A Framework for Enhancing Transportation Asset Management (TAM) Implementation for Sustained TAM Programs

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On the Road Again: Implementing a Sustainable Asset Management Program at Your Agency

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Acknowledgements

- Expert panel
- Practitioner review panel
- Representatives from case study agencies

Agenda

Conceptual Research

TAM Implementation Review Framework (TIRF)

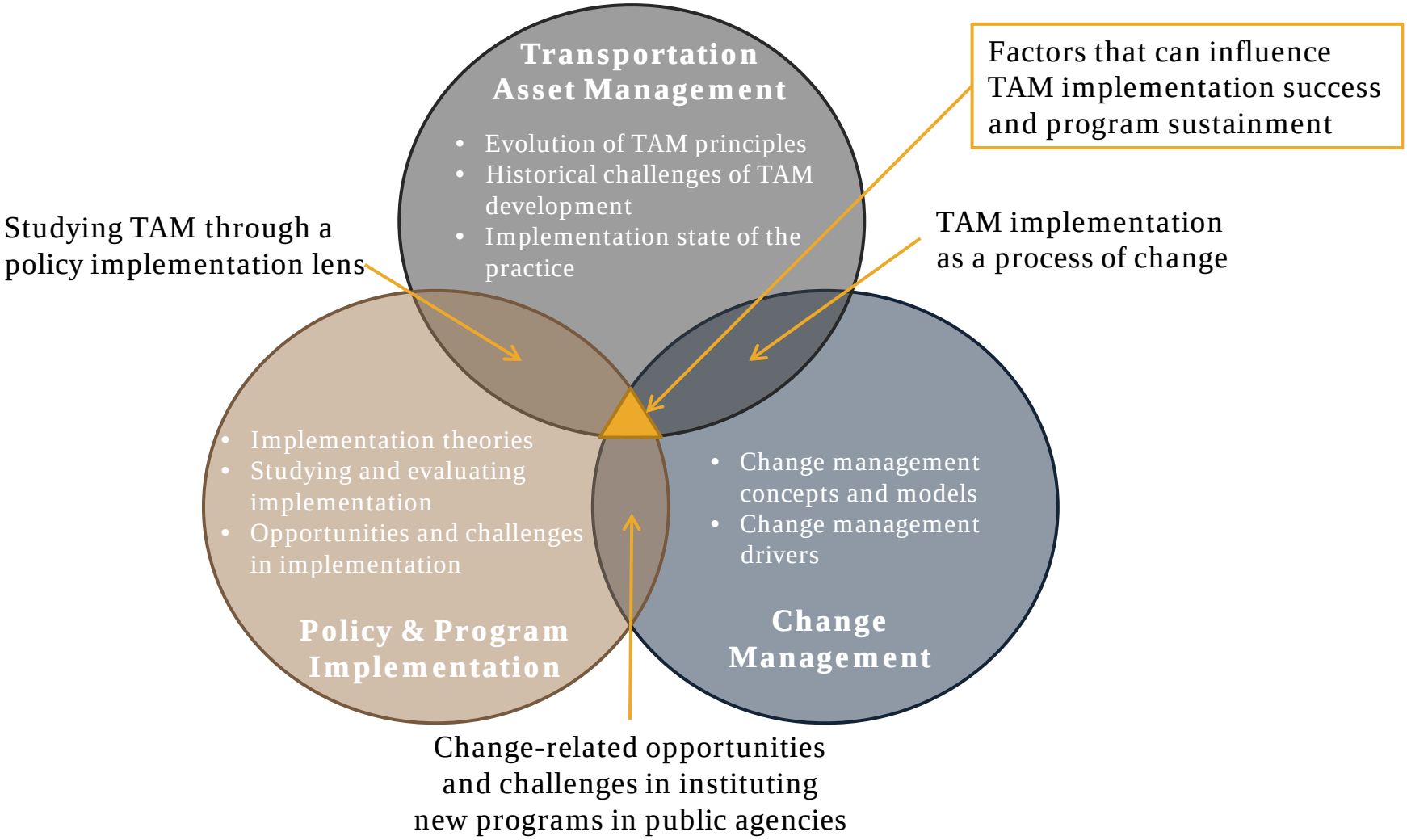
TIRF Case Studies

Research Objective

To develop a conceptual framework and an approach to guide a review of an agency's TAM implementation practices to identify opportunities for enhancing implementation towards long-term program sustainment.

- Program sustainment is the extent to which an innovation…
  - …is maintained within the operations of an organization (Proctor et al. 2011)
  - …reflects what it was initially intended to look like (Wiltsey Stirman et al. 2012)
  - …has benefits delivered over an extended period of time, after the initial activity around implementation has reached a steady state (Rabin et al. 2008)

Exploratory Literature Review

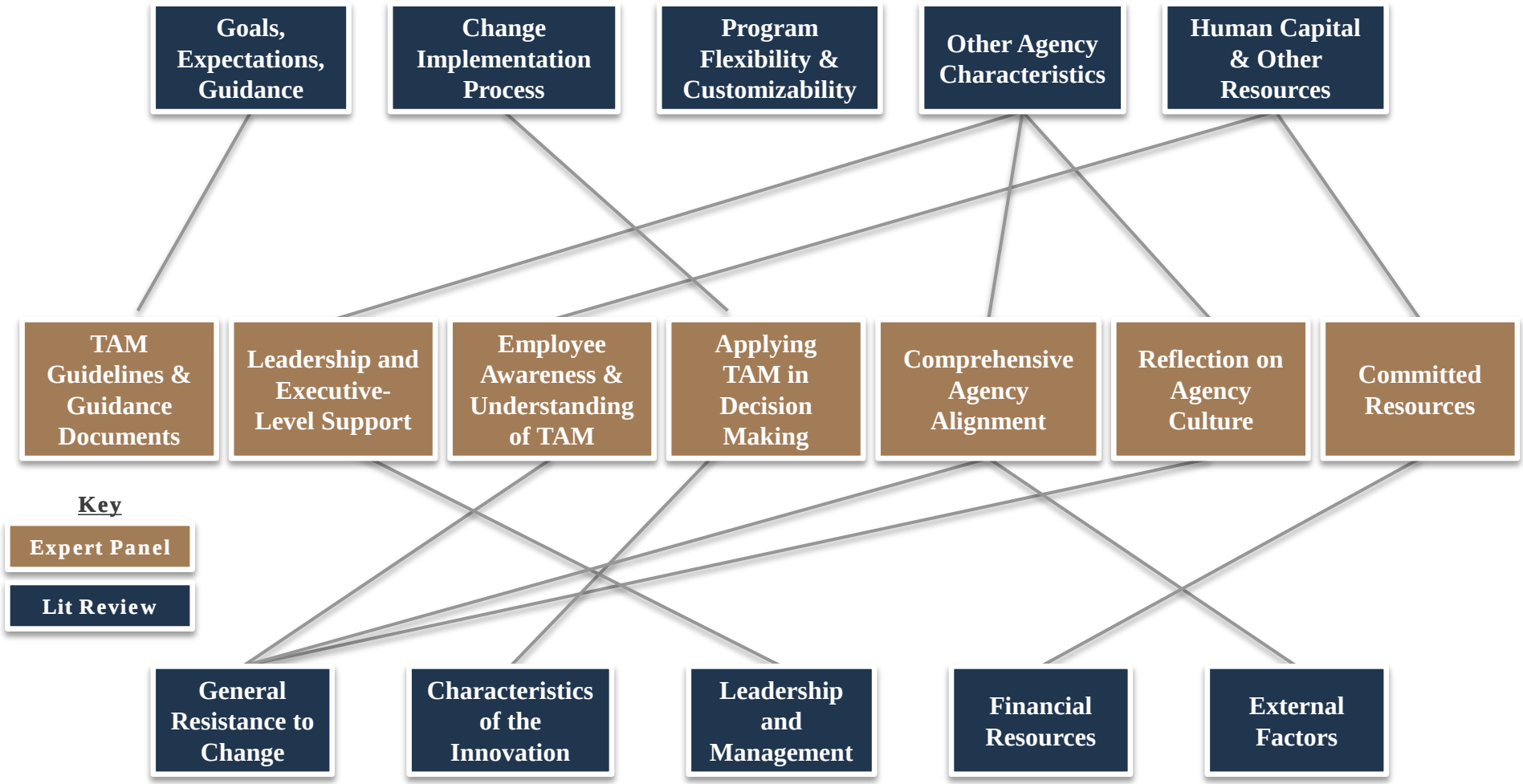


Synthesis of Implementation Factors Identified from Literature

*Also people-related

Implementation "Domain"	Implementation Factors	TAM Literature	Policy/Program Implementation Research	Change Management
Organization	External Factors	X	X	X
	Financial Resources	X	X	
	Goals, Expectations, Guidance	X	X	X
	General Resistance to Change*	X	X	
	Organizational Structure & Related Characteristics	X	X	X
Program	Change Implementation Process*	X		X
	Characteristics of the Innovation	X		X
	Program Flexibility and Customizability	X	X	X
People	Human Capital & Other Resources	X	X	X
	Leadership and Management Support		X	X

Program Sustainment Influence Factors



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Conceptual Research

TAM Implementation Review Framework (TIRF)

TIRF Case Studies

TIRF Factor Categories (1)

Strategies that address the **Guidance** category...	...ensure that TAM is reflected in major agency policy documents.
	...explain where TAM fits in agency programming.
	...provide clarity on how standard operating procedures (SOPs) should change to incorporate TAM.
	...provide clear guidelines on how decision making should change, including explanations of risk analysis.
Strategies that address the **Leadership** category...	...illustrate support and commitment from upper-level employees, management, and executives.
	...ensure total agency representation in the TAM governing structure.
	...promote accountability for the TAM governing structure.
	...reduce chances of diminishing support due to leadership changes.
Strategies that address the **Applications** category...	...introduce TAM into established decision-making processes.
	...incorporate clear metrics and expected outcomes (goals/targets).
	...utilize decision-making questions that require reference to data.
	...promote decisions based on management systems.

TIRF Factor Categories (2)

Strategies that address the **Culture** category...	...clearly communicate TAM goals and applications throughout the agency.
	...promote a uniform TAM language.
	...promote a long-term agency focus.
Strategies that address the **Employee** category...	...expand workforce capacity with respect to TAM.
	...promote employee understanding of their role in using TAM or how their job changes to incorporate TAM.
	...clarify expected outcomes or benefits of TAM to employees.
Strategies that address the **Alignment** category...	...create clear links between TAM and agency outcomes/goals.
	...incorporate TAM into all aspects of programming (capital-side, maintenance, etc).
	...create connections to customer service.
Strategies that address the **Resources** category...	...allocate financial resources to TAM development and implementation.
	...commit human resources efficiently towards TAM programming.
	...prioritize and enhance data management.

TAM Implementation Review Framework (TIRF)

- Guides state transportation agencies to conduct a **systematic review** of their TAM implementation approach using **specific implementation strategies**
- Produces a **descriptive picture** of how the **overall implementation approach** addresses program sustainment implementation factors

Implementation Approach: general plan of action towards implementation; compilation of implementation strategies

Implementation Strategy: specific activity or action taken towards TAM implementation

GLACEAR Systematic Review

Systematic reviews to distill and document:

- Definition: Use of a well-defined approach to select experiences as evidence for the database based on strict criteria (Rowley 2012; Briner 2009; Stetler 2001)
- Application to this study: Program sustainment implementation factors as systematic review criteria

"Does this implementation strategy address the criteria in the X category?"

Where X = G, L, A, C, E, A, or R

G	**Guidance** and Expectations
L	**Leadership** and Executive-Level Support
A	**Applications** in Decision Making
C	Reflection in Agency **Culture** and Language
E	**Employee** Awareness and Understanding
A	Comprehensive Agency **Alignment**
R	**Resources** Committed to TAM Development

Agenda

Conceptual Research

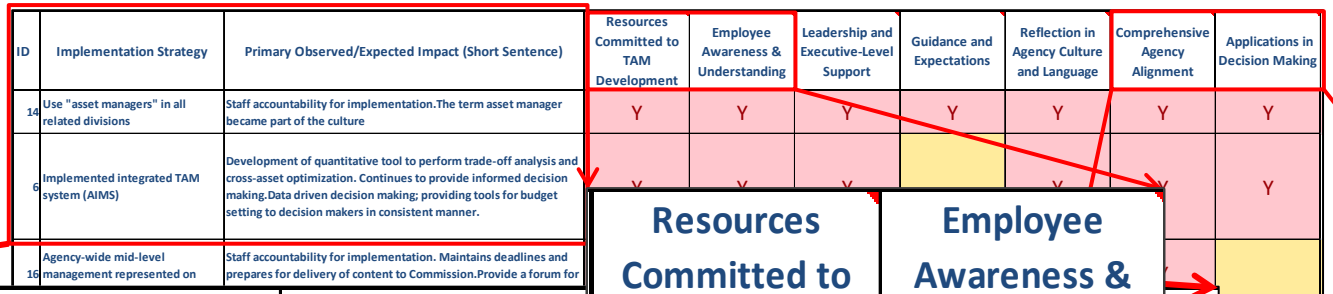
TAM Implementation Review Framework (TIRF)

TIRF Case Studies

Case Study Demonstration

- Three DOTs selected based on:
  - Record of TAM development and implementation experience
  - Differences in location, size, geography, and climate
- 3-step case study protocol

Case Study Output



ID	Implementation Strategy	Primary Observed/Expected Impact (Short Sentence)	Resources Committed to TAM Development	Employee Awareness & Understanding	Leadership and Executive-Level Support	Guidance and Expectations	Reflection in Agency Culture and Language	Comprehensive Agency Alignment	Applications in Decision Making
14	Use "asset managers" in all related divisions	Staff accountability for implementation.The term asset manager became part of the culture	Y	Y	Y	Y	Y	Y	Y
6	Implemented integrated TAM system (AIMS)	Development of quantitative tool to perform trade-off analysis and cross-asset optimization. Continues to provide informed decision making.Data driven decision making; providing tools for budget setting to decision makers in consistent manner.	Y	Y	Y		Y	Y	Y
16	Agency-wide mid-level management represented on	Staff accountability for implementation. Maintains deadlines and prepares for delivery of content to Commission.Provide a forum for							

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6	Implemented integrated TAM system (AIMS)	Development of quantitative tool to perform trade-of cross-asset optimization. Continues to provide informed decision making.Data driven decision making; providing tools for budget setting to decision makers in consistent manner.
16	Agency-wide mid-level management represented on TAM Working Committee	Staff accountability for implementation. Maintains deadlines and prepares for delivery of content to Commission.Provide a forum for discussion and way to communicate change on a monthly basis.

Resources Committed to TAM Development

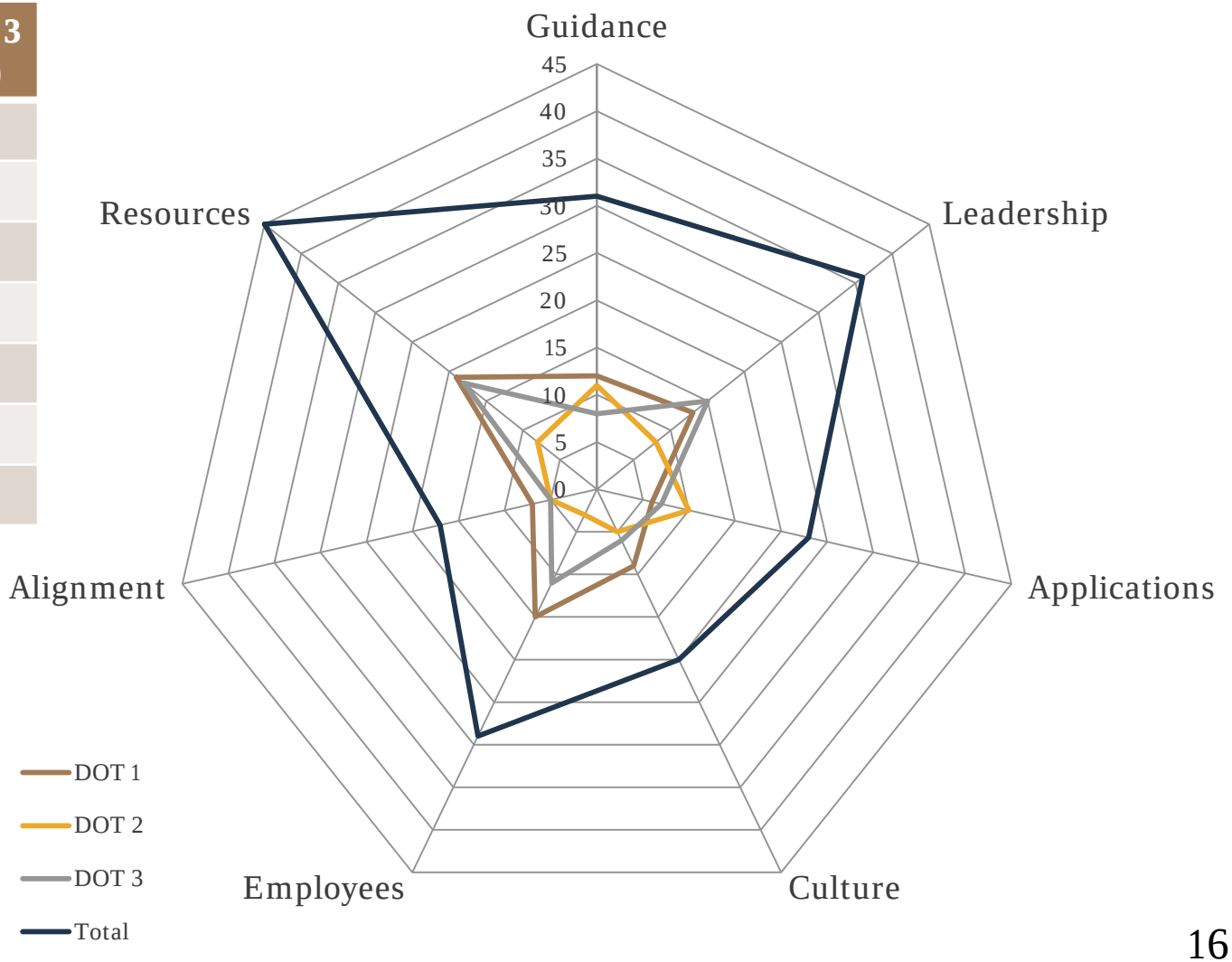
Employee Awareness & Understanding of TAM

Comprehensive Agency Alignment

Applications in Decision Making

Comparative Analysis: Category Trends

	DOT 1 (24)	DOT 2 (21)	DOT 3 (27)
G	12	11	8
L	13	8	15
A	6	10	7
C	9	5	6
E	15	3	11
A	7	5	5
R	19	8	18



Comparative Analysis: Strategy Trends

- Nine strategies common to more than one DOT
  - Two common to all three
  - Seven common to at least two

- Alignment in TIRF categories identified for five strategies

ID	Implementation Strategy	Primary Observed/Expected Impact (Short Sentence)	G	L	A	C	E	A	R
DOT0121	Implementation plan projects have leads assigned with deadlines	Staff accountability for implementation.Emphasizes the need for accountability		Y			Y		Y
DOT0213	TAMP Work Plan developed with clear staff assignments & deadlines			Y			Y		Y
DOT0218	TAM Improvement plan with estimated timeframes and expected outcomes	The TAMP exists, but it is not widely understood by employees in general.		Y					Y
DOT0322	TAM Implementation Plan has specific list of action items with defined timeframe, unit responsible, resources needed, and expected outcomes	Goals/objectives are clear and targets for specific action items are met.		Y			Y		Y

Comparative Analysis: Strategy Trends

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- Alignment in TIRF categories identified for five strategies

ID	Implementation Strategy	Primary Observed/Expected Impact (Short Sentence)	G	L	A	C	E	A	R
DOT0106	Implemented integrated TAM system (AIMS)	Development of quantitative tool to perform trade-off analysis and cross-asset optimization. Continues to provide informed decision making.Data driven decision making; providing tools for budget setting to decision makers in consistent manner.		Y	Y	Y	Y	Y	Y
DOT0210	Implemented Agile Assets Enterprise Asset Management Program				Y				Y
DOT0317	Developed and implemented enterprise-based TAM system (GAMS)				Y				Y

Context-Sensitive Considerations

- Internal & external environments
- Linking to AASHTO TAM Maturity (AASHTO 2011)

TAM Maturity Scale Level	Generalized Description	Recommended TIRF Category Focus
Initial	No effective support from strategy, processes, or tools. There can be lack of motivation to improve.	Employees Leadership Resources
Awakening	Recognition of a need and basic data collection. There is often reliance on heroic effort of individuals.	Guidance Alignment Resources
Structured	Shared understanding, motivation, and coordination. Development of processes, and tools.	Applications Resources
Proficient	Expectations and accountability drawn from asset management strategy, processes, and tools.	Culture Resources
Best Practice	Asset management strategies, processes, and tools are routinely evaluated and improved	ALL

Practitioner Review Survey

Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Weighted Average
1. The TIRF is useful for reviewing TAM implementation	0 (0%)	0 (0%)	1 (16.67%)	1 (16.67%)	4 (66.67%)	**4.50**
2. The TIRF is suitable for DOTs	0 (0%)	0 (0%)	0 (0%)	3 (50%)	3 (50%)	**4.50**
3. The TIRF is effective for improving TAM implementation	0 (0%)	0 (0%)	1 (17%)	2 (33%)	3 (50%)	**4.33**
4. The seven criteria categories are important for TAM implementation	0 (0%)	0 (0%)	0 (0%)	1 (17%)	5 (83%)	**4.83**
5. The seven criteria categories are comprehensive	0 (0%)	0 (0%)	0 (0%)	4 (67%)	2 (33%)	**4.33**
6. There are some additional criteria that could be included	0 (0%)	2 (33%)	4 (67%)	0 (0%)	0 (0%)	**2.67**
7. The TIRF output provides misleading information	1 (17%)	5 (83%)	0 (0%)	0 (0%)	0 (0%)	**1.83**
8. I can see the TIRF in use in DOTs	0 (0%)	0 (0%)	1 (17%)	4 (67%)	1 (17%)	**4.00**
9. I can see the TIRF in use in other transportation agencies	0 (0%)	1 (17%)	0 (0%)	5 (83%)	0 (0%)	**3.67**
10. The TIRF is complete	0 (0%)	0 (0%)	2 (33%)	3 (50%)	1 (17%)	**3.83**

Comments & Feedback

- Practitioner Review Panel
  - **Could potentially serve as an objective beacon** that agencies can use to measure the extent to which each different approach can help them reach TAM maturity
  - **Useful to assess overall TAM strategies**, especially the "soft" side of TAM including dedicating resources, changing culture, etc.
  - **No major weakness**
  - **May not be readily applicable to the management of other transportation assets** (transit, marine, aviation, etc.) … but might be applicable to TAM in those modes after a few tweaks
- Case Study DOT Representatives
  - **Straight forward** and simple to use
  - **Good method** to gauge implementation of TAM
  - Would like to have a **wider range of coworkers complete the survey** as part of our gap analysis for updating our TAMP

Summary

- Conceptual framework **facilitates a systematic review of agency TAM implementation** with respect to TAM program sustainment
  - Assists agencies in understanding how their **implementation approach influences likelihood of sustained TAM** programming
  - Provides **descriptive results that can support future decisions** on implementation investments, especially when considered in addition to other resources
- Forms the **foundation of a catalog (evidence-based database)** of systematically reviewed implementation strategies
  - Allows **identification of strategies** that can address each category
  - Reveals the **strength of implementation strategies** with respect to program sustainment, as additional experiences are documented
- Potential applications
  - Scheduled agency TAM plan updates
  - Peer exchanges
  - TAM Knowledge Portal

Thank You

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