APPENDIX TABLE 5A-1. Pilot demonstration methods. Overview of the various quantitative data used by NNCTA projects, organized by method type and critical technology. Direction of arrow corresponds to strategic planning vs. impact-assessing methods: left-facing arrows indicate historical assessment, right-facing arrows indicate future strategic planning or modeling. Number in the arrow corresponds to the note number immediately below, which provides detail on the specific methodological approach. When multiple methods are integrated their note number is duplicated.

	Early-stage technologies		Integrated technologies	
	Semiconductors	Artificial intelligence	Energy storage and critical materials	Biopharmaceuticals
QUALITATIVE METHODS				
Expert elicitation	1 →		2 →	3 →
Public elicitation			← 4	← 5
Survey methods		← 6	7 →	
Interviews	1 →		← 4, 2 →	← 5
QUALITATIVE METHODS				
Bibliometrics		8 →		
Econometrics		← 9		
AI, natural language processing	← 10	← 11, 8 →		
Techno-economic modeling	12 →		13 →	14 →
Scenario modeling			15 →	16 →
Structural economic modeling			17 →	

1. Expert elicitation and semi-structured interviews about technical bottlenecks to commercialization of the “beyond-CMOS” semiconductor technology with which subjects were most familiar

2. Expert elicitation and semi-structured interviews to characterize the expert mental model of the impact of energy storage technologies and supply chains, their supportive policies, and expert perception of public trust and acceptance of these technologies and policies

3. Expert elicitation and semi-structured interviews to characterize expert mental model of the impact of biopharmaceutical supply chains and generic drugs, their supportive policies, and expert perception of public trust and acceptance of these technologies and policies

4. Public survey elicitation and semi-structured interviews to characterize the public mental model of the impact of energy storage technologies and supply chains, their supportive policies, public trust and acceptance of these technologies and policies, and comparison of this model to the analogous expert model to identify discrepancies

5. Public survey elicitation and semi-structured interviews to characterize the public mental model of the impact of biopharmaceutical supply chains and generic drugs, their supportive policies, public trust and acceptance of these technologies and policies, and comparison of this model to the analogous expert model to identify discrepancies

6. Characterization of the size, age, and geographic distribution of AI-adopting firms using matched ABS and LBD weighted by macroeconomic statistics, and identification of organizational factors complimentary or integral to AI adoption

7. Characterization of the supply of battery manufacturing–relevant skills across regions, occupations, and industries and identification of potential labor mobility into high-demand skills from industries and occupations outside of critical technology applications using data from the US Current Population Survey, American Community Survey, and Occupational Employment and Wage Survey

8. Extraction of verb-noun pairs of AI-related research with natural language processing AI to create a semantic proxy of AI-related activities, and then analyze academic disciplines for the density of these pairings to determine applicability of AI to scientific fields

9 Analysis of firm-level output, productivity, and employment changes associated with AI-related patent awards and employment of AI-related researchers, their coauthors, or students using firm fixed effects models and event study approaches

10 Analysis of *Journal of Solid State Circuits* article titles and abstracts to characterize the proportion of publications on "beyond-CMOS" technologies that had access to a commercial fab

11 Analysis using a large language model (LLM) in conjunction with a variational autoencoder (VAE) to learn efficient encodings of unlabeled firm-level job posting data to analyze the effects of AI/ML-related hiring on firm-level demand for both ML- and non-ML-related labor

12 Technoeconomic model of the economic value and cost effectiveness of "beyond-CMOS" technology investment based on the technologies' performance characteristics, and the historical economic productivity gains of improvements in those characteristics

13 Technoeconomic model of the economic value of critical material supply resilience investments and policies by comparing the effects of critical material supply chain disruptions on the price and output of battery electric vehicles against a no-disruption baseline

14 Technoeconomic model of the applicability of advanced biopharmaceutical manufacturing techniques to significant drugs

15 Scenario modeling of future price impacts of supply disruptions on critical battery materials and resulting battery pack production costs

16 Scenario modeling of the impact of loss of access to a geographically concentrated supplier country on "essential" generic drug supply

17 Oligopolistic equilibrium model of the US automotive market to estimate how manufacturers would respond to changes in critical battery material supply by calculating a new partial-equilibrium outcome for the US vehicle market