

INDEPENDENT PROJECT ANALYSIS, INC.



# Commercialization of New Technology

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Conference

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# Outline

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- ***Independent Project Analysis Approach***
- **Innovative Projects**
- **Commercialization Best Practices**



# IPA's Background

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- **IPA works for the process industry around the world, evaluating 800 to 900 major projects per year**
- **We analyze about 40 to 60 new technology projects per year**
- **We collect data on new technology projects at all phases, from R&D to operation**
- **This experience provides IPA a vantage point for what works and what doesn't work in new technology commercialization**



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# Why Is New Technology Important?

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***New technology plays an important role in business success***

- **In specialties, new technology is frequently required to bring a new product to market**
- **In commodity businesses, new technology is a driver of being the coveted “low-cost producer”**
- **For all customers, new technology creates business opportunities**



# New Technology Database

## *Project Characteristics*

|                                 |  |
|---------------------------------|--|
| <b>Number of Projects:</b>      | <b>1000+</b>   |
| <b>Project Size Range:</b>      | <b>\$500 Thousand to \$2 Billion</b>   |
| <b>Number of Organizations:</b> | <b>150</b>   |
| <b>Authorization Year:</b>      | <b>1996</b>  |
| <b>Range:</b>                   | <b>1973 - 2010</b>   |
| <b>Project Types:</b>           | <ul style="list-style-type: none"><li>• Greenfield and Brownfield</li><li>• Sustaining Maintenance</li><li>• Expansion</li><li>• Revamp</li></ul>  |
| <b>Industry Sectors:</b>        | <ul style="list-style-type: none"><li>• Minerals</li><li>• Consumer Products</li><li>• Commodity Chemicals</li><li>• Specialty Chemicals</li><li>• Refining</li><li>• Pharmaceutical</li></ul> |



# New Technology Database

## *Project Technology Characteristics*

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### **Technical Difficulty:**

- Ranges from new application for company to significant advance in technology
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### **Process Complexity (*Median*):** *Range:*

**6 Steps**  
***1 Step to 16 Steps***

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### **Feedstock:**

- Raw Solids
- Process Solids
- Liquids and Gases



## Lack of Coherent Approach

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- **Despite the importance of new technology, most companies today lack a coherent approach**
  - **Have no rules or guidelines on how to commercialize new technology**
  - **Would like to have A+ capability with D- resources**
  - **Are ignorant of the realities of new technology in the businesses**
- **Startup companies are often pushed by inexperienced investors to perform faster than humanly possible**

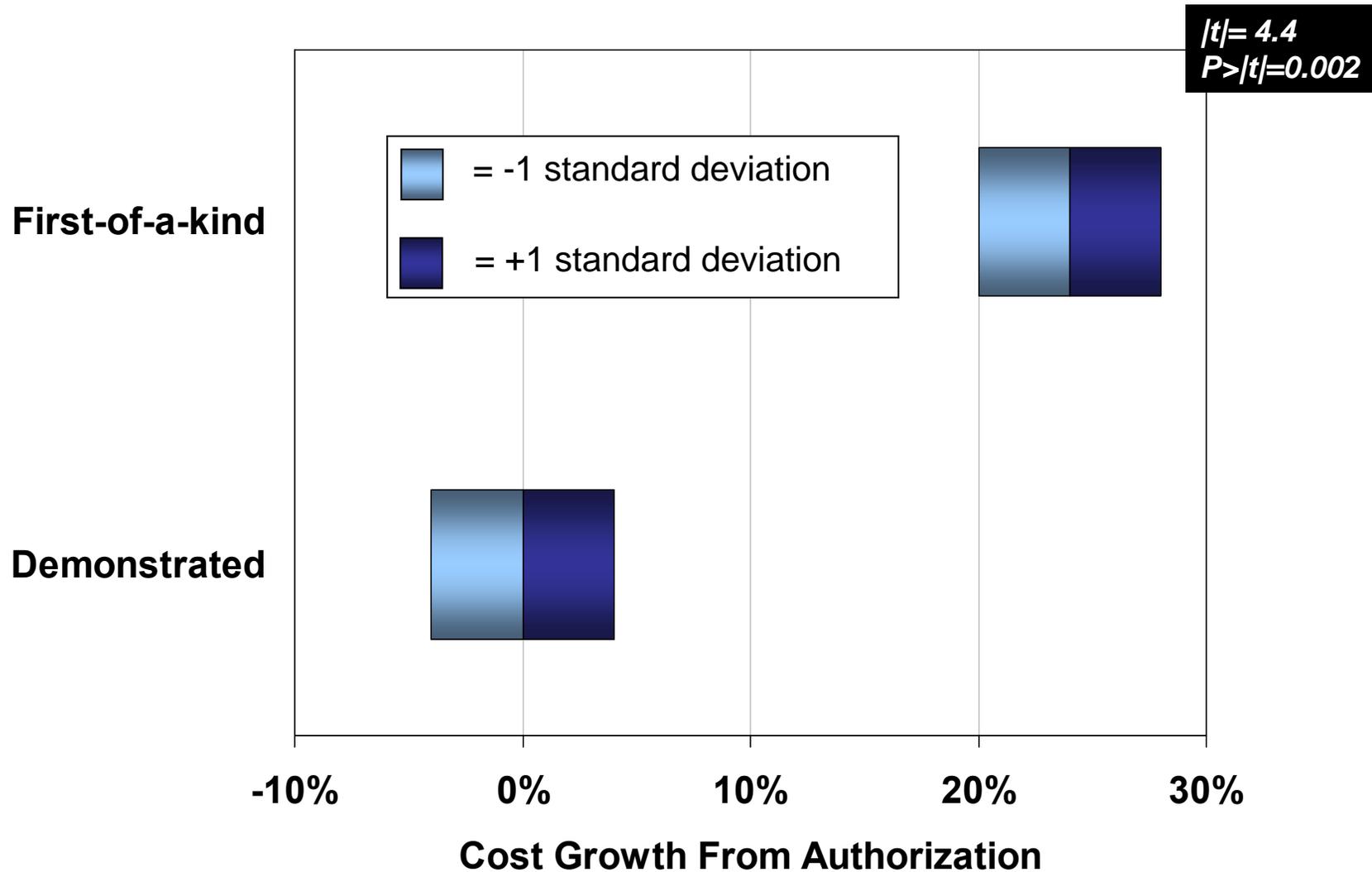


# New Technology Track Record

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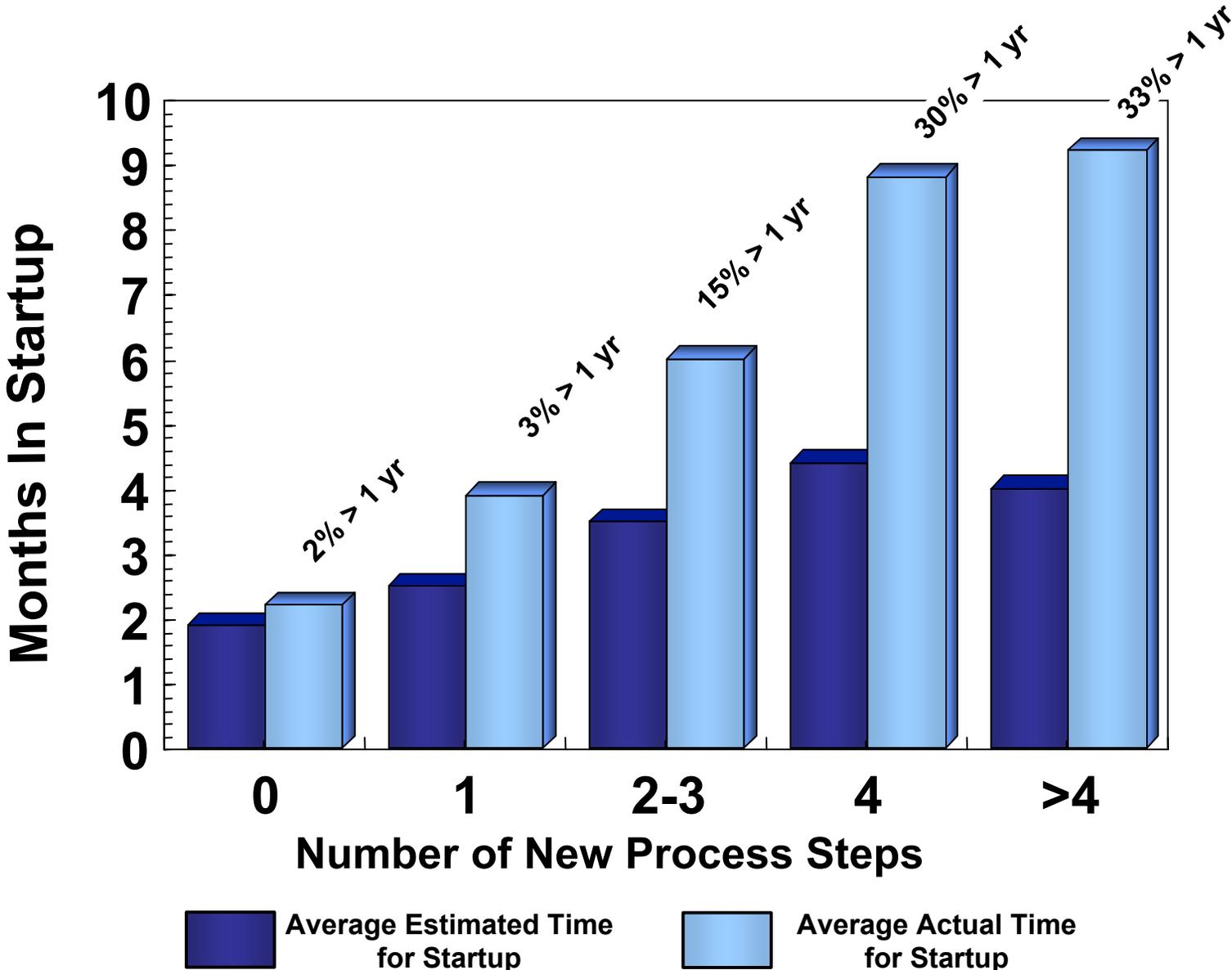
- **Over 40 percent of the moderate and high innovation efforts were outright failures**
- **Fewer than 20 percent delivered all of what was promised at full-funds authorization**
  - **However, many of those delivered a bundle of money to the bottom line**
- **Success and failure do not necessarily reflect the technology, but often indicate process development and project practices**

# First-of-a-Kind Processes Have Higher Cost Growth Than Those Previously Demonstrated



*Not controlled for other factors*

# New Technology Startup Erodes Cycle Time





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- Independent Project Analysis Approach
- Innovative Projects
- ***Commercialization Best Practices***
  - ***Recognize Risks of Innovation***
  - Provide Adequate Resources
  - Complete Basic Data
  - Define Project Well



# Recognize Risks of Innovation

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- **New technology projects fail because risks – business and technical – are underestimated or not recognized**
  - **Some project cultures seek to downplay all project risks for fear of turndown at authorization**
  - **Many project systems do not see enough innovative projects to develop the necessary respect for them**
  - **Many new ventures with no innovation experience in capital heavy process industries**



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# Resourcing the New Technology Project

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- **New technology projects need**
  - **A higher level of technical resources**
  - **Better team continuity**
  - **Better team integration**
  - **Much more business involvement**
  - **Willingness to pilot**
  - **Senior management buy-in to the new technology nature of the project**
  - **Substantial owner involvement—no “hands-off” approach**
- **Willingness to schedule by accomplishment**



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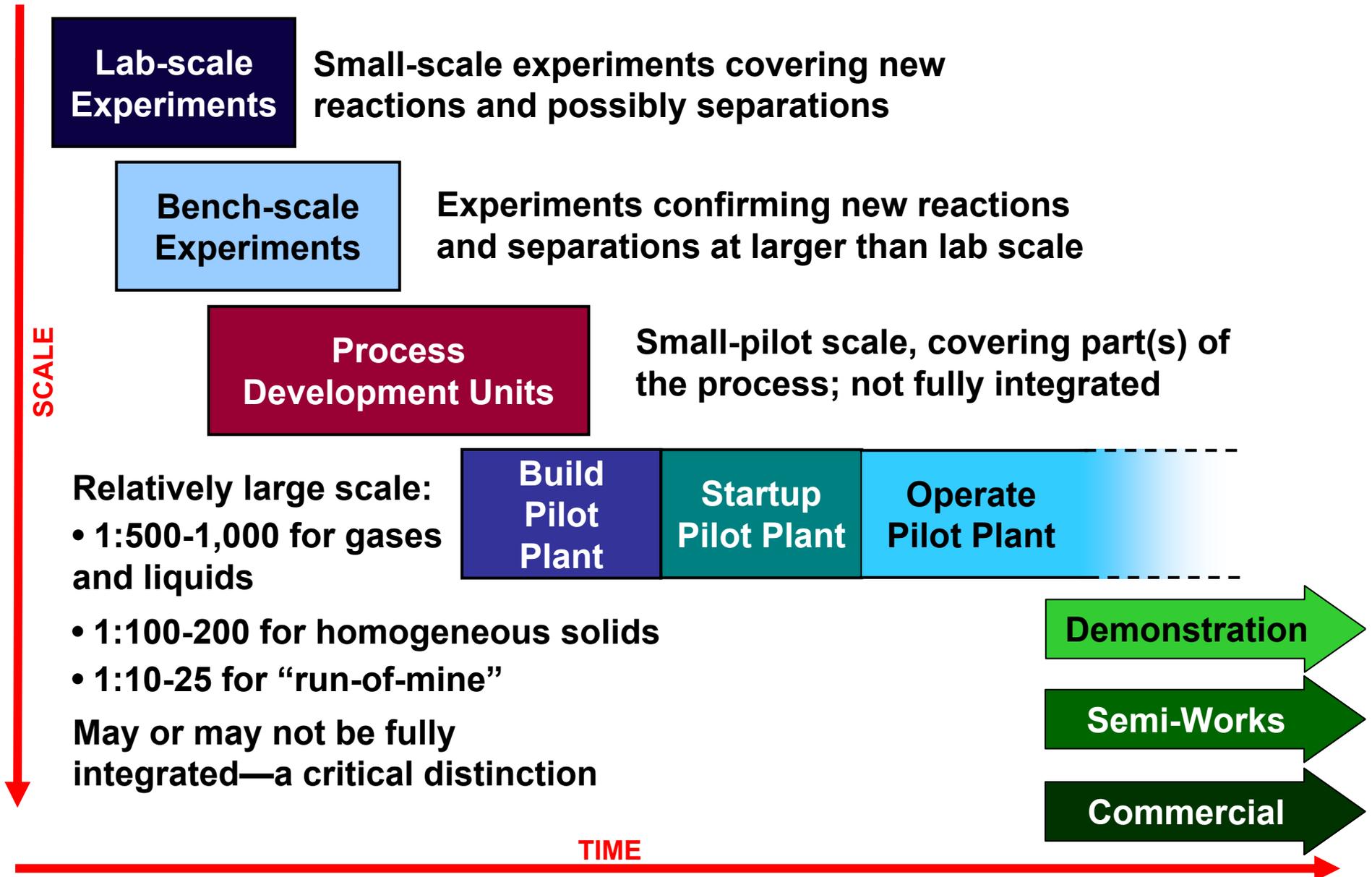


# Complete Basic Data

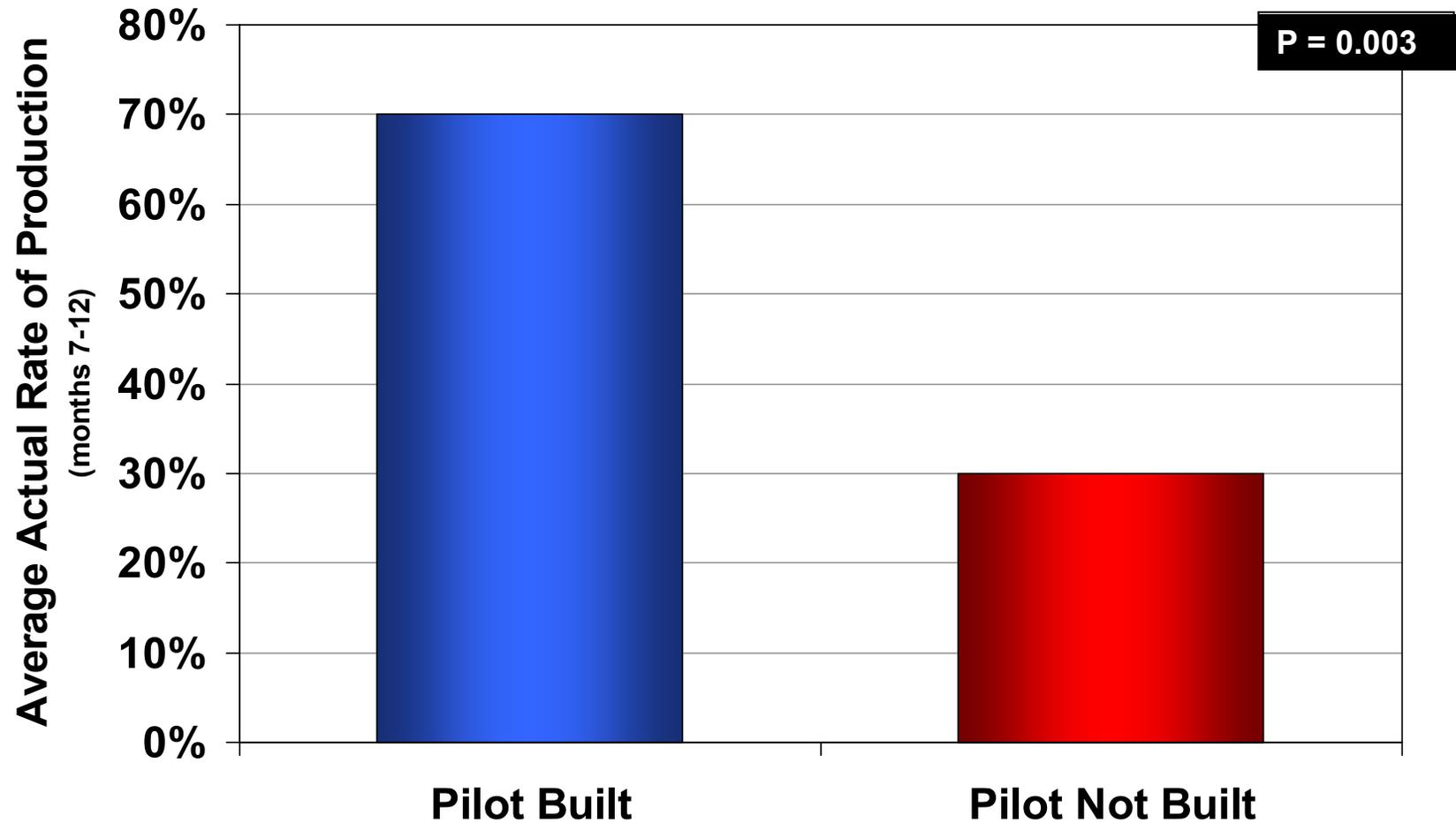
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- **Every project is engineered from a Basic Technical Data package that governs design**
- **Basic Data reflect science underpinning technology**
- **Sometimes Basic Data are fully or almost fully developed before project starts scope development**
- **For many projects, however, Basic Data are to some degree uncertain or even unknown**
  - **Many projects containing new technology**
  - **All projects involving new raw materials supplies:**
    - > **New minerals deposit development**
    - > **New petroleum reservoir developments**

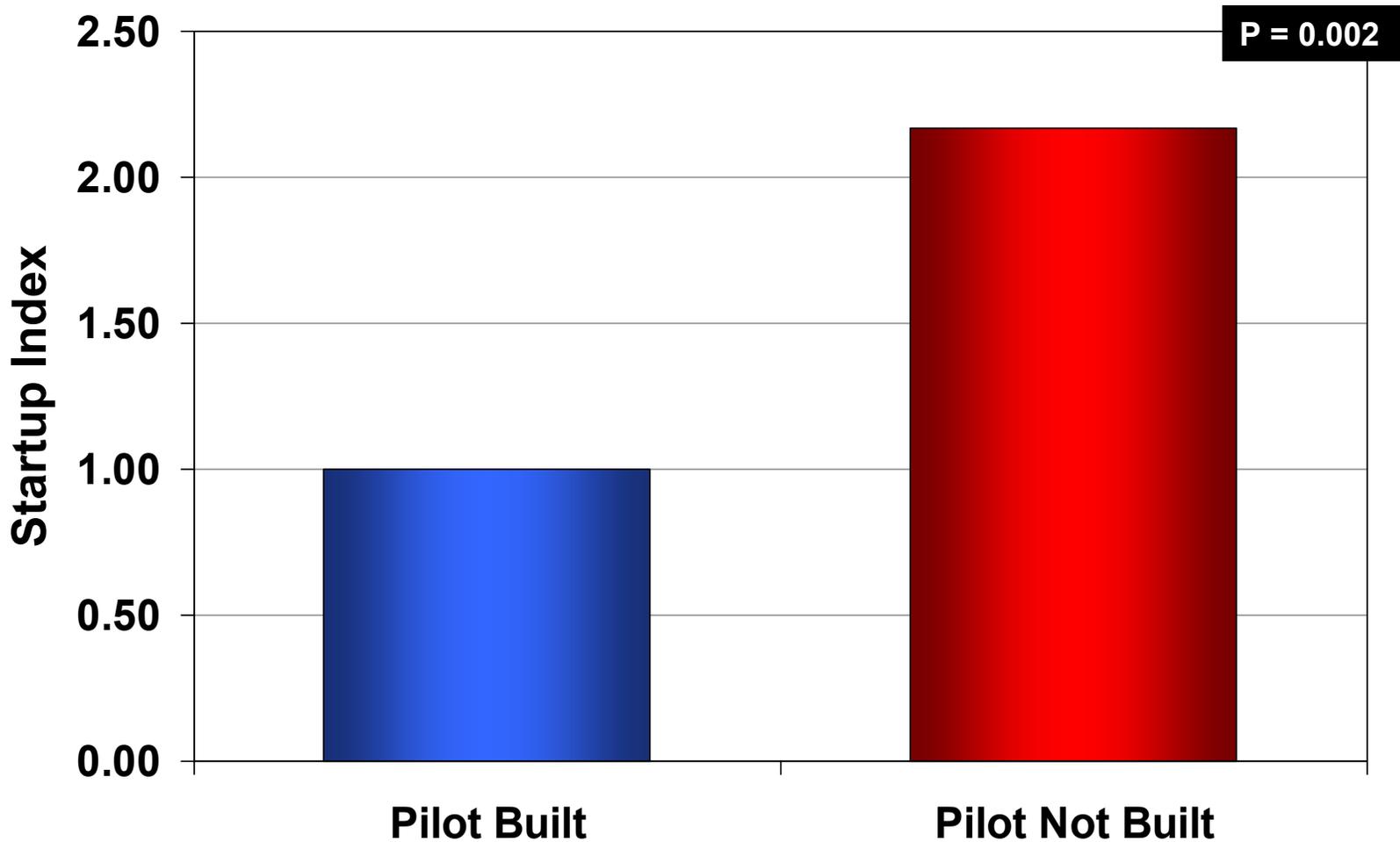
# Develop the Process Well



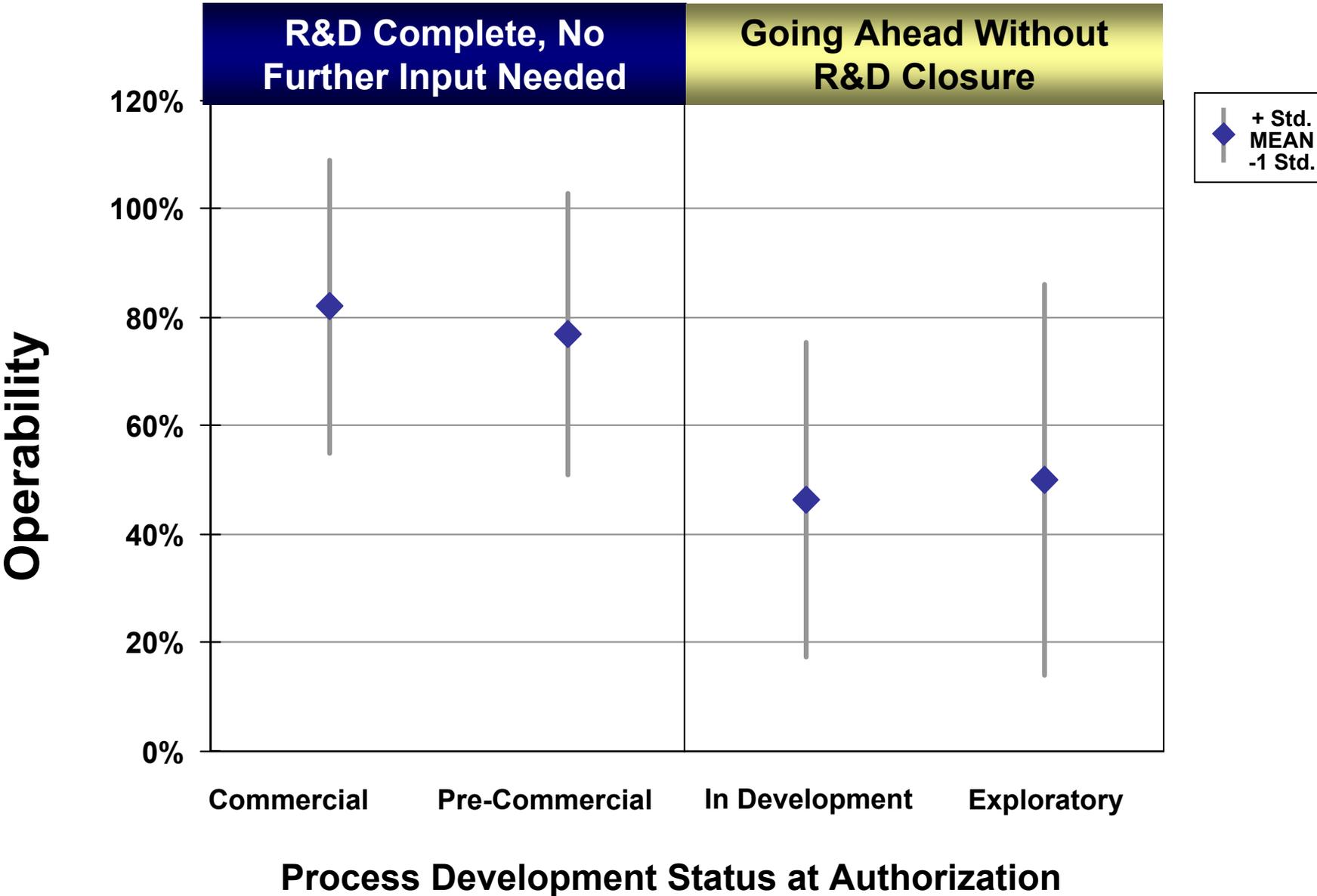
# Pilot Plants Increase Operability



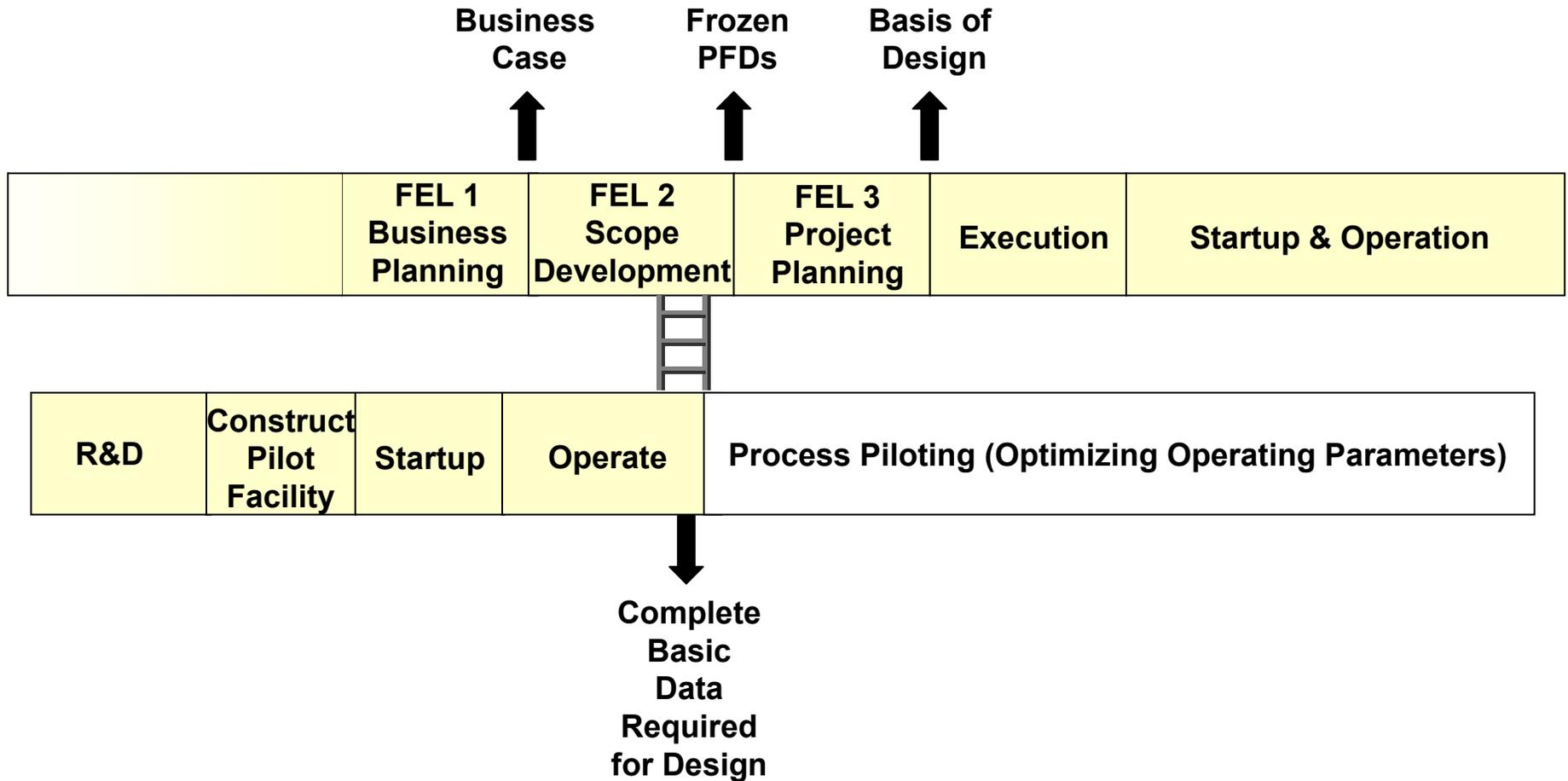
# Pilot Plants Decrease Startup Time



# Process Development Is a Prerequisite



# Schedule by Accomplishment Only Project Delivery Roadmap



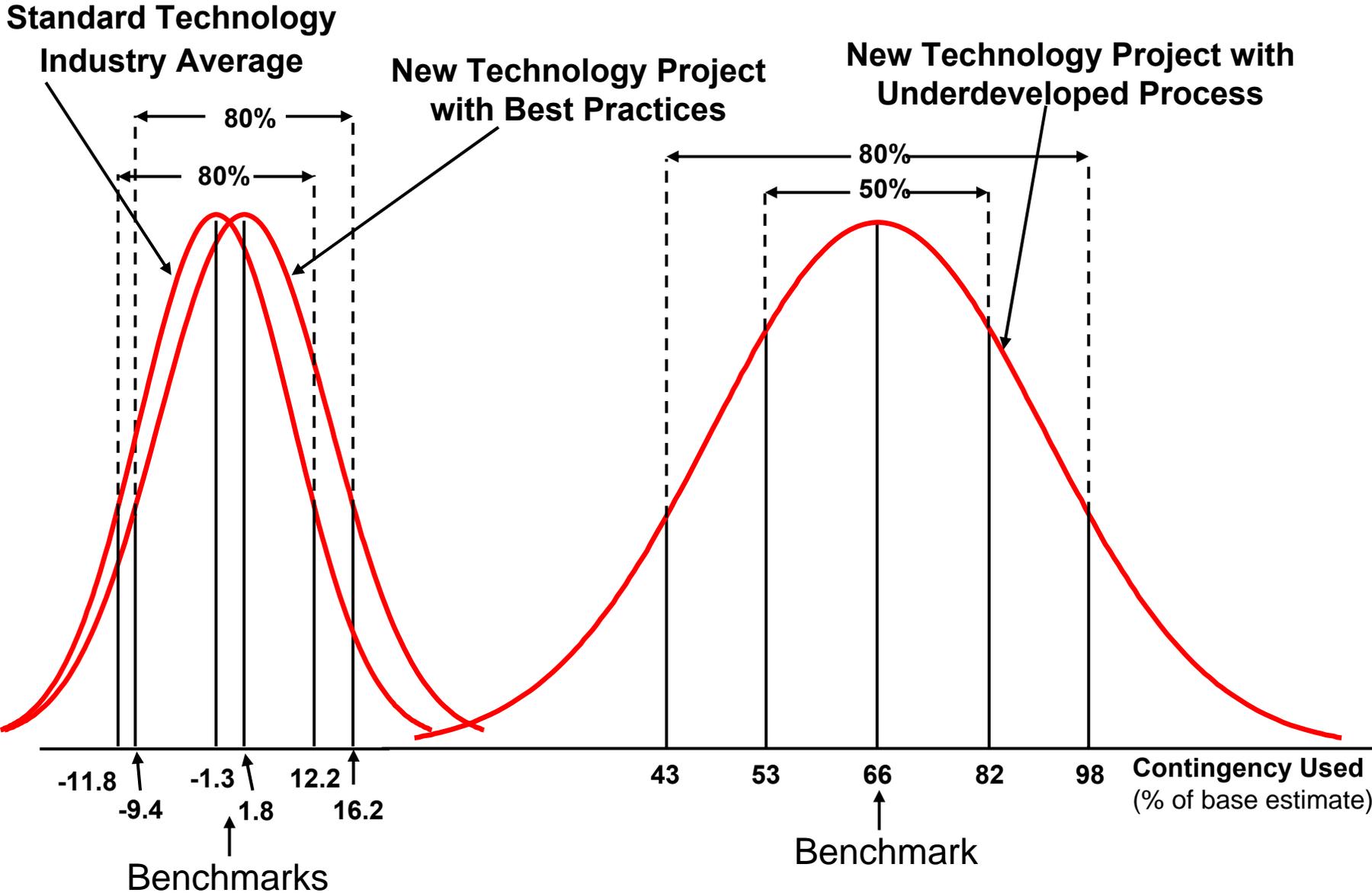


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# Contingency Requirements of Projects





# Summary

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## **Key Practices for Successful Commercialization of New Technology**

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- ✓ **Recognize the innovation**
- ✓ **Robust teams with all critical team members that are established early is essential to project success**
- ✓ **High owner involvement and early contractor participation are key elements to any contracting strategy**
- ✓ **A complete Basic Technical Data package is fundamental to the project's operational performance and overall success**
- ✓ **Project definition is key to controlling the risks inherent to innovative projects**



# Questions?

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