

ANALYSIS OF HIGH-SPEED RAIL IMPLEMENTATION ALTERNATIVES IN THE NORTHEAST CORRIDOR: THE ROLE OF INSTITUTIONAL AND TECHNOLOGICAL FLEXIBILITY



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Motivation

The Northeast Corridor (NEC) is the most densely settled and richest region in the US – congested transportation system

New and innovative methods in the engineering systems field to seek new insights about how one might go about improving mobility

Challenges in upgrading to high-speed rail a multi-state, multi-use and multi-operator corridor

Planning and implementation under uncertainty related to inputs, requirements, and outcomes of the system

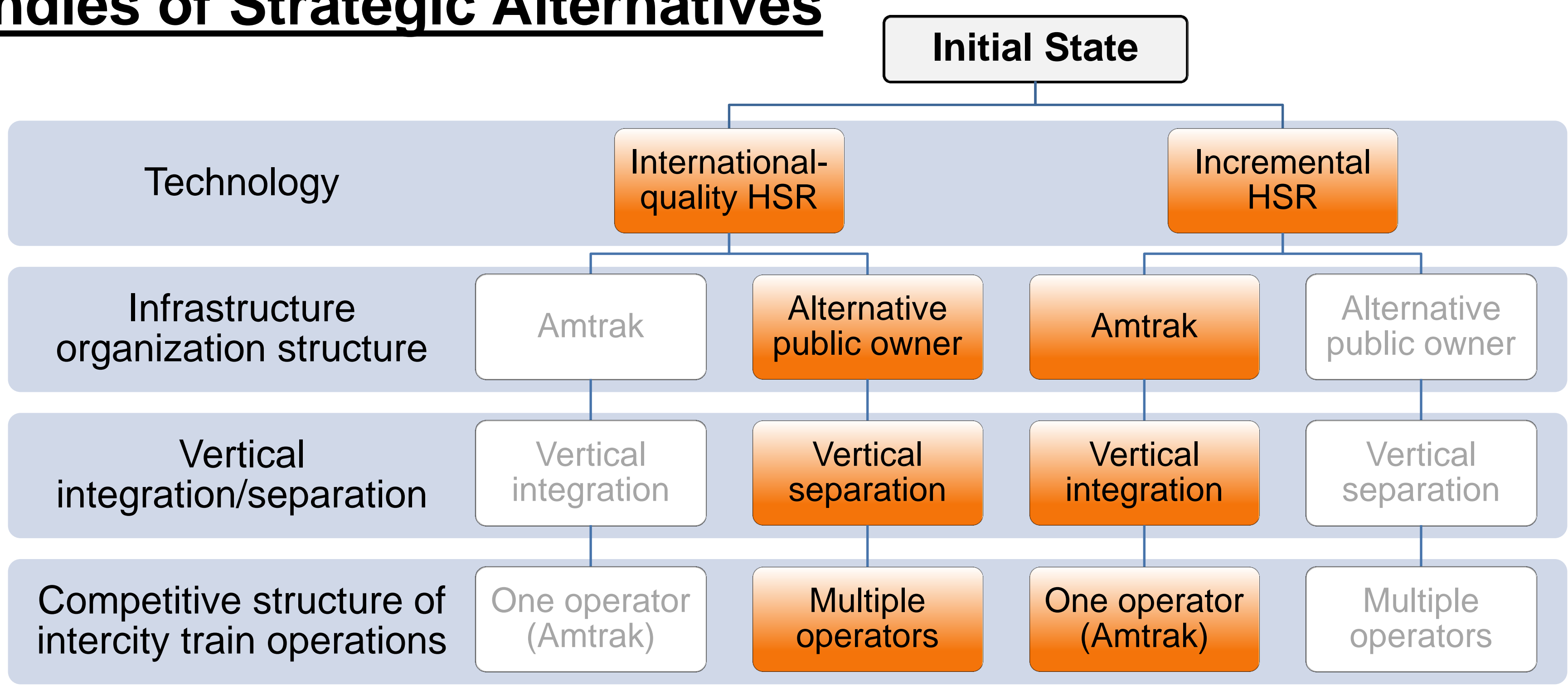
Methodology

1. CLIOS Process
Conceptual Framework -- Physical Domain embedded on an Institutional Sphere

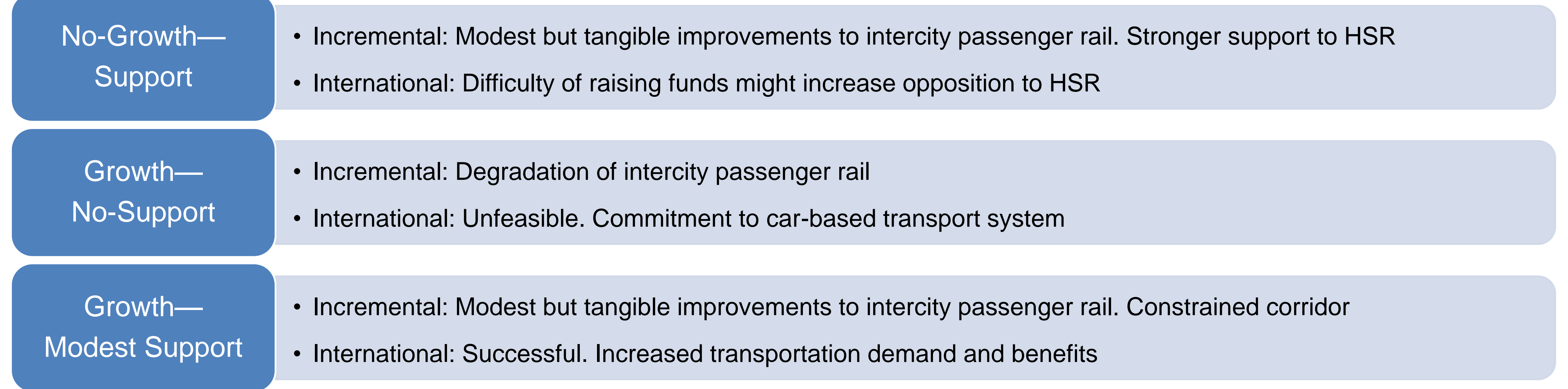
2. Scenario Planning
Scenarios are “stories about the way the world might turn out”, but not predictions of the future nor extrapolations of the past

3. Flexibility – ‘real options’
Flexibility allows decision-makers to respond dynamically to different realizations of the future.

Bundles of Strategic Alternatives

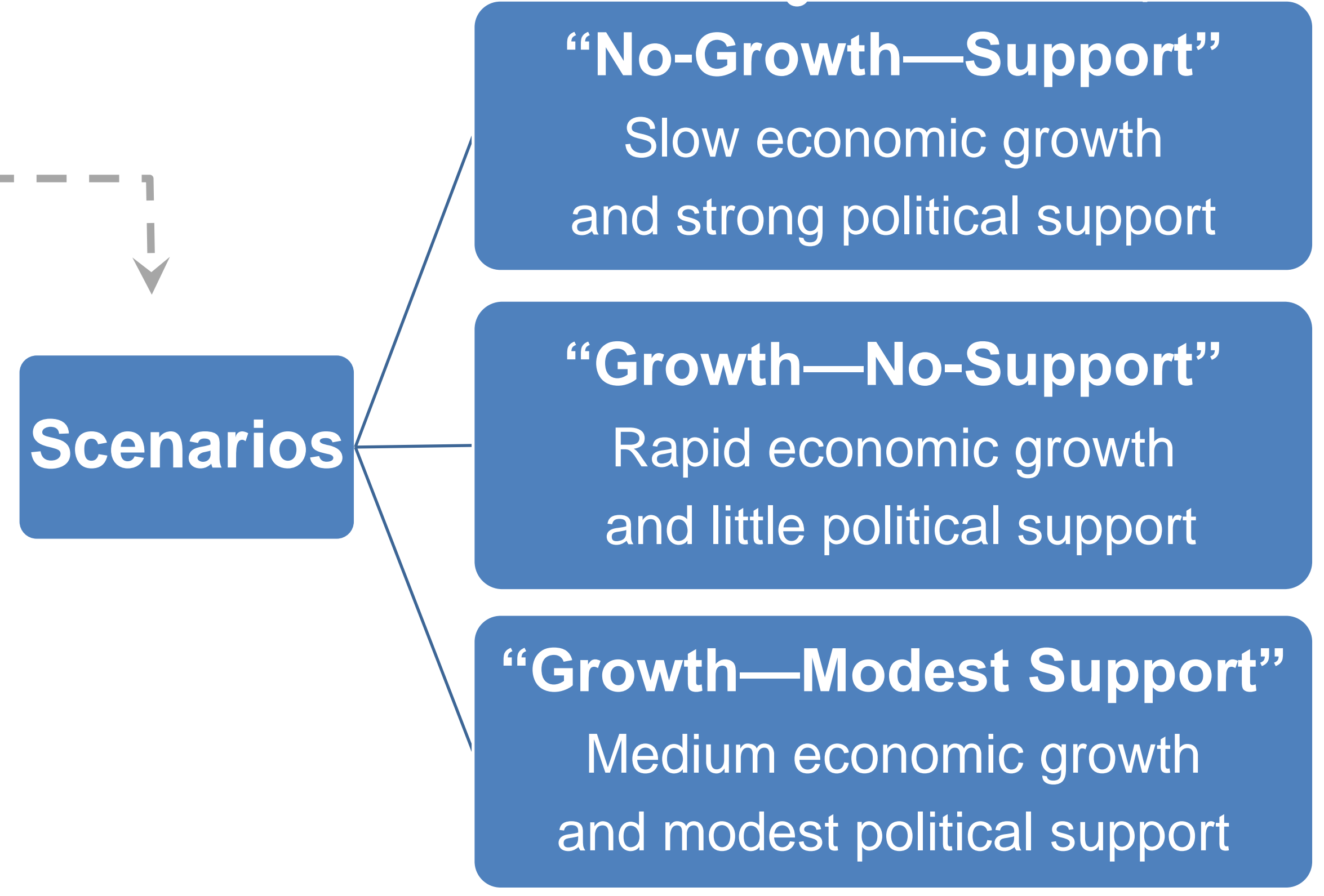


Without Flexibility

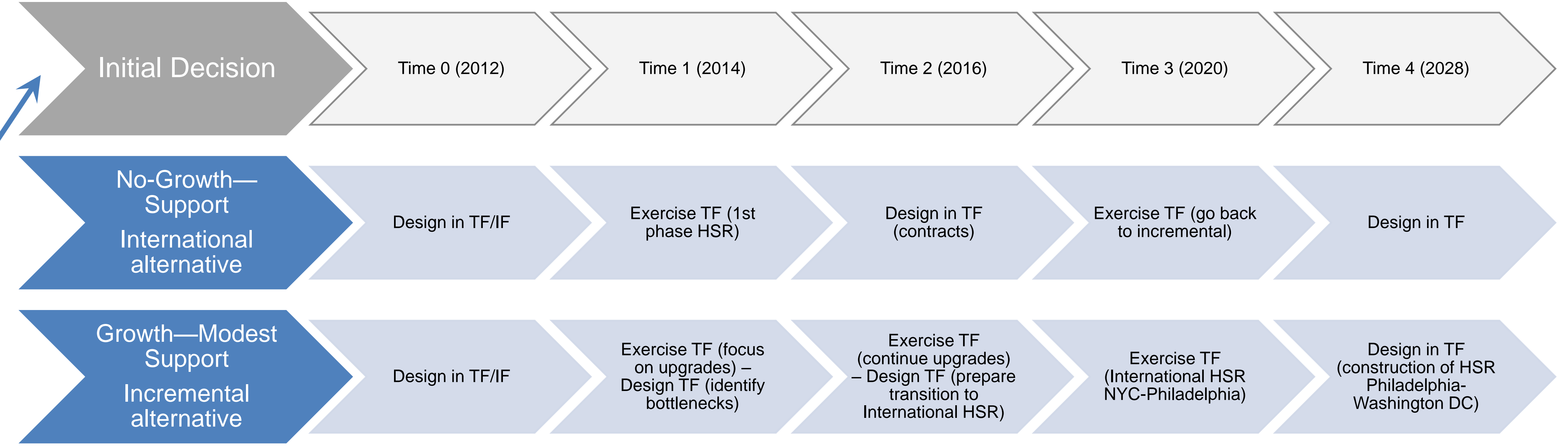


Three Scenarios

- Driving forces**
- economic growth
 - political support
 - congestion
 - technological change
 - public perception
 - environmental changes
 - energy
 - funding sources
 - multimodal cooperation



With Flexibility (Technological/Institutional)



Technological Flexibility (TF): e.g. the option to change from implementing international-quality HSR to incremental HSR and vice-versa.
Institutional Flexibility (IF) : e.g. the option for the institutional structure of the NEC (Amtrak, separate subsidiaries of Amtrak, private sectors, etc.)

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References

J. Sussman, et al. *Transportation in the Northeast Corridor of the U.S.: A Multimodal and Intermodal Conceptual Framework*. 2012. http://esd.mit.edu/Faculty_Pages/sussman/Trans-Northeast-Corridor.pdf. Accessed Jul. 23, 2012.

Implications and Recommendations

Understanding the types of strategic alternatives and the flexibility needed will allow HSR in the NEC to move forward effectively

Under a constrained-funding scenario with strong political support, an incremental approach is better than an all-at-once approach for both institutional and technological reasons

While designing-in and executing flexibility has a cost, it may facilitate the implementation of the bundles by enabling adaptation under different scenarios, thereby improving performance