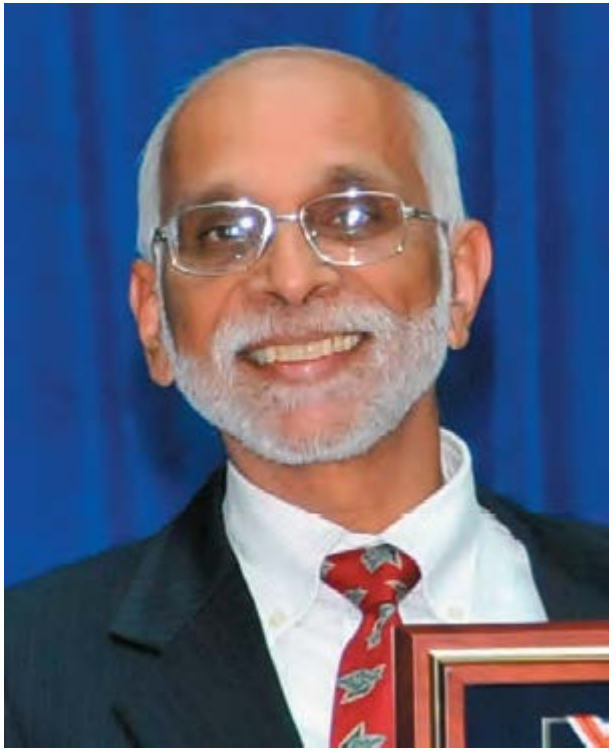
Project Delivery Benefit-Cost Analysis

P3-VALUE 2.0 Webinar

February 22, 2016

Instructors



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Office of Innovative Program Delivery

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P3-VALUE 2.0 Webinars

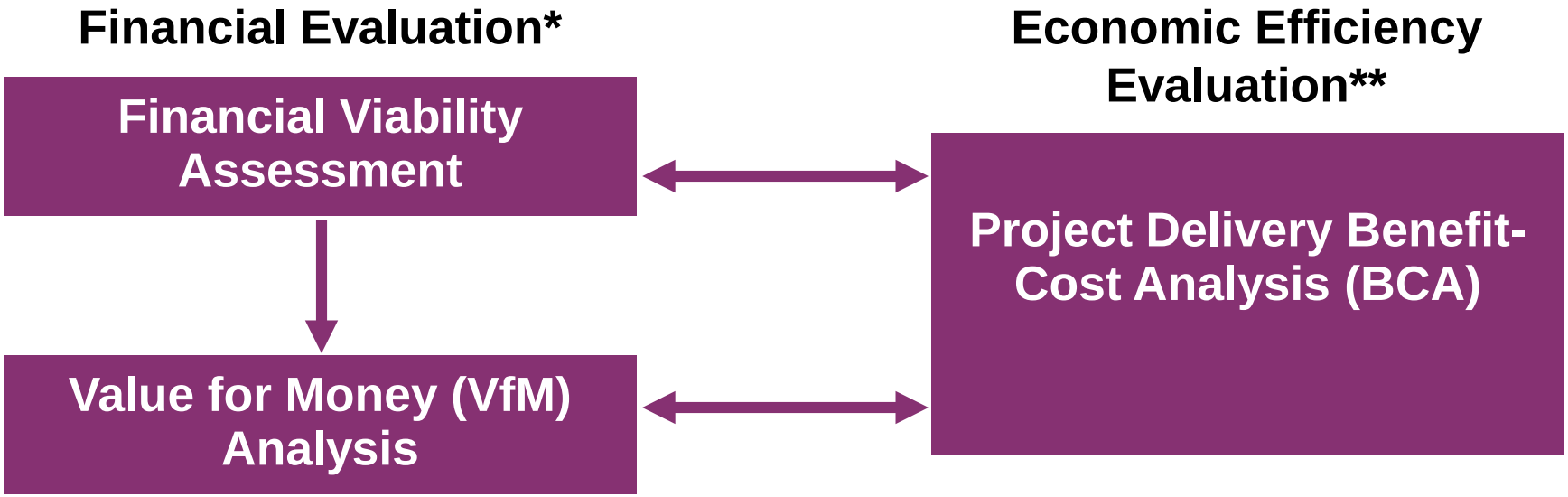
- **P3:** Public Private Partnership
- **P3-VALUE 2.0:** Analytical tool to help practitioners understand processes used to quantitatively evaluate P3 options
- This is the fourth webinar on P3-VALUE
  - P3 Evaluation Overview (January 25, 2016)
  - Value for Money Analysis (February 8, 2016)
    - VfM Exercise Review (February 16, 2016)
  - **Project Delivery Benefit-Cost Analysis (today)**
  - Risk Valuation
  - Financial Viability Assessment

Webinar Outline

Part 1

Introduction

Types of Project Delivery Evaluation



* Cash flow analysis

** Net economic benefits excludes transfers and financing cash flows

Financial vs. Economic Evaluation

- **Financial Evaluation**
  - Considers financial elements only, i.e., “cash flows”
  - Perspective is that of the procuring agency

- **Economic Efficiency Evaluation**
  - Considers full range of costs and benefits to society
  - Perspective is that of society as a whole

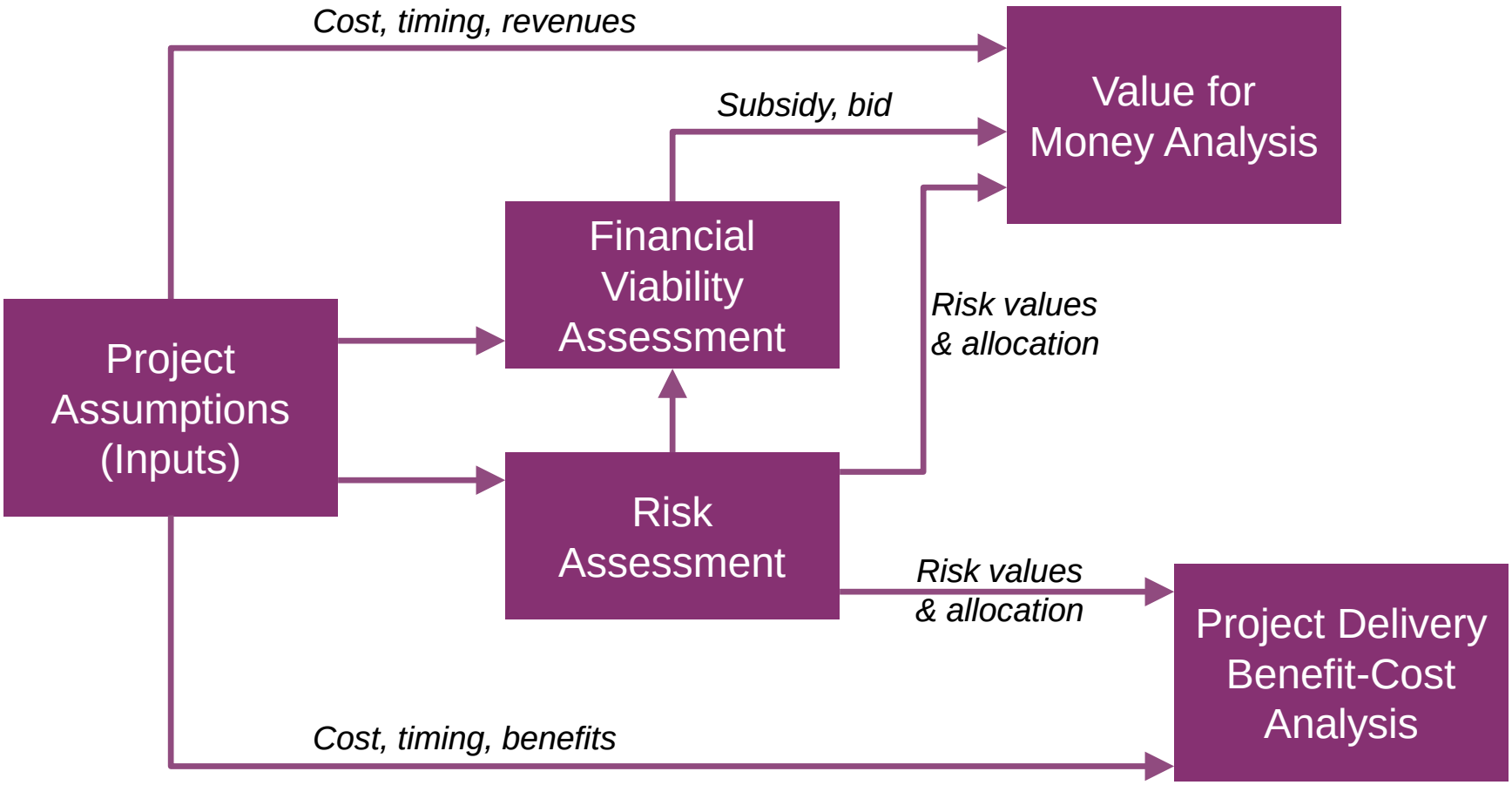
Financial Evaluation Questions

- Is the project affordable to the public agency?
- Will P3 procurement enhance the financial position of the public sponsor?

Economic Efficiency Questions

- Does the project yield benefits to society that exceed the costs to society?
  - What is the best project design alternative?
  - When should a project be undertaken?
- Will P3 delivery increase net benefits to society compared with conventional procurement?

P3-VALUE 2.0 Tool Structure



Accounting for Costs

Project Cost	Benefit-Cost Analysis	Value for Money
Capital cost	✓	✓
O&M cost	✓	✓
Risk	✓	✓
Public transaction costs	✓	✓
Private transaction costs (winning bid)	✓	✓
Private transaction costs (losing bids)	✓	✗

Accounting for Other Social Impacts

Other Social Impacts	Benefit-Cost Analysis	Value for Money
User Benefits		
Travel time cost	✓	✗
Incident/accident cost	✓	✗
Vehicle operation cost	✓	✗
Accident cost	✓	✗
Externalities		
Emission costs	✓	✗

Accounting for Financing

Purely Financial Transactions, i.e., Economic Transfers	Benefit-Cost Analysis	Value for Money
Revenues	✗	✓
Taxes	✗	✓
Debt and equity contributions	✗	✓
Interest and dividend payments	✗	✓

Real vs. Nominal Values

	Benefit-Cost Analysis	Value for Money
Dollar values	Real	Nominal
Discount rate for NPV calculations	Real	Nominal

Test Your Knowledge

True or False

- Financial evaluation considers the full range of costs and benefits to society.

Questions?

Submit a question using the chat box

Part 2

Benefit-Cost Analysis Process

Benefit-Cost Evaluation Process

Step 1

Project BCA

Step 2

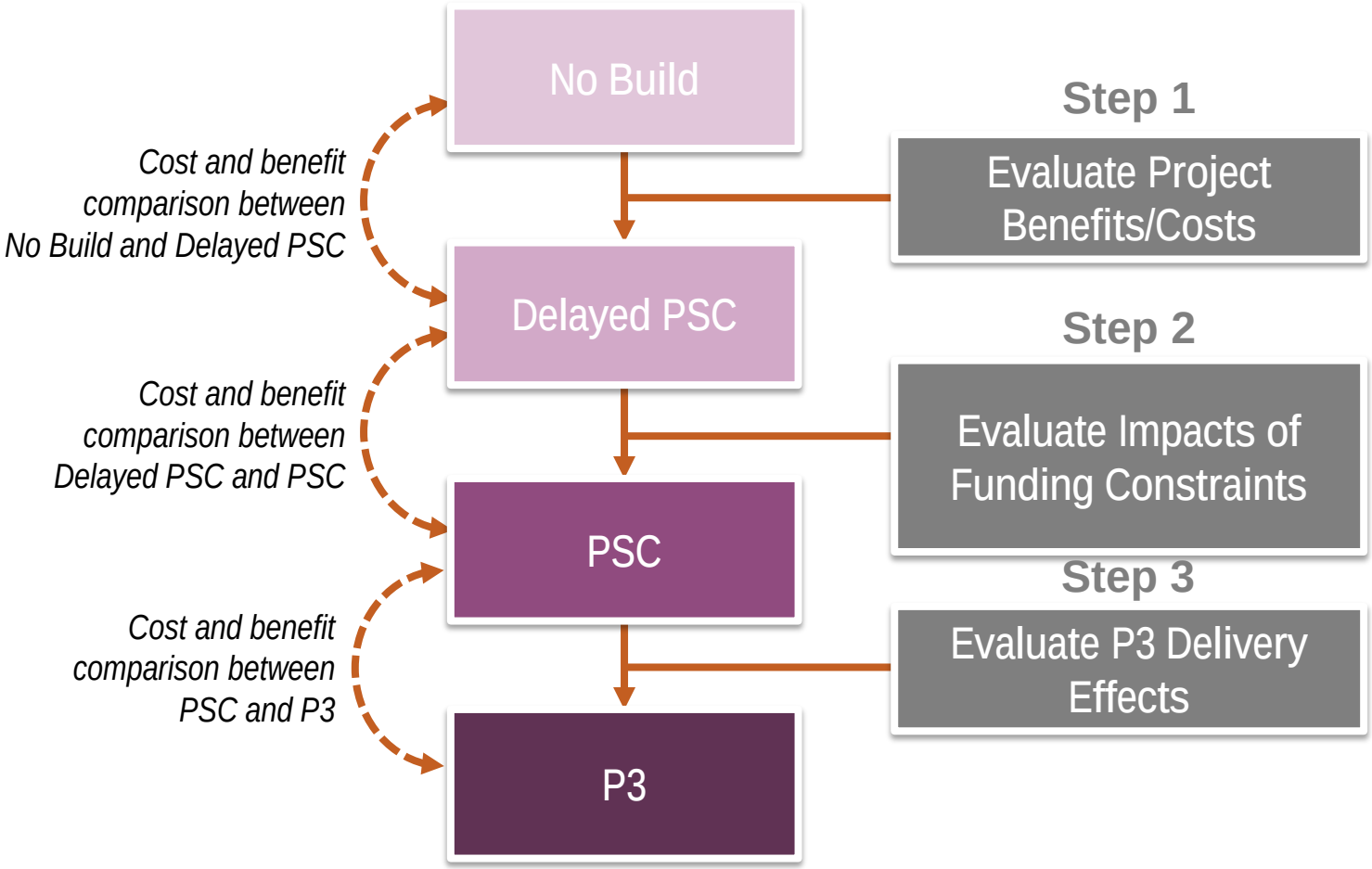
Impacts of Funding Constraints

Step 3

Impacts of P3 Delivery

- Timing impacts
- Cost impacts
- Quality impacts
- Scope optimization

Project Delivery BCA Framework

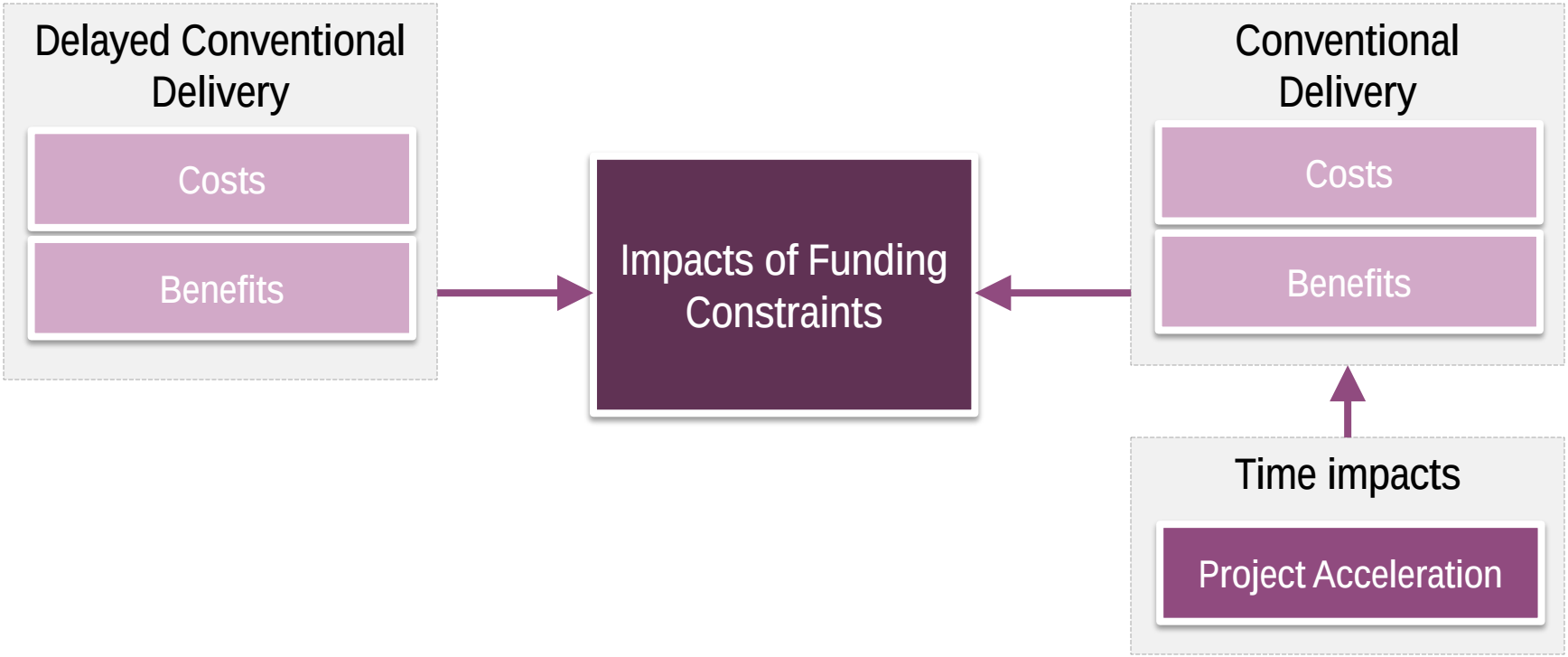


Step 1: Project Benefits/Costs

Delayed Conventional Delivery compared to No Build

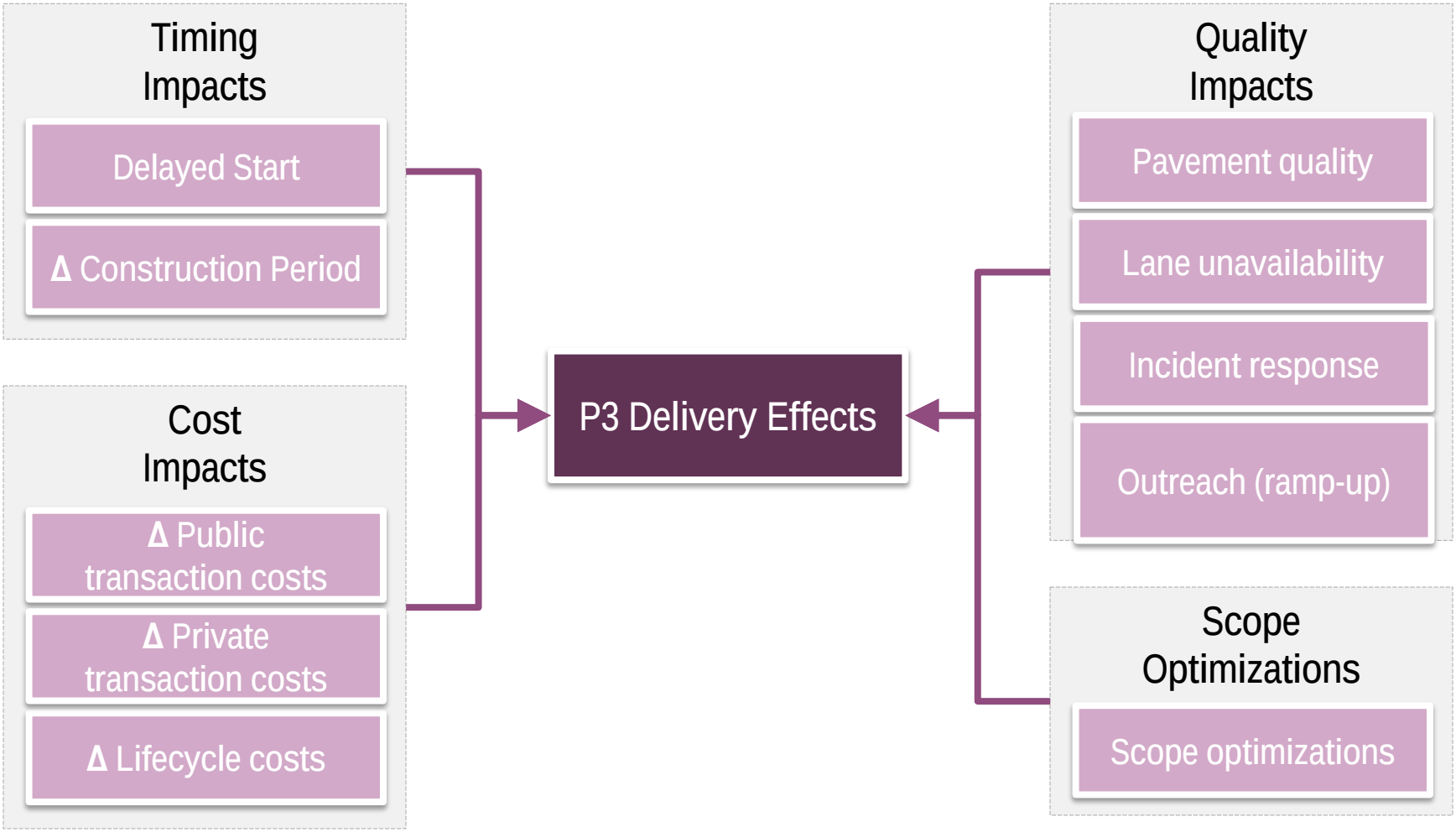
Step 2: Impacts of Funding Constraints

Delayed Conventional Delivery (Delayed PSC) compared to Conventional Delivery (PSC)



Step 3: P3 Delivery Effects

Conventional Delivery (PSC) compared to P3



P3 Timing Impacts

P3 can delay or accelerate project:

- Complex P3 contracting may delay project start
- P3 concessionaire may be financially incentivized to shorten construction period (acceleration)

Impacts of acceleration are:

- Higher NPV of costs due to effect of discounting
- Higher NPV of benefits due to earlier opening to traffic

P3 Quality Impacts

Benefit Category	Estimation based on:
Pavement quality adjustment to vehicle operating costs	• Difference in International Roughness Index (IRI)
Delays during construction due to lane unavailability	• Differences in number of days and hours of lane closures
Delays during operation due to lane unavailability	• Differences in number of days and hours of lane closures
Delays during operation due to incidents	• Differences in effect on average speed
Faster traffic ramp-up due to P3 innovations & outreach activities	• Difference in traffic volumes during ramp-up period

Economic Costs

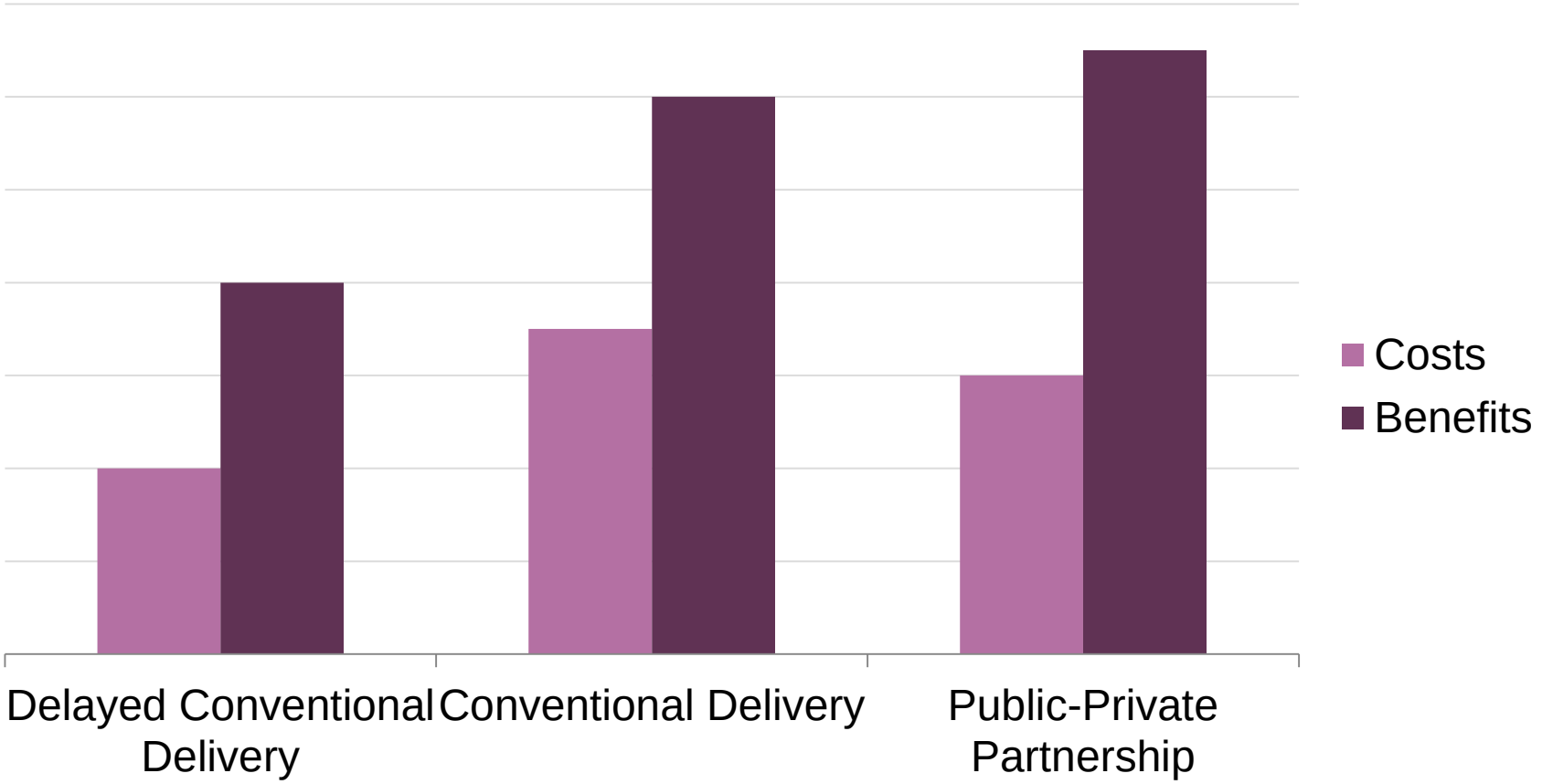
Cost item	Delayed PSC ($M)	PSC ($M)	P3 ($M)
Planning and preparation costs			
Procurement costs			
Design and engineering costs			
Construction costs			
O&M costs			
Major maintenance costs			
Contingencies			
Base variability			
Systematic risks and uncertainties			
Total costs for Build Alternative			
No Build cost savings			
Total economic costs			

Economic Benefits

Benefit item	Delayed PSC ($M)	PSC ($M)	P3 ($M)
Travel time savings			
Vehicle operating cost savings			
Fuel cost savings			
Environmental benefits			
Safety benefits			
Other benefits			
Disbenefits during construction			
P3 quality impacts			
Economic benefits - existing users			
Consumer surplus - “new” users			
Producer surplus - “new” users			
Total economic benefits			

Project Delivery BCA Output

Delivery models compared to No Build



Perspective Considerations

Perspective	Financial Analysis (VfM)	Economic Analysis (PDBCA)
Agency	Costs to Agency's balance sheet	Agency costs plus societal benefits
State	Costs to State	State costs plus societal benefits
National	Societal costs	Societal costs and benefits (true BCA)

Test Your Knowledge

True or False

- Benefits from project acceleration may not necessarily be attributable to P3 delivery.

Questions?

Submit a question using the chat box

Part 3

P3 Delivery Economic Differences

Factors Affecting P3 Differences

Project characteristics

- Size
- Complexity

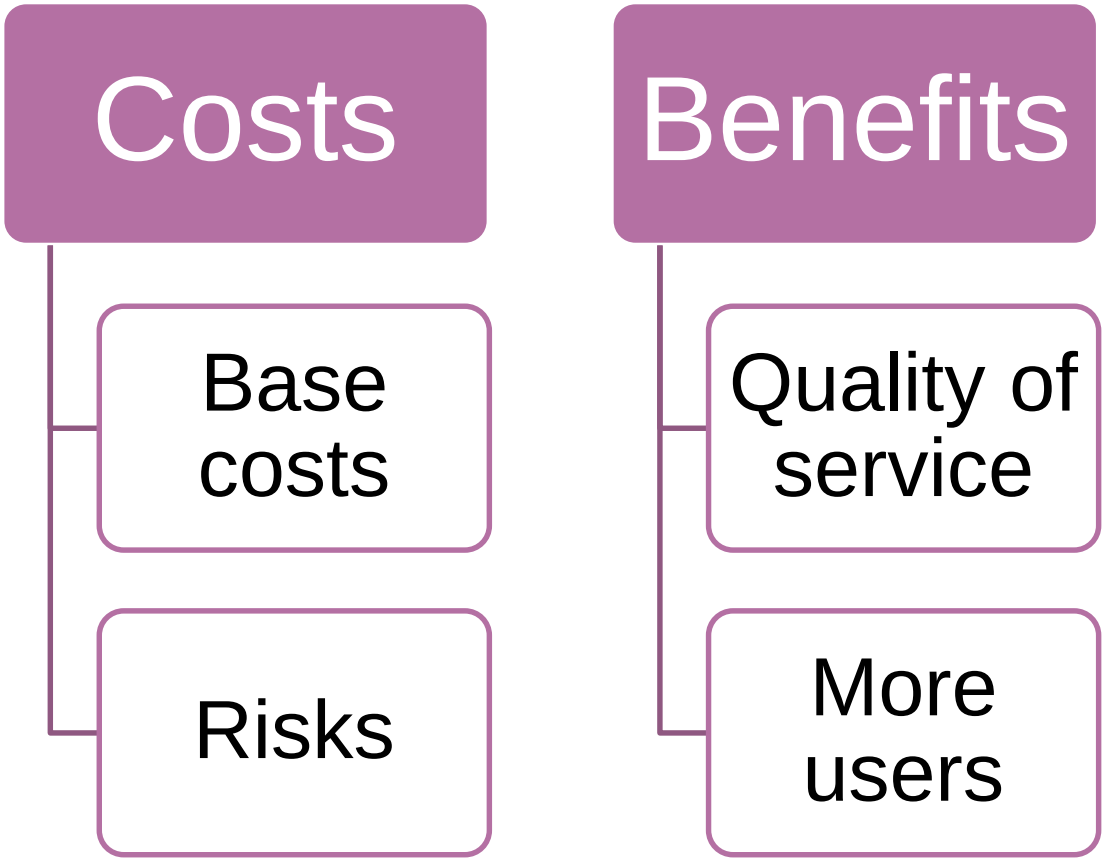
Context characteristics

- Institutional capacity
- Market

Procurement characteristics

- Agreement
- Conventional delivery efficiency

Impacts of P3 Differences



Differences Relative to VfM Analysis

- **Included costs:**
  - Only financing fees
  - Lifecycle performance risk under P3
  - Uncompensated costs of losing bidders

- **Not included:**
  - Toll revenues (and uncertainty adjustment)
  - Financing – equity, debt, and repayments

Differences Relative to VfM (contd.)

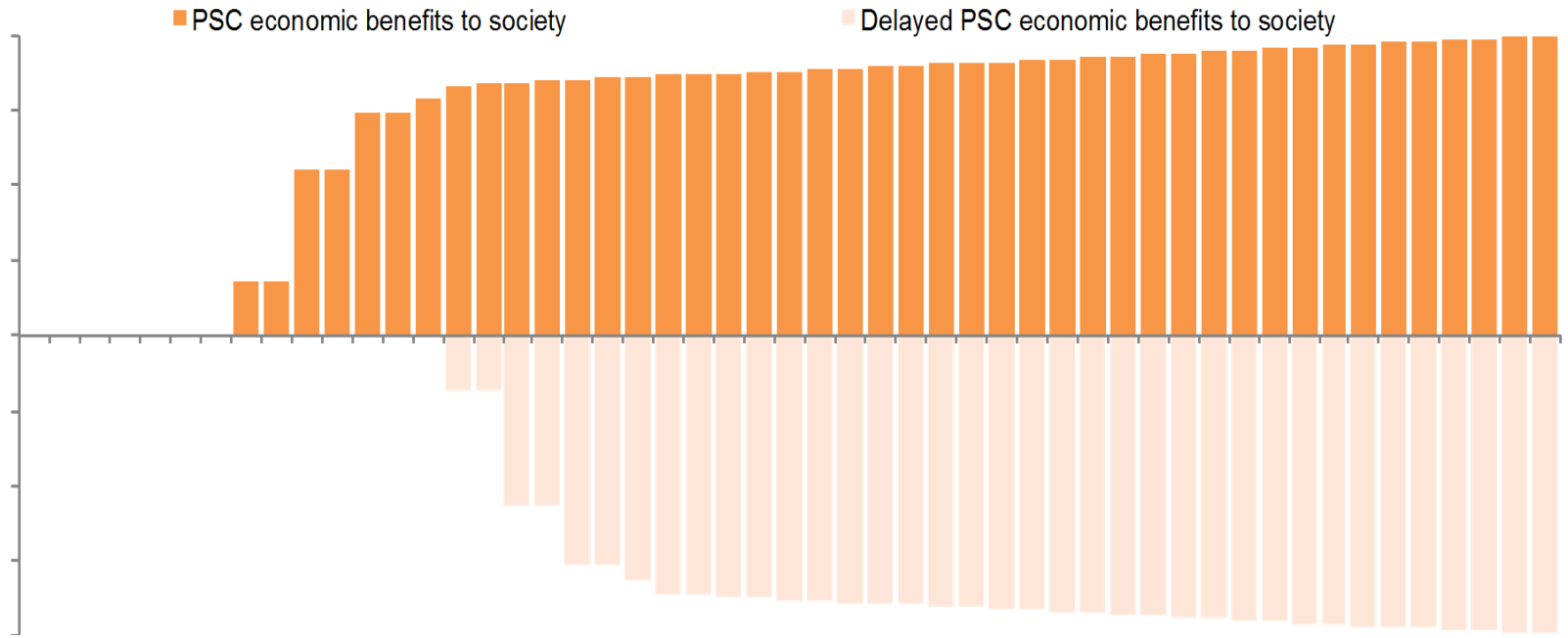
- **Benefits:**
  - *User benefits* – travel time, travel cost (including vehicle operating costs), accident cost differences
    - Existing users
    - New users
  - *Externalities* – emissions cost differences

Sources of Benefits

- **Improved quality of service:**
  - Earlier construction completion
  - Pavement ride quality
  - Work zone practices
  - Incident response

Benefits to Users

- **Earlier construction completion**: Increase in years of benefits



Benefits to Users (contd.)

- **Pavement ride quality**: International Roughness Index vs. fuel and non-fuel cost

	Fuel cost % adjustment		Non-fuel cost % adjustment	
Parameters >>	2 axle	4+ axle	2 axle	4+ axle
IRI	%	%	%	%
0	97.05%	96.07%	100.00%	100.00%
25	97.68%	96.53%	100.00%	100.00%
50	98.00%	97.04%	100.00%	100.00%
75	98.24%	97.53%	100.00%	100.00%
100	98.46%	97.99%	100.00%	100.00%
150	99.52%	99.31%	101.65%	101.84%
200	100.53%	100.74%	105.20%	105.78%
250	101.95%	102.57%	108.76%	109.73%
300	103.39%	104.68%	112.31%	113.67%
350	105.01%	107.03%	115.86%	117.62%
400	107.16%	109.96%	119.41%	121.57%
450	109.31%	112.89%	122.96%	125.51%

Benefits to Users (contd.)

- **Work zone practices**: Estimated 45% speed reduction in work zones, applied:
  - To traffic in section affected
  - For duration affected, on the days affected

**based on SHRP 2 Project L08.*

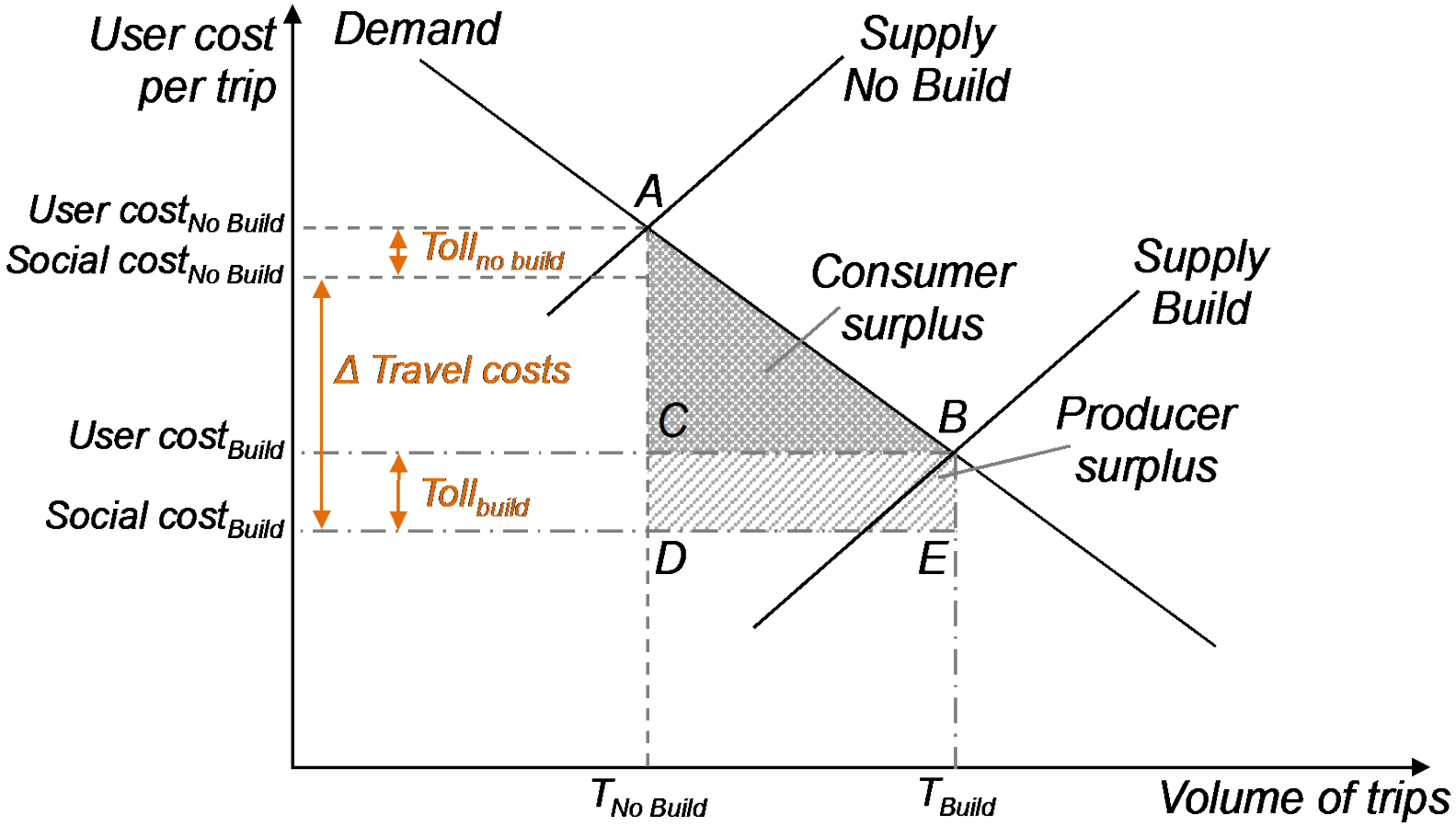
Benefits to Users (contd.)

- **Incident response**: Speed reduction relative to congested speed estimated based on *Urban Mobility Report* (Texas Transportation Institute)

Level of congestion	Daily traffic volume per lane	Speed reduction factor
Uncongested	Under 15,000	5%
Medium	15,001 -17,500	5%
Heavy	17,501 – 20,000	9%
Severe	20,001 – 25,000	18%
Extreme	Over 25,000	23%

Benefits to "New" Users

Rule of Half



Test Your Knowledge

- Which of the following may be different under a P3:
  - Construction completion
  - Pavement ride quality
  - Impacts of work zone practices on travel time
  - Incident response time
  - All of the above

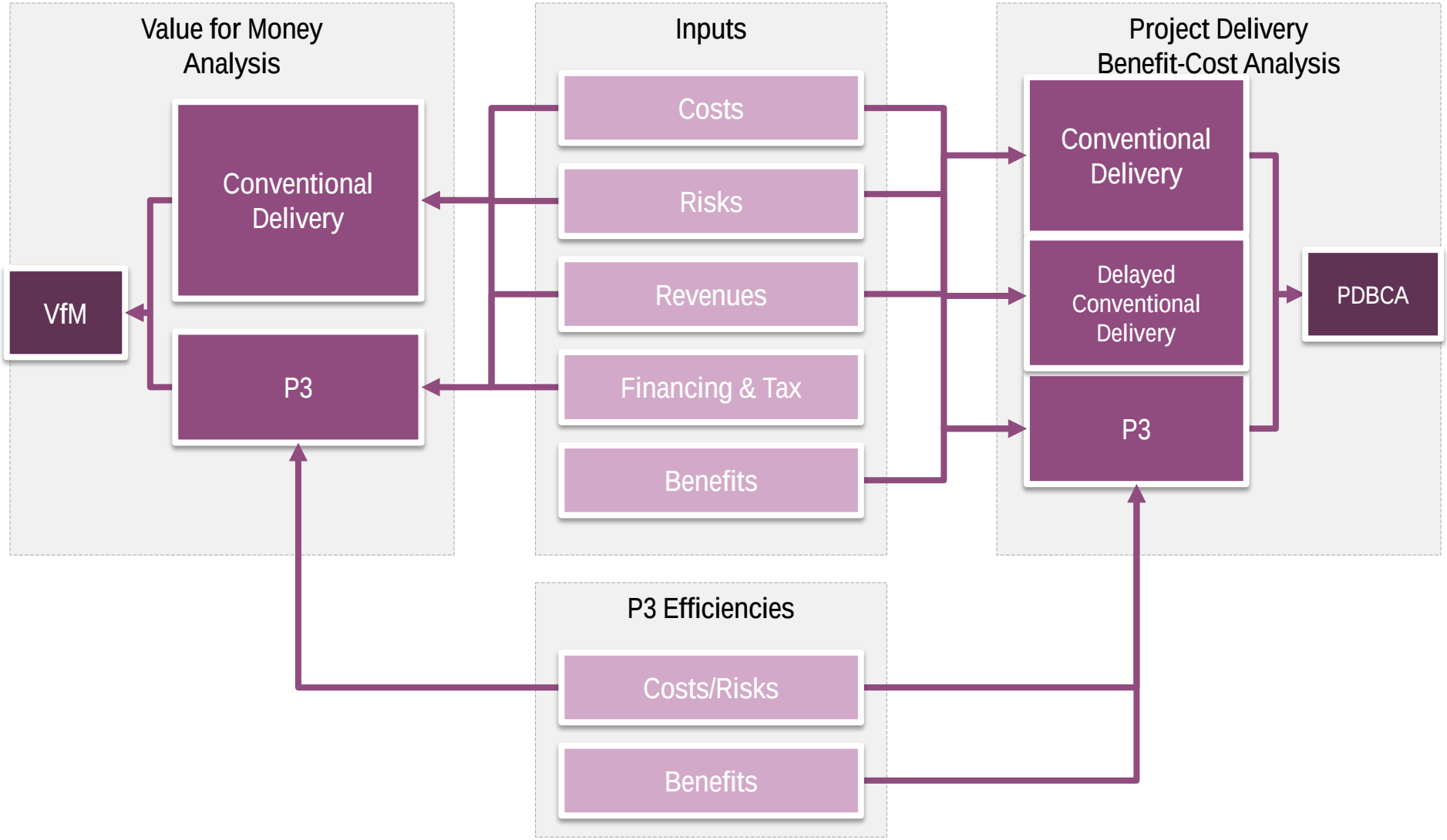
Questions?

Submit a question using the chat box

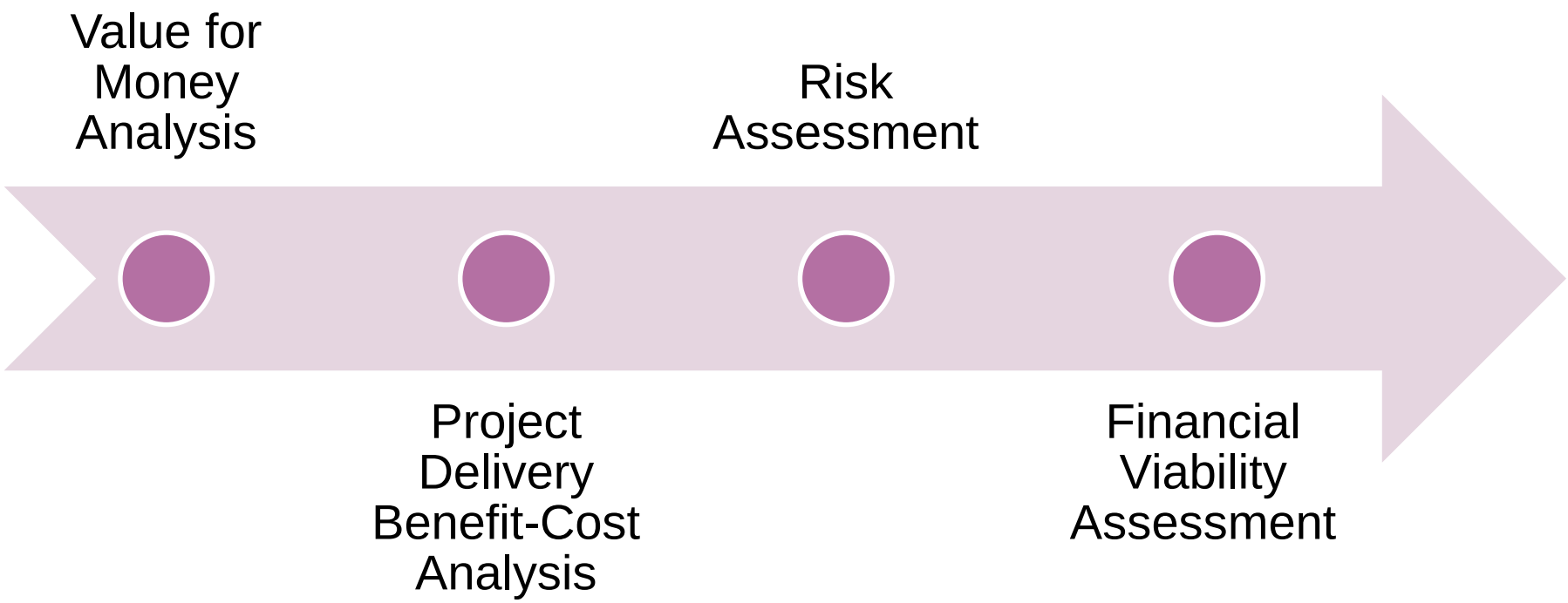
Part 4

Project Delivery Benefit-Cost Analysis using P3-VALUE 2.0

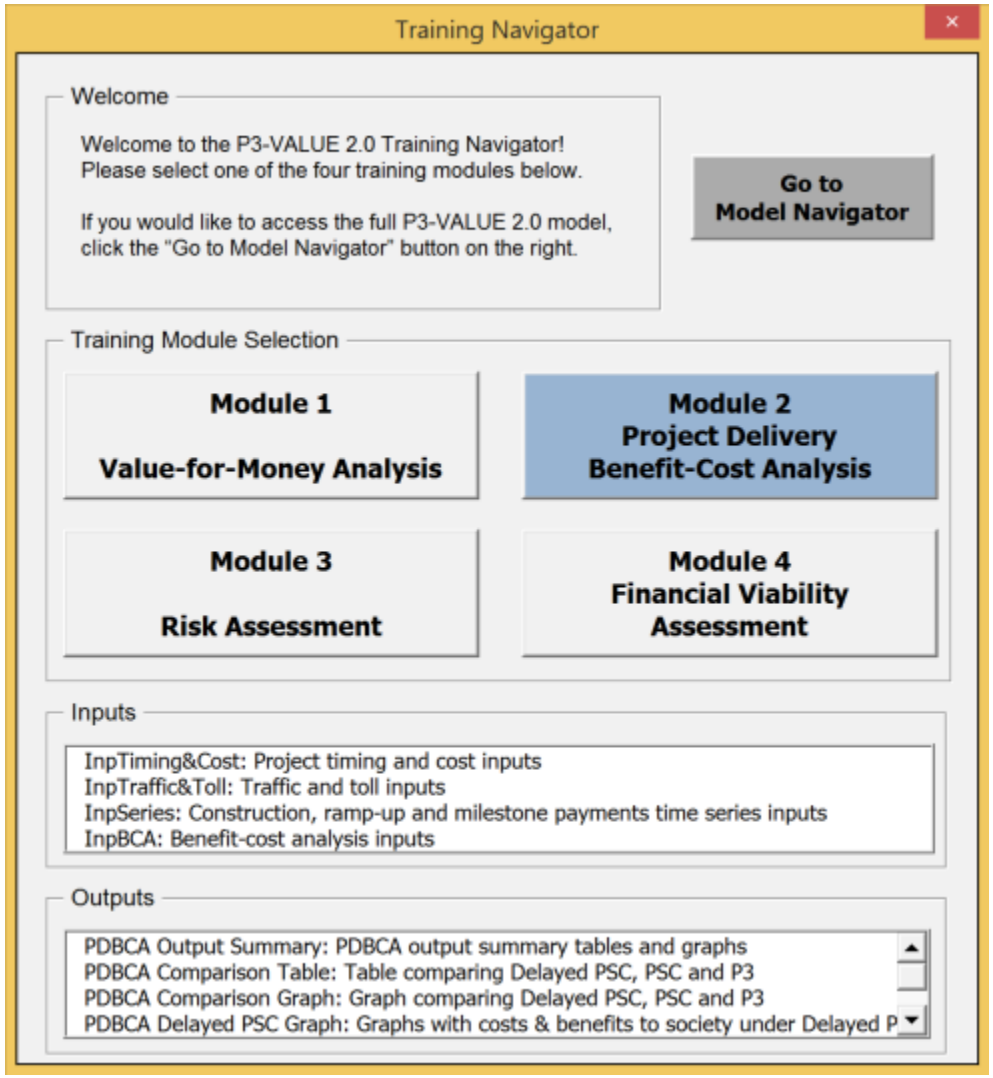
FHWA's P3-VALUE 2.0



Training Modules



Training Navigator User Interface



Training Module selection

Input sheet selection

Output sheet selection

Demonstration of PDBCA Module

Please stand by as we open the Excel file

Questions?

Submit a question using the chat box

Webinar Summary

Webinar Recap

Part 1	Introduction
Part 2	Benefit-Cost Analysis (BCA) Process
Part 3	P3 Delivery Economic Differences
Part 4	Benefit-Cost Analysis using P3-VALUE 2.0

Tool and References

P3-VALUE 2.0 Excel Spreadsheet

User Guide

Primers & Guidebooks

Upcoming P3-VALUE Training

- **February 29 (12:30pm) BCA Exercise review**
- **March 7** (2:00pm) Risk Valuation (2:00pm)
- **March 21** (2:00pm) Financial Viability Assessment

To access the Exercise Review webinar, please use the following link and telephone number:

Link: https://connectdot.connectsolutions.com/p3

Telephone: 1-888-363-4749, Passcode: 6139168#

Resources

FHWA's Office of Innovative Program Delivery Website:
http://www.fhwa.dot.gov/ipd/

P3 Website:
http://www.fhwa.dot.gov/ipd/p3/

Contact Information

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Questions?

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