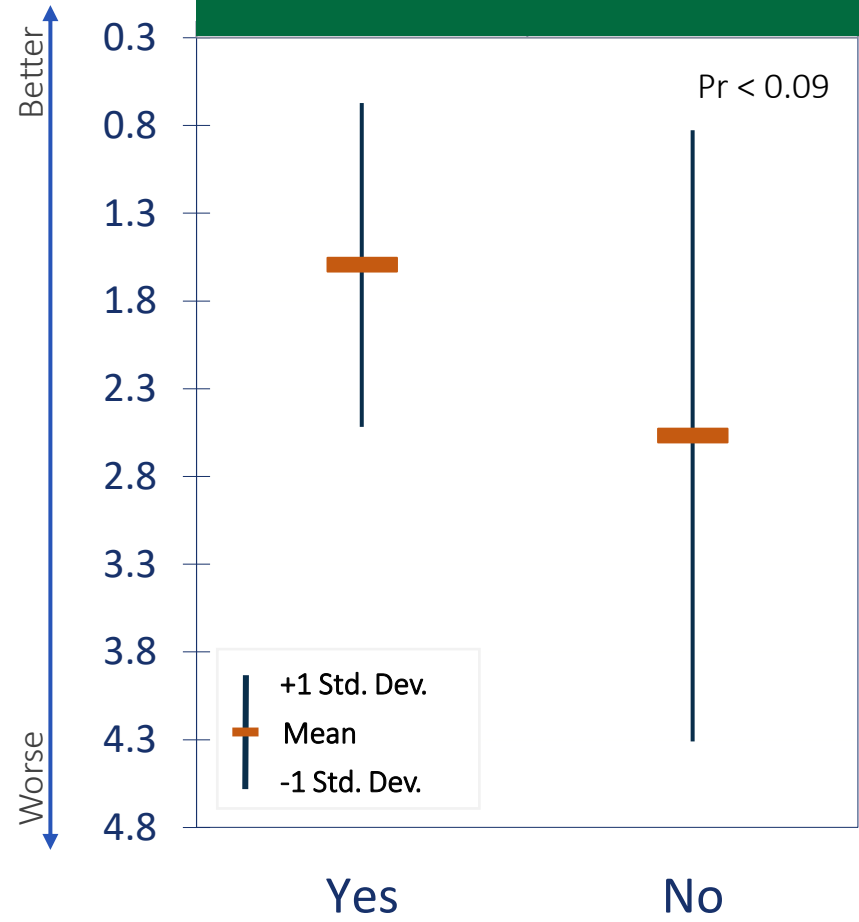


Source: Independent Project Analysis, inc.

27% of PLs Have Had Experience In Other Industries



Opportunity Competitiveness



PL Has Experience Outside Oil & Gas

Better Leaders Often Spent Time on NOVs*

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

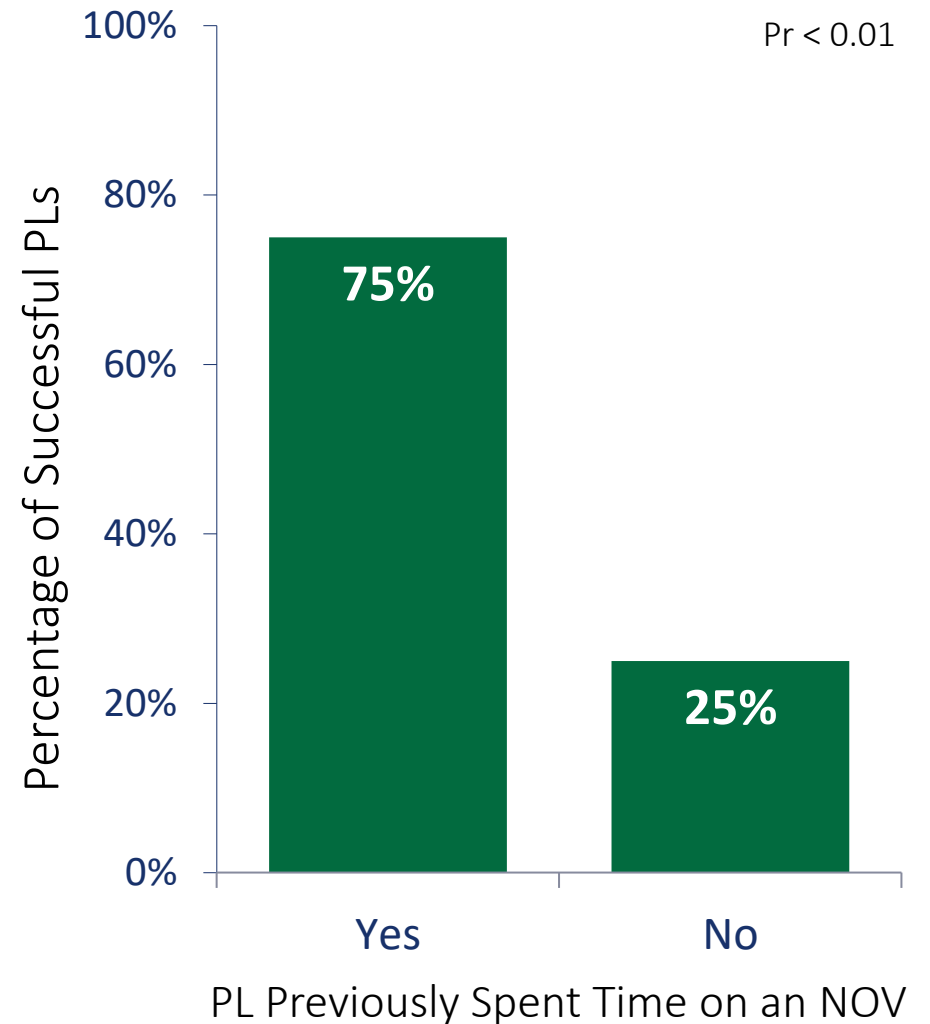
Leadership Style and Preference



Source: Independent Project Analysis, inc.

- 59% of respondents worked as NOV reps but they make up nearly 80% of successful leaders
- We speculate that time on NOVs is a period of intense learning for (prospective) project leaders
- Time to watch others make mistakes
- Time to reflect on what works and what doesn't

*Non-Operated Venture



Experience Summary

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



- Big picture thinkers are more likely to succeed as project leaders; this is not surprising, nor counterintuitive
- The result of complexity is problems that are unpredictable and often have not been encountered before
- To solve these problems leaders need to be able to think holistically about the project and apply broad knowledge and experience in unique ways
- The most successful leaders of complex projects in Industry have the unique combination of generalist preference and experience to support this way of thinking

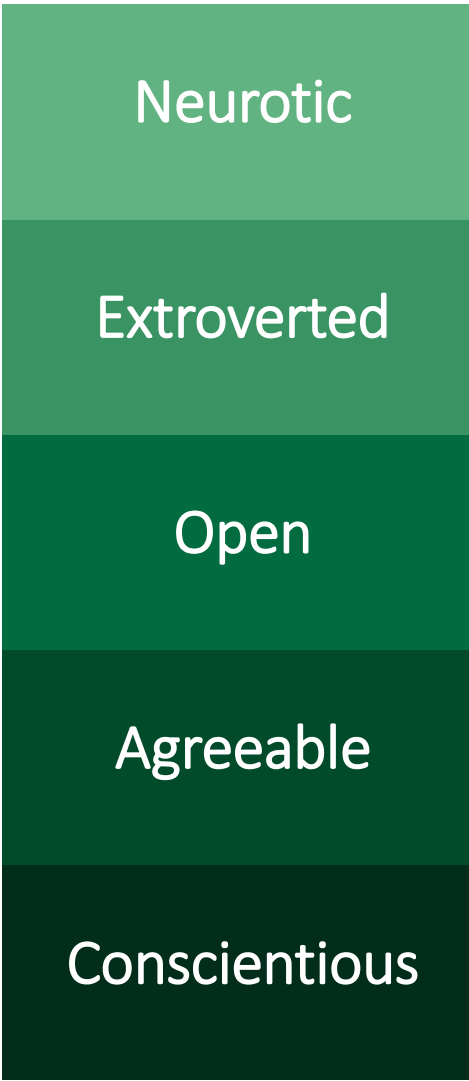
The Five Factor Model of Personality

A Well-Established and Validated Instrument

Generalist Orientation
Varied Experience
Personality
Emotional Intelligence
Leadership Style and Preference



Source: Independent Project Analysis, inc.



Inattentive
Take Risks
Even Tempered

Quiet
Cautious
Solitary

Skeptical
Rational
Conventional

Suspicious
Confrontational
Un-sacrificing

Spontaneous
Not Process-bound
Not Many Rules



Hyper-vigilant
Risk-averse
Tend to Worry

Outgoing
Adventurous
Novelty Seeking

Curious
Creative
Open to Changes

Trusting
Compliant
Affectionate

Organized
Self Directed
Controlling



The Role of Personality

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



- Our average project leader was close to the middle on most attributes of personality measured by the Five Factor Model (aka The Big 5)
- The averages of the sample hide the importance of personality
- Some traits are associated with success and others with failure
- Let's look at the best of our projects and the worst...

● Better

Achieved cost or schedule target

Cost Performance Index: ≤ 1.00 OR
Schedule Performance Index: ≤ 1.00

● Worse

Did not meet cost and schedule targets

Cost Performance Index: > 1.00 AND
Schedule Performance Index > 1.00

Better and Worse

Generalist Orientation

Varied Experience

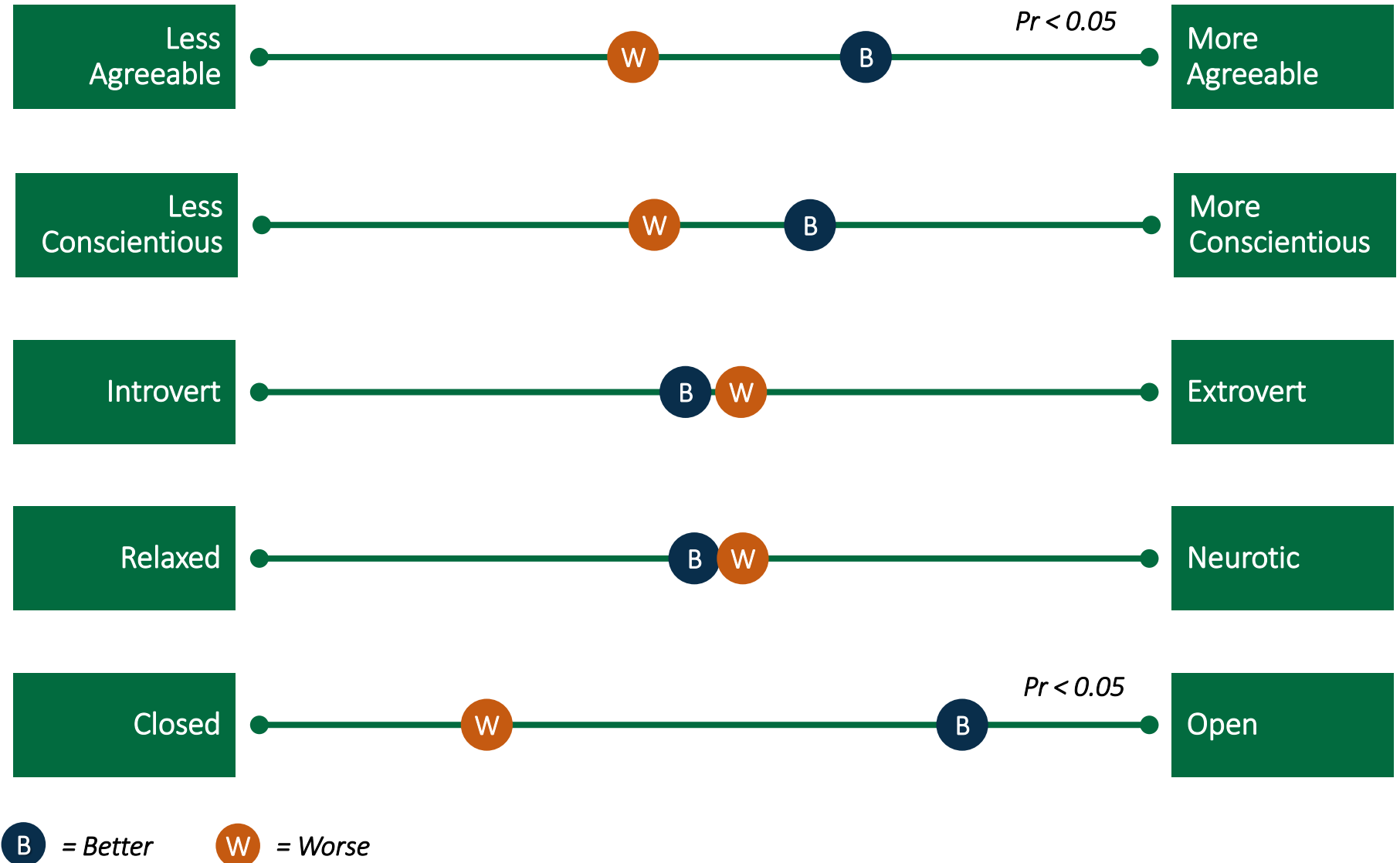
Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



Emotional Intelligence and Success

Generalist Orientation
Varied Experience
Personality
Emotional Intelligence
Leadership Style and Preference



Source: Independent Project Analysis, inc.

Dimension	Relationship to Performance
Recognize Own Emotions	• Successful leaders have good self-awareness • Connection with their inner signals allows them to speak with conviction about their vision for projects and act accordingly
Recognize Others' Emotions	• Effective leaders are more attuned to the emotions exhibited by others • This skill can help the leader foresee risks, setbacks, and morale loss before they manifest in project performance
Social Skills	• Effective project leaders are better able to establish strong relationships • Key to effective teamwork and stakeholder management
Optimism	• Successful project leaders have higher levels of optimism enabling them to maintain emotional strength and positivity in the face of difficulties

Lower

Successful Leaders

Higher

Across each dimension, a higher level of emotional intelligence was associated with more successful leaders

Summarizing Experience & Temperament

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



- The personality profile of the successful large complex project leader doesn't resemble a cross-section of engineers
- The profile also doesn't look a lot like that of project leaders of smaller, simpler projects
- Successful complex project leaders are open
- Successful leaders are systematically high on all emotional intelligence scales

The successful project leader is the experienced, generalist who is open to others' views and trusting of their team's abilities

The Causal Links

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference

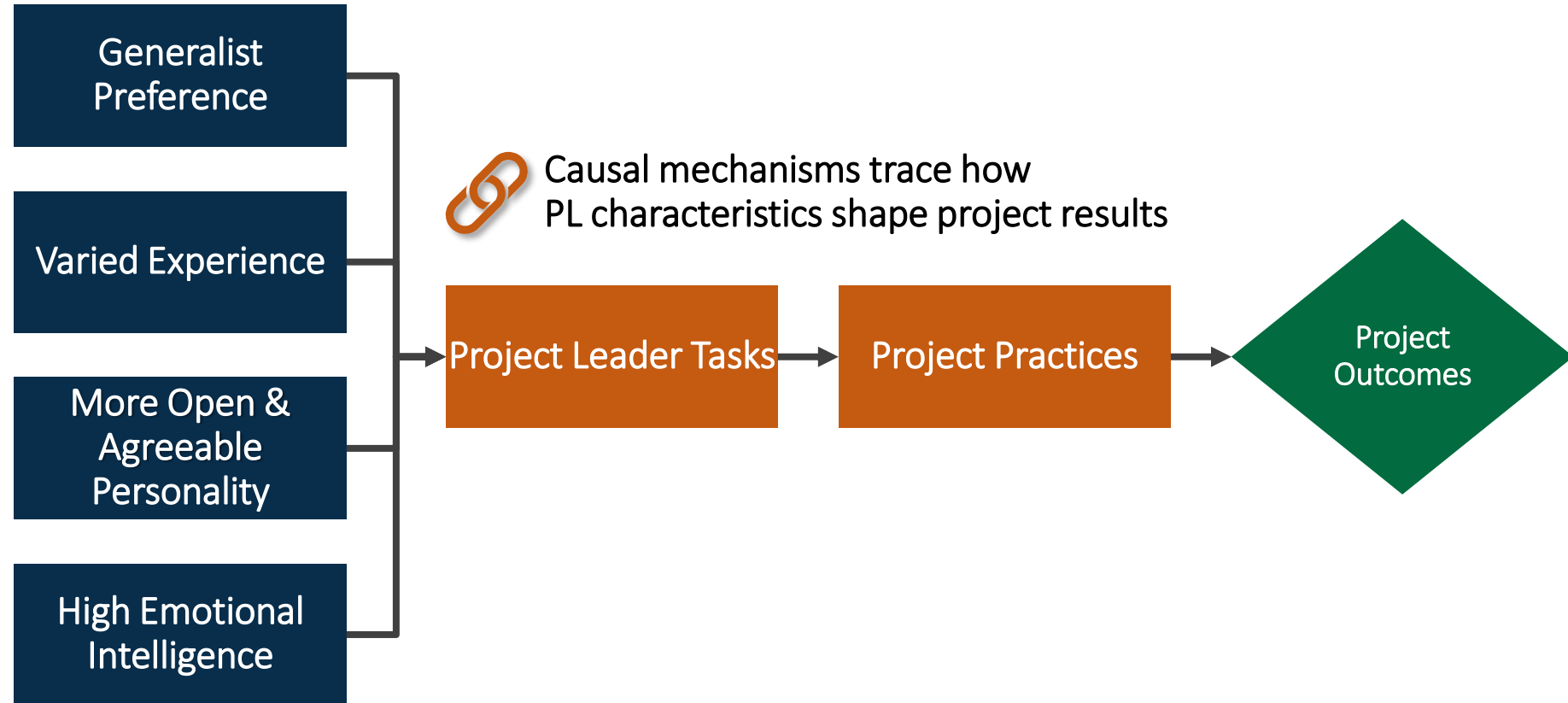


Source: Independent Project Analysis, inc.

- Personality characteristics and emotional intelligence do not magically change project outcomes
- Rather, they shape the tasks that leaders actually do
 - Personality and emotional intelligence affect the things one is good at doing
 - Everyone tends to do more of the things we are good at and less of what we are not
- **Personality and Emotional Intelligence shape the extent to which the right practices are actually followed**

From Traits to Tasks and Practices

Project Leader Traits that Matter



Personality and E-Intelligence Shape Tasks

Generalist Orientation
Varied Experience
Personality
Emotional Intelligence
Leadership Style and Preference



Source: Independent Project Analysis, inc.



Tasks Project Leaders Spend Time On During Projects		
	Significantly Less Time	Significantly More Time
Big 5 Personality Scales		
Openness	Work Process and Engineering	Communication and People Management
Conscientious	People Management	Communication and Contracting
Extrovert		People Management and Contracting
Neurotic	Contracting	Project Management
Emotional Intelligence Scales		
Recognize Own Emotions	Project Management	People Management
Recognize Others' Emotions	Project Management	People Management
Regulate Emotions	Project Management	Contracting
Social Skills	Work Process, Project Controls, and Project Management	People Management
Use Emotions	Work Process	People Management and Contracting
Optimism	Project Controls	People Management and Contracting

Leaders v. Managers

Generalist Orientation

Varied Experience

Personality

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Leadership Style and Preference



Source: Independent Project Analysis, inc.



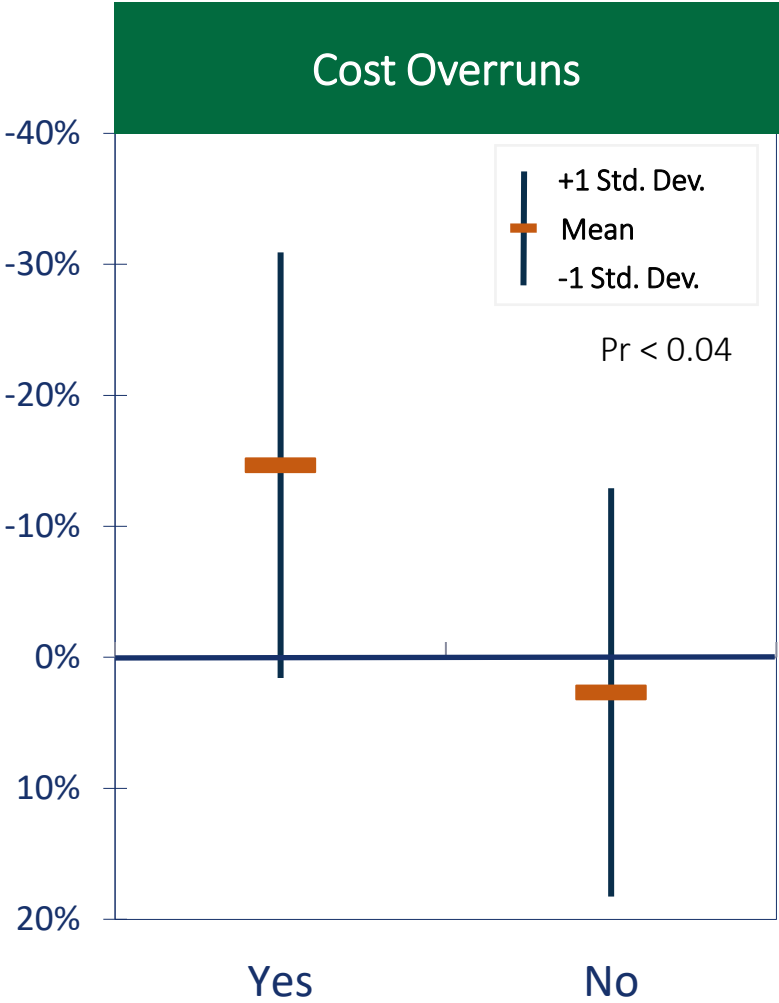
- Those with more open personalities and high emotional intelligence tended to focus on:
 - Communication
 - People management
 - Contracting
- Those lower on these scales tended to focus on:
 - Project management tasks
 - Controls and engineering
 - Work process
- The first group understood their job to be leadership; the second felt their job was project management

Valuing Stakeholder Management is Key

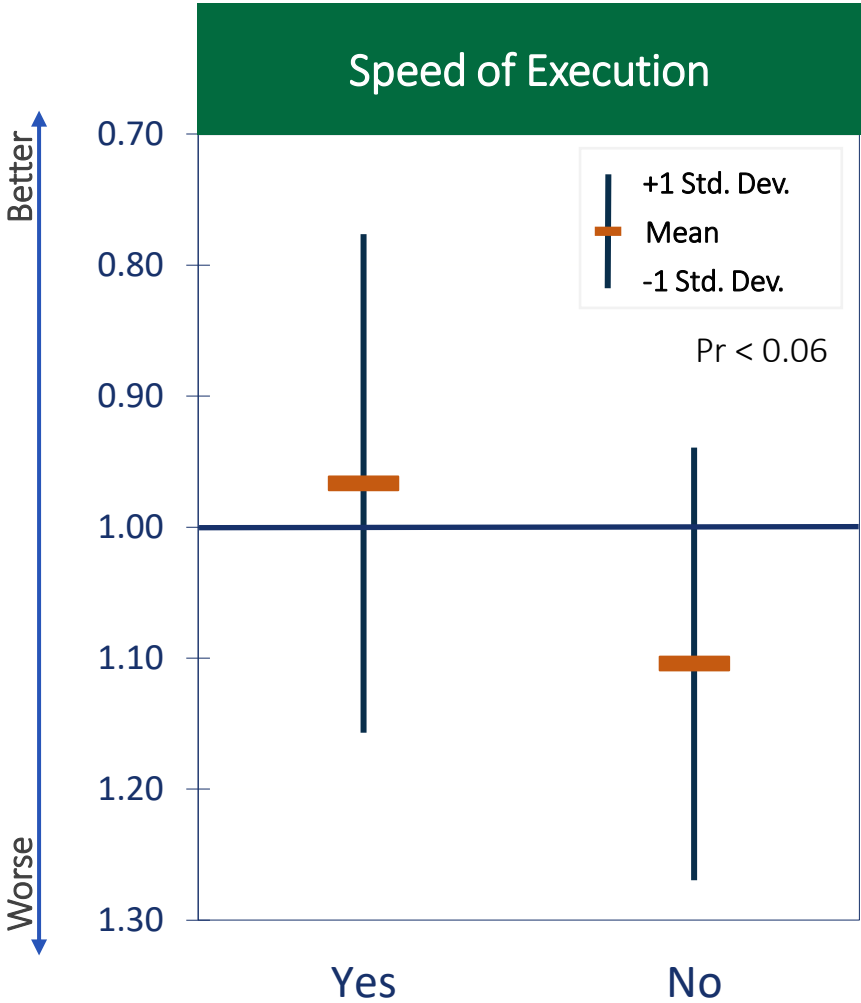
- Generalist Orientation
- Varied Experience
- Personality
- Emotional Intelligence
- Leadership Style and Preference



Source: Independent Project Analysis, inc.



Stakeholder Management Perceived as Value-Adding PL Task



Stakeholder Management Perceived as Value-Adding PL Task

Listening and Decision-Making

Generalist Orientation

Varied Experience

Personality

Emotional Intelligence

Leadership Style and Preference



Source: Independent Project Analysis, inc.



- Successful leaders manage to balance a paradox:
 - Good project leaders listen to everyone, but
 - Jealously guard their decision-making prerogatives
- The key is that they are genuine listeners:
 - They will change their mind if the evidence is good
 - They never do “fake listening”
- But they and they alone will make the final decisions
 - No need for consensus
 - No group-think
 - No going along to be a good sport

Conclusions

- The leaders of complex projects have a very different profile than project managers generally or engineers generally
- A successful complex project leader is:
 - A generalist (understands the “big picture”)
 - Aware that areas of focus change through the project’s life cycle
 - Has clear understanding of objectives and deliverables for each phase of the project
 - Has diverse experiences that can support difficult decision-making and solving unpredictable problems
 - Politically savvy within the company
 - Diplomatically adept with extensive network within the organization
 - Can get others to cooperate
 - An excellent communicator
 - Especially upward communication
 - Able to take complex issues and simplify the decision-making process for business superiors



Thought

***“The hard stuff is easy.
It’s the soft stuff that is really hard.”***

*—Leader of the most complex successful
gigaproject*





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