Pooled Fund Study Framework for Multi-State Digital Infrastructure

Overview

This framework provides a structured approach for state DOTs to collaborate on digital infrastructure initiatives through FHWA pooled fund studies. It addresses the unique challenges of implementing BIM/IFC, ARC-ITS integration, and digital twins across jurisdictional boundaries, enabling true corridor-level interoperability.

Purpose: Enable multi-state consortiums to:

- Share costs for digital infrastructure implementation
- Develop common standards and specifications

- Create regional digital twins for interstate corridors
- Accelerate connected/autonomous vehicle readiness
- Demonstrate interoperability for federal grants

Target Audiences:

- State DOT Research and Innovation Offices
- Pooled Fund Study Managers
- Interstate Corridor Coalitions
- Regional Planning Organizations (MPOs)

Section 1: Why Pooled Fund Studies for Digital Infrastructure?

1.1 The Multi-State Challenge

The Problem: Interstate corridors don't respect state boundaries, but infrastructure data does:

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I-80 Corridor Reality (California → New Jersey, 11 states):

Current State:
- 11 different CAD standards
- 11 separate ATMS systems
- 11 independent 511 feeds
- No unified digital twin
- Fragmented work zone / incident data

Result:
- Freight operators check 11 different websites
- TMCs make manual phone calls for cross-border coordination
- V2X messages inconsistent across state lines
- Grant applications difficult (can't demonstrate interoperability)
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The Pooled Fund Solution:

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I-80 Digital Corridor Initiative (hypothetical):

Participating States: CA, NV, UT, WY, NE, IA, IL, IN, OH, PA, NJ
Pooled Fund Budget: $2.5M over 3 years
Federal Match: $7.5M (3:1 match typical)
Total Program: $10M

Outcomes:
✓ Common IFC specification for all 11 states
✓ Shared digital twin platform (DOT Corridor Communicator)
✓ Regional training program (120 staff trained)
✓ Unified V2X message generation
✓ Corridor-wide analytics and reporting
✓ Proof of interoperability for future grants
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1.2 Financial Advantages

Cost Comparison: Individual vs. Pooled Approach

Item	Individual State Cost	Pooled Fund Cost (11 states)	Savings per State
Standards development	$150K	$500K ÷ 11 = $45K	$105K (70%)
Platform implementation	$200K	$800K ÷ 11 = $73K	$127K (63%)
Training curriculum	$100K	$400K ÷ 11 = $36K	$64K (64%)
Integration testing	$75K	$300K ÷ 11 = $27K	$48K (64%)
Total per State	**$525K**	**$181K**	**$344K (66%)**

Additional Benefits:

- Federal match (typically 3:1): $180K state contribution leverages $540K total
- Shared lessons learned (avoid repeating mistakes)
- Peer accountability (states keep each other on track)
- Vendor leverage (bulk purchasing power)

1.3 Regulatory Drivers

FHWA Encourages Pooled Funds for:

- Multi-state corridor management
- Emerging technology deployment (V2X, CAV)
- Data sharing and interoperability
- Performance measurement (TPM)

23 U.S.C. 505 Benefits:

- State DOTs pool funds for research/implementation
- FHWA can provide matching funds
- Simplified procurement (lead state contracts for all)
- Shared intellectual property rights

Section 2: Pooled Fund Study Structure

2.1 Governance Model

Recommended Structure:

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EXECUTIVE COMMITTEE (Decision-Making Authority)
├─ One representative per state (typically Traffic Operations Director or CIO)
├─ Meets quarterly (virtual) + annual in-person
├─ Voting: Majority or consensus (defined in charter)
└─ Responsibilities: Budget approval, strategic direction, milestone acceptance

TECHNICAL WORKING GROUP (Day-to-Day Implementation)
├─ 2-3 representatives per state (engineers, IT staff, planners)
├─ Meets monthly (virtual)
├─ Subcommittees:
│   ├─ Standards & Specifications
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│   ├─ Procurement & Contracting
│   ├─ Training & Change Management
│   └─ Data Integration & Interoperability
└─ Responsibilities: Work plan execution, deliverable review, technical decisions

LEAD STATE (Administrative Role)
├─ Manages pooled fund account
├─ Executes contracts on behalf of consortium
├─ Coordinates meetings and communications
├─ Reports to FHWA
└─ Compensation: 5-10% of budget for admin overhead
```

Sample Charter Language:

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ARTICLE III: DECISION-MAKING

3.1 Executive Committee Decisions

Major decisions requiring Executive Committee approval:
a) Annual work plan and budget
b) Acceptance of deliverables (digital twin platform, training materials, etc.)
c) Amendments to study scope or budget
d) Addition or removal of participating states

Voting: Each state has one vote; decisions require 2/3 majority unless otherwise
specified

3.2 Technical Working Group Authority

Technical Working Group may make operational decisions without Executive Committee
approval:
a) Detailed technical specifications (within approved scope)
b) Meeting schedules and agendas
c) Subcommittee assignments
d) Minor budget reallocations (<$50K)

3.3 Consensus Items

The following require unanimous consent:
a) Changes to governance structure
b) Intellectual property licensing
c) Data sharing agreements (unless state opts out)
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2.2 Membership Models

Option 1: Open Consortium (Recommended for Corridors)

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Structure: Any state along corridor can join at standard contribution level

I-80 Example:
- Core Members (11 states): $180K each (full voting rights)
- Associate Members (adjacent states): $90K (observer status)
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- Industry Partners (freight, tech vendors): $50K (no vote, data access)

Total Fund: 11 × $180K + 3 × $90K + 5 × $50K = $2.5M

Advantages:
✓ Inclusive (maximizes corridor coverage)
✓ Scales with participation
✓ Industry engagement for sustainability

Challenges:
× Coordination complexity grows with size
× Consensus harder with more states
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Option 2: Fixed Consortium (Recommended for Focused Initiatives)

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Structure: Limited to specific states with shared characteristics

Example: Midwest ITS Digital Twin Consortium
- Members: IA, MN, WI, IL, IN, OH (6 states)
- Focus: Common ATMS vendor (SunGuide), similar ITS deployments
- Contribution: $250K each = $1.5M total

Advantages:
✓ Easier coordination (similar systems)
✓ Faster decision-making
✓ Deeper collaboration

Challenges:
× Limited geographic scope
× May miss corridor connections
```

Option 3: Tiered Membership

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Structure: Different contribution levels with corresponding benefits

Example: National Digital Infrastructure Initiative
- Tier 1 (Lead States): $300K → Full platform access, governance seats
- Tier 2 (Participating States): $150K → Platform access, observer status
- Tier 3 (Pilot States): $50K → Limited access, lessons learned

Advantages:
✓ Accommodates varying budgets
✓ Allows phased commitment
✓ Encourages broad participation

Challenges:
× Complexity in benefit allocation
× Perceived inequity (voting rights)
```

2.3 Lead State Selection Criteria

Ideal Lead State Characteristics: ☐ Experience managing pooled fund studies ☐ Robust procurement and contracting systems ☐ Geographic centrality (for in-person meetings) ☐ Strong administrative capacity ☐ Respected by peer states

Lead State Responsibilities:

- Establish pooled fund account (SPR-4 for FHWA funds)
- Solicit and evaluate proposals (RFP process)
- Execute contracts with vendors/consultants
- Manage budget and invoice processing
- Coordinate quarterly Executive Committee meetings
- Submit annual reports to FHWA
- Manage intellectual property and deliverable distribution

Compensation: Typically 5-10% of total budget for administrative overhead Example: $2.5M study → $125K-$250K to lead state

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Section 3: Sample Work Plan (3-Year Digital Infrastructure Initiative)

Year 1: Foundation and Standards Development

Phase 1.1: Kickoff and Needs Assessment (Months 1-3)

Budget: $200K

Activities:

- Executive Committee kickoff meeting (in-person, 2 days)
- Inventory existing systems by state:
  - CAD standards and software
  - ATMS platforms and vendors
  - IFC usage and maturity
  - V2X/CV deployments
- Gap analysis: Where are states today vs. desired end state?
- Define use cases and success criteria

Deliverables: ☐ Needs assessment report ☐ Gap analysis by state ☐ Prioritized use cases ☐ 3-year roadmap with milestones

Phase 1.2: Standards and Specifications (Months 4-8)

Budget: $500K

Activities:

- Develop common IFC specification:
  - Property sets for ITS equipment (device_id, NTCIP, etc.)
  - Coordinate system standards
  - File naming and organization
  - Quality acceptance criteria
- Create procurement toolkit:
  - Model RFP language
  - QA/QC checklists
  - Payment terms tied to IFC quality

- buildingSMART IDS validation rules
- Data sharing agreements and governance

Deliverables: ☐ Multi-State IFC Specification (v1.0) ☐ Procurement Toolkit for Designers ☐ IDS Validation File (XML) ☐ Data Sharing Agreement Template ☐ Technical Standards Report (TRB-publishable)

Phase 1.3: Platform Selection and Pilot (Months 9-12)

Budget: $600K

Activities:

- Procure digital twin platform (DOT Corridor Communicator or similar)
- Select 50-100 mile pilot corridor (crossing 2-3 states)
- Upload existing IFC models (if available) or create new
- Integrate with ATMS systems (NTCIP device data)
- Conduct gap analysis on pilot corridor
- Train pilot users (traffic ops staff, maintenance crews)

Deliverables: ☐ Platform deployment (hosted instance for consortium) ☐ Pilot corridor digital twin (operational) ☐ Integration with 20+ ITS devices (live data) ☐ Pilot evaluation report ☐ Lessons learned document

Year 2: Implementation and Training

Phase 2.1: Corridor Expansion (Months 13-18)

Budget: $800K

Activities:

- Expand digital twin to full corridor (500-1000 miles)
- Integrate all participating states' ITS equipment
- Real-time data feeds from ATMS (NTCIP, APIs)
- V2X TIM message generation (SAE J2735)
- Spatial query tools for incident response
- Performance metrics dashboard

Deliverables: ☐ Full corridor digital twin (operational) ☐ 200+ ITS devices integrated with live data ☐ V2X message broadcasting capability ☐ Incident response playbook ☐ Performance metrics baseline

Phase 2.2: Training and Capacity Building (Months 19-24)

Budget: $400K

Activities:

- Develop training curriculum:
  - Executive overview (2 hours)
  - Project manager course (4 hours)
  - Designer/consultant course (8 hours)
  - Field crew training (1 hour)
- Deliver training to all participating states:
  - 2 sessions per state (120 staff total)
  - Hybrid format (in-person + virtual)
  - Hands-on exercises with platform

- Create train-the-trainer materials
- Webinar series (monthly, ongoing)

Deliverables: ☐ Training Curriculum (4 courses) ☐ Training Delivery (120 staff trained) ☐ Train-the-Trainer Guide ☐ Webinar Series (12 episodes, Year 2-3) ☐ Training Evaluation Report

Year 3: Optimization and Sustainability

Phase 3.1: Advanced Features and Analytics (Months 25-30)

Budget: $500K

Activities:

- Predictive maintenance module (ML-based)
- Automated work order generation from alerts
- Integration with pavement/bridge management systems
- Cross-border incident coordination workflows
- Historical performance analytics
- Grant application support (SMART, BUILD, RAISE, ATCMTD)

Deliverables: ☐ Predictive Maintenance Tool ☐ CMMS Integration (3 states piloted) ☐ Incident Coordination Protocol ☐ Analytics Dashboard (corridor performance) ☐ Grant Support Package (templates, ROI calculators)

Phase 3.2: Documentation and Knowledge Transfer (Months 31-36)

Budget: $300K

Activities:

- Final technical report (TRB/AASHTO publication)
- Case studies by use case (incident response, maintenance, V2X, etc.)
- National webinar and conference presentations
- Toolkit for other states/corridors to replicate
- Transition plan for ongoing operations

Deliverables: ☐ Final Technical Report (NCHRP-style) ☐ 5 Case Study Documents ☐ Replication Toolkit for Non-Participating States ☐ Sustainability Plan (post-study funding model) ☐ TRB Annual Meeting Paper(s)

Total 3-Year Budget: $3.3M

(Note: Assumes federal match of 3:1, requiring $825K state contributions)

Section 4: Procurement Strategy

4.1 Contracting Mechanisms

Option A: Master Contract (Recommended)

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Lead State executes single contract with vendor/platform provider

Example:
Contract: Iowa DOT (Lead State) ↔ DOT Corridor Communicator
Scope: Digital twin platform for I-80 Consortium
Term: 3 years
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Value: $1.2M
Benefits: All 11 states access platform under one contract

Advantages:
✓ Simplified procurement (one RFP, one evaluation)
✓ Volume pricing (bulk discount)
✓ Consistent terms across states
✓ Easier contract management

Challenges:
× Lead state procurement rules may limit flexibility
× All states must accept lead state's terms
× Delays if lead state procurement is slow
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Option B: Cooperative Procurement

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One state procures, others "piggyback" via cooperative agreement

Example:
Primary Contract: Utah DOT ↔ Vendor ($400K)
Piggybacking States: NV, WY, CO, NE (each adds $200K via amendment)
Total Value: $1.2M

Advantages:
✓ Faster (no re-procurement)
✓ State-specific customization possible
✓ Flexibility in timing (states join when ready)

Challenges:
× Requires cooperative procurement authority in state law
× May lose volume pricing if states negotiate separately
× Administrative complexity (multiple contracts)
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Option C: Joint Powers Authority (JPA)

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States create legal entity to contract on behalf of consortium

Example:
Entity: "I-80 Corridor Mobility Coalition" (JPA)
Members: 11 states sign intergovernmental agreement
Procurement Authority: Coalition can RFP and contract directly

Advantages:
✓ Independent legal entity (faster than state procurement)
✓ Long-term sustainability (outlives pooled fund)
✓ Can accept industry/foundation funding

Challenges:
× Legal complexity (interstate compact or JPA formation)
× Ongoing governance overhead
× May require state legislative approval
```

4.2 Sample RFP Outline

Request for Proposals: Multi-State Digital Infrastructure Platform

```
SECTION 1: INTRODUCTION
1.1 Background (I-80 Corridor Consortium, participating states)
1.2 Purpose and Objectives
1.3 Procurement Schedule
1.4 Contract Term and Value (3 years, up to $1.5M)

SECTION 2: SCOPE OF WORK
2.1 Platform Requirements
    - IFC model parsing and validation
    - Gap analysis engine (buildingSMART IDS)
    - Real-time NTCIP/ARC-ITS integration
    - V2X TIM message generation (SAE J2735)
    - Multi-state corridor filtering
    - Spatial query tools
    - Performance analytics

2.2 Data Integration
    - Ingest 46+ state WZDx/511 feeds (existing capability)
    - Link IFC elements to ATMS device IDs
    - Real-time polling of NTCIP endpoints
    - Alert generation for device failures

2.3 User Access
    - Role-based permissions (11 states, 200+ users)
    - API access for integration with state systems
    - Mobile-responsive design
    - 99.5% uptime SLA

2.4 Training and Support
    - Develop curriculum (4 courses)
    - Deliver training (120 staff)
    - Ongoing technical support
    - Monthly webinars (Year 2-3)

SECTION 3: DELIVERABLES
3.1 Year 1
    - Platform deployment (Month 3)
    - Pilot corridor operational (Month 12)
    - 20+ ITS devices integrated (Month 12)

3.2 Year 2
    - Full corridor operational (Month 18)
    - 200+ ITS devices integrated (Month 24)
    - Training delivery complete (Month 24)

3.3 Year 3
    - Advanced features deployed (Month 30)
    - Final documentation (Month 36)
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    - Sustainability plan (Month 36)

SECTION 4: PROPOSAL REQUIREMENTS
4.1 Technical Approach
4.2 Relevant Experience (similar multi-state projects)
4.3 Project Team and Qualifications
4.4 Work Plan and Schedule
4.5 Cost Proposal (broken down by year and deliverable)

SECTION 5: EVALUATION CRITERIA
- Technical Approach (40 points)
- Experience and Qualifications (25 points)
- Cost (20 points)
- Project Management and Schedule (15 points)

SECTION 6: CONTRACT TERMS
6.1 Performance Guarantees (uptime, response time)
6.2 Intellectual Property (consortium owns data, vendor owns code)
6.3 Payment Terms (milestone-based)
6.4 Termination for Convenience
6.5 Data Security and Privacy
```

Section 5: Data Sharing and Governance

5.1 Data Sharing Agreement Template

Key Provisions:

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MULTI-STATE DATA SHARING AGREEMENT
FOR I-80 DIGITAL CORRIDOR INITIATIVE

ARTICLE I: DATA CONTRIBUTIONS

Each Participating State agrees to provide:
a) Real-time traffic event data (WZDx, 511, or equivalent)
b) IFC models for infrastructure within their jurisdiction
c) ATMS device inventory and operational data (where feasible)
d) Historical performance data (optional)

Data Format: Standardized per consortium IFC specification
Update Frequency: Real-time (60-second polling) for operational data
Geospatial Extent: [Corridor limits within state]

ARTICLE II: DATA USE RIGHTS

Permissible Uses:
✓ Traffic operations and incident response
✓ Multi-state corridor coordination
✓ Performance measurement and reporting
✓ Research and development
✓ Public safety and traveler information
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✓ Grant applications and compliance reporting

Prohibited Uses:
× Commercial resale of raw data
× Personally identifiable information (PII) collection
× Law enforcement (unless specific agreement)
× Political or lobbying activities

ARTICLE III: DATA QUALITY AND LIABILITY

Each state warrants that contributed data:
- Is accurate to the best of their knowledge
- Complies with applicable laws and regulations
- Does not contain PII or sensitive security information

Liability Limitation:
No state shall be liable for errors, omissions, or use of data by other states. Data
provided "as-is" without warranty.

ARTICLE IV: INTELLECTUAL PROPERTY

Contributed Data: Remains property of contributing state
Platform and Tools: Owned by consortium (shared by all members)
Derivative Products: Jointly owned (reports, analytics, case studies)

ARTICLE V: DATA SECURITY

Platform Provider shall:
- Maintain SOC 2 Type II compliance
- Encrypt data in transit and at rest (AES-256)
- Conduct annual security audits
- Notify consortium within 24 hours of any breach

ARTICLE VI: PUBLIC ACCESS

Data Tiers:
- Tier 1 (Public): Aggregated corridor statistics, general traveler info
- Tier 2 (Consortium): Real-time operational data, device details
- Tier 3 (Restricted): Sensitive infrastructure data (security-controlled)

Each state may opt out of public sharing for specific data elements by written notice.

ARTICLE VII: TERM AND TERMINATION

Term: Effective upon execution, continues for duration of pooled fund study + 2 years
Termination: Any state may withdraw with 90 days notice; data contributions cease but
historical data remains available to consortium

Survival: Data use rights and liability limitations survive termination.
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5.2 Data Governance Structure

Data Stewardship Roles:

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CONSORTIUM DATA GOVERNANCE COMMITTEE
├─ Chair: Rotating annually among participating states
├─ Members: One data steward per state
├─ Meets: Quarterly (or as needed for policy issues)
└─ Responsibilities:
    - Approve data sharing requests (external parties)
    - Resolve data quality issues
    - Update data sharing agreement as needed
    - Ensure compliance with state/federal regulations

DATA QUALITY WORKING GROUP (Subcommittee)
├─ Technical staff from each state
├─ Monitors: Quality scores, completeness, timeliness
├─ Tools: Automated quality dashboards
└─ Actions:
    - Alert states to data quality degradation
    - Recommend corrective actions
    - Share best practices for improvement
```

Section 6: Funding and Sustainability

6.1 Initial Funding Sources

State Contributions:

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Pooled Fund Study (SPR-4)
- States contribute $180K each (11 states) = $1.98M
- Used for: Platform, training, standards development

State Planning & Research (SPR) Funds:
- Each state eligible for federal match (typically 80/20)
- Example: Iowa contributes $36K state, $144K federal = $180K total
```

Federal Match Opportunities:

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FHWA Pooled Fund Program:
- Can provide matching funds for multi-state initiatives
- Typical match: 50% to 300% (varies by program)
- Request via pooled fund study proposal

FHWA Every Day Counts (EDC):
- If digital infrastructure becomes EDC innovation
- Technical assistance and promotional support
- Not direct funding but in-kind value
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Grant Augmentation:

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SMART Grants (Strengthening Mobility and Revolutionizing Transportation):
- $100M annually for data-driven initiatives
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- Pooled fund demonstrates multi-state coordination (scoring advantage)
- Can request $2-5M for technology deployment

BUILD Grants (Better Utilizing Investments to Leverage Development):
- $1.5B annually for infrastructure projects
- Digital infrastructure as enabling technology for corridor improvement
- Multi-state applications strongly favored

RAISE Grants (Rebuilding American Infrastructure with Sustainability and Equity):
- Similar to BUILD, emphasis on equity and sustainability
- Digital infrastructure improves mobility for all users

ATCMTD (Advanced Transportation and Congestion Management Technologies Deployment):
- $60M annually for technology deployment
- V2X/CAV focus aligns with digital twin capabilities
```

6.2 Long-Term Sustainability Plan

Transition from Pooled Fund to Operations (Year 3+):

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OPTION 1: Operational Budget Incorporation

Each state budgets for platform subscription:
- Professional Tier: $2,500/month × 12 = $30K/year per state
- 11 states × $30K = $330K annual revenue
- Platform provider sustains operations commercially

Advantages:
✓ Predictable costs (known subscription rate)
✓ No ongoing pooled fund administration
✓ States budget individually (flexibility)

Challenges:
× Risk of states dropping out over time
× No mechanism for collective enhancements
```

OPTION 2: Ongoing Consortium Model

```
Establish long-term coalition (beyond pooled fund study):

I-80 Corridor Mobility Coalition (post-study)
- Annual membership: $50K per state (reduced from study phase)
- Purpose: Continued platform enhancements, training, research
- Governance: Existing Executive Committee continues

Uses of Annual Funding:
- Platform hosting and support: $200K
- Annual training and webinars: $100K
- Standards updates and research: $100K
- New feature development: $150K
Total: $550K (11 states × $50K)
```

```
Advantages:
✓ Collective investment in continuous improvement
✓ Maintains inter-state coordination
✓ Can pursue additional grants (coalition continues)

Challenges:
× Requires ongoing governance
× States may have budget approval challenges
```

OPTION 3: Hybrid Model (Recommended)

```
Core Platform: Commercial subscription ($30K/state/year)
Enhancement Fund: Optional pooled fund ($25K/state/year)

Breakdown:
- Core Subscription ($330K total): Covers existing features, hosting, support
- Enhancement Fund ($275K if all states opt in): New features, research, training

States can choose:
- Tier 1: Subscription only ($30K) → Use platform as-is
- Tier 2: Subscription + Enhancement ($55K) → Influence roadmap, new features

Advantages:
✓ Sustainability of core platform guaranteed
✓ Flexibility for states with budget constraints
✓ Innovation continues for committed members

Challenges:
× Two-tier system may create inequity
× Administrative complexity
```

Section 7: Success Metrics and Evaluation

7.1 Key Performance Indicators (KPIs)

Technical Performance:

Metric	Target	Measurement Method
Platform uptime	≥99.5%	Automated monitoring
IFC upload success rate	≥95%	Platform logs
Real-time data sync	≥98%	NTCIP polling success
User satisfaction	≥80% satisfied	Annual survey (NPS score)
Spatial query response time	<3 seconds	Performance testing

Adoption and Usage:

Metric	Target	Measurement Method

States onboarded	11/11 (100%)	Platform accounts
Active monthly users	≥150 (75% of trained staff)	Login analytics
IFC models uploaded	≥100 models	Platform database
ITS devices integrated	≥200 devices	Digital twin inventory
API integrations	≥5 states	API key usage logs

Operational Impact:

Metric	Target	Measurement Method
Incident response time	-30% reduction	Before/after CAD logs
Cross-border coordination	≥50 incidents/year	TMC coordination logs
Maintenance efficiency	≥100 hours saved/year	Work order analysis
Grant funding secured	≥$5M (cumulative)	Award notifications

Knowledge Sharing:

Metric	Target	Measurement Method
Staff trained	≥120 (target met)	Training attendance
Webinar attendance	≥30/session average	Registration logs
Peer exchanges	≥2 per year	Event calendar
Conference presentations	≥5 (national conferences)	Presentation records

7.2 Evaluation Framework

Annual Evaluation Process:

```
YEAR 1 EVALUATION (End of Month 12):

Focus: Foundation and adoption
Questions:
1. Did all states successfully onboard to platform?
2. Is pilot corridor digital twin operational with live data?
3. Are standards and specifications being used by designers?
4. What barriers to adoption were encountered?

Methods:
- Platform usage analytics
- User surveys (early adopters)
- Executive Committee debrief
- External peer review (TRB panel or AASHTO)

Deliverable: Year 1 Evaluation Report (30 pages, publicly available)
```

```
YEAR 2 EVALUATION (End of Month 24):

Focus: Implementation and impact
Questions:
1. Has corridor-wide digital twin improved operations measurably?
2. Are states integrating digital infrastructure into routine projects?
3. What operational efficiencies have been achieved?
4. Is training producing competent users?

Methods:
- Before/after operational metrics
- Case study interviews (TMC operators, field crews)
- Financial analysis (ROI calculation)
- Training assessment (knowledge retention tests)

Deliverable: Year 2 Evaluation Report + Case Studies (5 use cases)

YEAR 3 EVALUATION (End of Month 36):

Focus: Sustainability and scalability
Questions:
1. Is the digital infrastructure approach replicable in other corridors?
2. What is the business case for continued investment?
3. How will consortium transition from pooled fund to operational model?
4. What national implications exist (AASHTO, FHWA adoption)?

Methods:
- Total cost of ownership (TCO) analysis
- State-by-state readiness for operational transition
- Replication assessment (survey of non-participating states)
- National stakeholder interviews (FHWA, AASHTO, industry)

Deliverable: Final Technical Report (150+ pages, TRB/NCHRP style)
```

Section 8: Sample Consortium: I-80 Digital Corridor Initiative

8.1 Hypothetical Structure

Participating States: California, Nevada, Utah, Wyoming, Nebraska, Iowa, Illinois, Indiana, Ohio, Pennsylvania, New Jersey (11 states)

Total Corridor: 2,900 miles, 11 states, 200+ ITS devices per state average

Pooled Fund Budget:

- State Contributions: $180K × 11 = $1.98M
- Federal Match (assumed 3:1): $5.94M
- **Total 3-Year Budget: $7.92M**

Lead State: Iowa DOT (central location, pooled fund experience)

Focus Use Cases:

1. **Freight Operations:** Real-time corridor status for commercial vehicles
2. **Incident Response:** Cross-border TMC coordination
3. **V2X Deployment:** Consistent TIM messages across state lines
4. **Asset Management:** Digital twin for ITS lifecycle management

8.2 Year-by-Year Milestones

YEAR 1: Foundation

```
Q1 (Months 1–3):
– Kickoff meeting (Des Moines, IA – central location)
– Needs assessment (all 11 states)
– Establish governance (Executive Committee, TWG)

Q2 (Months 4–6):
– Standards development (IFC specification v1.0)
– Procurement (platform RFP issued)
– Pilot corridor selection (Iowa I–80, mile 100–200)

Q3 (Months 7–9):
– Contract execution (platform provider)
– Platform deployment (cloud hosting)
– Pilot data upload (Iowa IFC models)

Q4 (Months 10–12):
– Pilot operational (100 miles, 20 devices)
– Nebraska and Wyoming begin onboarding
– Year 1 Evaluation
```

YEAR 2: Expansion

```
Q1 (Months 13–15):
– California, Nevada, Utah onboarded
– Western segment digital twin (CA–UT, 1,200 miles)
– Training begins (CA, NV, UT, WY staff)

Q2 (Months 16–18):
– Illinois, Indiana, Ohio onboarded
– Eastern segment digital twin (IA–OH, 800 miles)
– V2X TIM generation tested (Iowa, Nebraska)

Q3 (Months 19–21):
– Pennsylvania, New Jersey onboarded
– Full corridor operational (CA–NJ, 2,900 miles)
– Training delivery (all 11 states, 120 staff)

Q4 (Months 22–24):
– Cross-border incident coordination (10+ events)
– Freight corridor analytics (delay forecasting)
– Year 2 Evaluation
```

YEAR 3: Optimization

```
Q1 (Months 25–27):
- Predictive maintenance piloted (3 states)
- CMMS integration (Iowa Maximo, Ohio SAP)
- Advanced analytics (freight travel time reliability)

Q2 (Months 28–30):
- Grant applications (SMART, BUILD, ATCMTD – using digital twin as proof)
- National webinar series (6 episodes)
- TRB paper submissions

Q3 (Months 31–33):
- Sustainability planning (transition to operational model)
- Final technical report drafted
- Replication toolkit for other corridors

Q4 (Months 34–36):
- Transition to operational model (hybrid subscription + enhancement fund)
- Final deliverables and closeout
- AASHTO Innovation Initiative presentation
- Year 3 / Final Evaluation
```

Section 9: Resources and Templates

9.1 Downloadable Templates

Available via DOT Corridor Communicator platform:

☐ Pooled Fund Study Charter Template (Word) ☐ Data Sharing Agreement Template (Word) ☐ Sample RFP for Digital Twin Platform (Word, 40 pages) ☐ Governance Structure Diagram (PowerPoint) ☐ Budget Template and Cost Estimator (Excel) ☐ Evaluation Framework and KPI Dashboard (Excel) ☐ Executive Committee Meeting Agenda Template (Word) ☐ Monthly Progress Report Template (Word)

Access: https://corridor-communicator.org/docs/pooled-fund-toolkit

9.2 FHWA Resources

Pooled Fund Study Program:

- Website: https://pooledfund.org/
- Contact: FHWA Office of Research and Technology
- Guidance: "How to Establish a Pooled Fund Study" (FHWA-HRT-21-001)

Federal Match Opportunities:

- SPR-4 Program: https://www.fhwa.dot.gov/research/spr/
- EDC Program: https://www.fhwa.dot.gov/innovation/everydaycounts/

9.3 Peer Examples

Existing Multi-State Pooled Funds (Digital Infrastructure Related):

1. **I-95 Corridor Coalition Vehicle Probe Project**
    - 16 states (ME to FL)

- Real-time traffic data sharing
- Lessons: Governance structure, data agreements

2. **Western States Pooled Fund (WSPF) - Rural ITS**
   - 10 western states
   - ITS deployment in rural areas
   - Lessons: Training and capacity building
3. **Midwest States Smart Work Zone Deployment Initiative**
   - 8 Midwest states
   - WZDx implementation and V2X
   - Lessons: Standards development process

Contact for case studies: pooled-fund-examples@corridor-communicator.org

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Section 10: Next Steps for Interested States

10.1 Initiating a Pooled Fund Study

Step 1: Identify Champion State (1-2 months)

- Find lead state willing to coordinate
- Typically state with strong research/innovation office
- Existing pooled fund experience helpful

Step 2: Recruit Participating States (2-4 months)

- Outreach to corridor neighbors or states with shared challenges
- Present business case (ROI, grant competitiveness)
- Target 5-10 states for critical mass
- Minimum 3 states typically required

Step 3: Develop Proposal (2-3 months)

- Problem statement
- Objectives and use cases
- Work plan and budget
- Governance structure
- Expected deliverables

Step 4: Secure Commitments (2-4 months)

- State budget approval (may require legislative action)
- Signed letters of commitment
- Lead state establishes pooled fund account

Step 5: FHWA Coordination (1-2 months)

- Submit to FHWA Office of Research for review
- Clarify federal match eligibility
- Obtain SPR-4 account number

Step 6: Launch (Month 1 of study)

- Execute intergovernmental agreements

- Kickoff meeting
- Procure platform/consultant
- Begin work plan

Total Timeline: 8-15 months from initial concept to active study

10.2 Getting Support

DOT Corridor Communicator Can Help:

- **Proposal Development:** Template work plans, budgets, use cases
- **Champion State Recruitment:** Connect interested states
- **Business Case:** ROI calculators, grant opportunity analysis
- **Kickoff Support:** Facilitate initial meetings, provide technical guidance

Contact:

- Pooled Fund Support: pooled-funds@corridor-communicator.org
- Phone: (555) 345-6789
- Request: Pooled Fund Starter Package (free for states)

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Related Documentation:

- Executive Business Plan
- IFC Quick Start Guide
- Procurement Toolkit
- Digital Standards Crosswalk

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