Technologies With Broad Impact

1. *What criteria should be used to select technology focus areas?*
Technology is inherently transitive in nature, with new technologies being integrated into manufacturing operations and ultimately being standardized. CAMA suggests that the definition of "technology focus areas" be broadened to sustain the longevity of the institutes. For example, an institute focused on "advanced materials," "small and medium manufacturers," or "sustainable manufacturing" could transform with time, as technologies transform, so that the Institutes remain viable and relevant. Additionally, the AMPMO should consider an institute that is dedicated to other aspects of manufacturing beyond technology, such as the business factors involved. *What technology focus areas that meet these criteria would you be willing to co-invest in?*
CAMA will work with our regional partners to identify areas worth co-investing in.   However to date, CAMA members have indicated that they may participate in an institute dedicated to one of the following industries / areas:

   - **Cleantech / Clean Energy**
   - **Biotech**
   - **Aerospace**
   - **Small and Medium Manufacturer Focus**
   - **Process improvement and Cost Reduction**

2. *What measures could demonstrate that Institute technology activities assist U.S. manufacturing?*
CAMA suggests the following measures that could be used to demonstrate that Institute technology is assisting US Manufacturing:
   1) **Number of jobs created**
   2) **Number of new SMEs launched**
   3) **Number of institute patents or IP adopted and used by industry**
   4) **Number of companies using institute owned / licensed IP**
   5) **Number of industry participants actively working with / for the institute**

3. *What measures could assess the performance and impact of Institutes?*
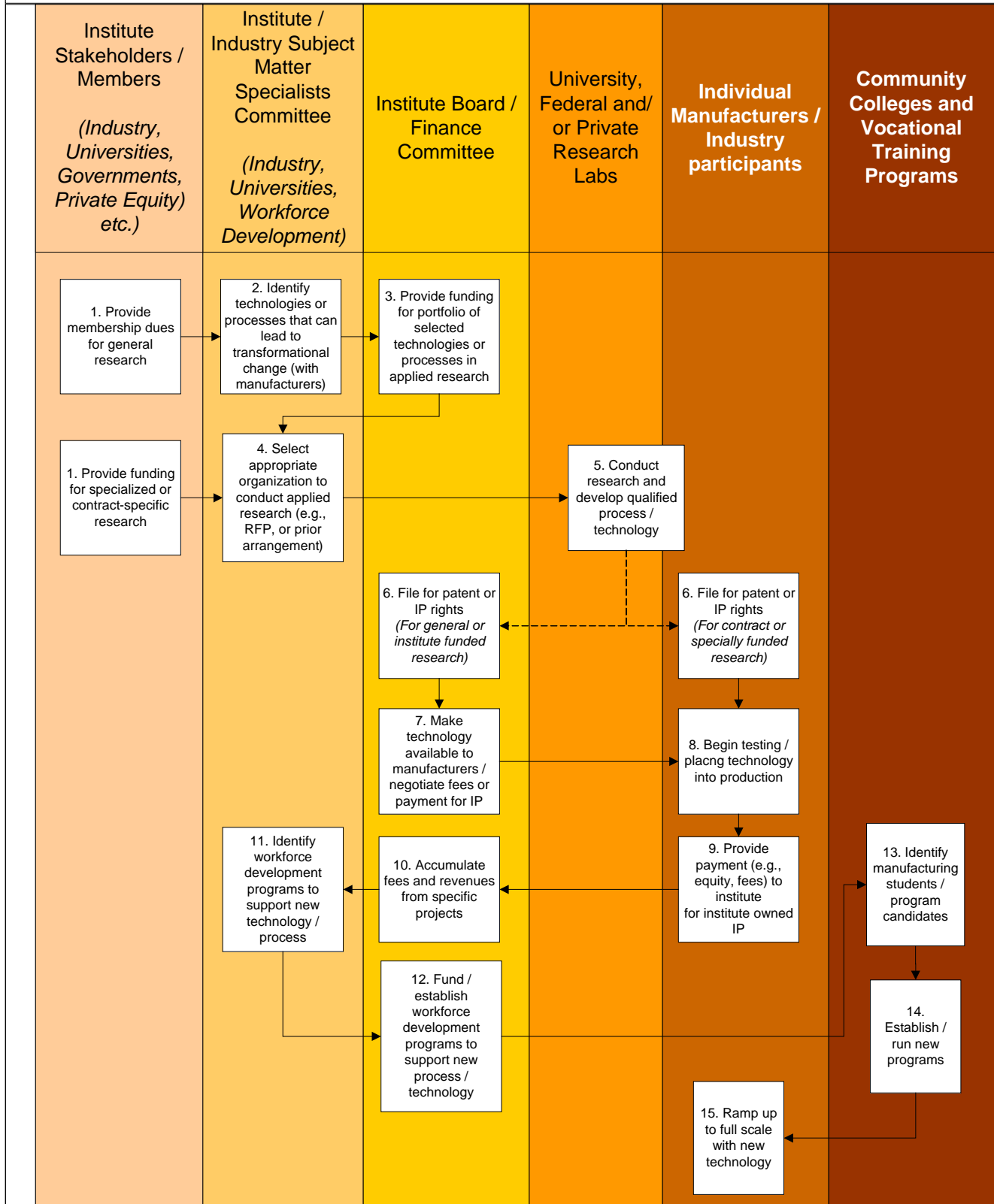**CAMA suggests the following as measures that could be used toward institute performance:**
   1) **Institute revenues coming from non-governmental sources (e.g., industry membership fees, license fees)**
   2) **Number of manufacturers engaged in institute related projects**
   3) **Number of individuals hired into industry, from Institute-related training programs**

4. *What business models would be effective for the Institutes to manage business decisions?*
   CAMA has developed a venture capital-type model, in coordination with the Colorado Office of Economic Development and International Trade (OEDIT) where technologies / processes are developed and tested with Universities / Laboratories/ Manufacturers and subsequently provided to small and medium enterprises (SMEs) for commercialization with a return of equity or license fees to the institute for reinvestment.

Sample Institute Business Model: Venture Capital-Type Model

Institute Stakeholders / Members (Industry, Universities, Governments, Private Equity) etc.)	Institute / Industry Subject Matter Specialists Committee (Industry, Universities, Workforce Development)	Institute Board / Finance Committee	University, Federal and/ or Private Research Labs	Individual Manufacturers / Industry participants	Community Colleges and Vocational Training Programs
1. Provide membership dues for general research	2. Identify technologies or processes that can lead to transformational change (with manufacturers)	3. Provide funding for portfolio of selected technologies or processes in applied research			
1. Provide funding for specialized or contract-specific research	4. Select appropriate organization to conduct applied research (e.g., RFP, or prior arrangement)		5. Conduct research and develop qualified process / technology		
		6. File for patent or IP rights *(For general or institute funded research)*		6. File for patent or IP rights *(For contract or specially funded research)*	
		7. Make technology available to manufacturers / negotiate fees or payment for IP		8. Begin testing / placng technology into production	
	11. Identify workforce development programs to support new technology / process	10. Accumulate fees and revenues from specific projects		9. Provide payment (e.g., equity, fees) to institute for institute owned IP	13. Identify manufacturing students / program candidates
		12. Fund / establish workforce development programs to support new process / technology			14. Establish / run new programs
				15. Ramp up to full scale with new technology	

5. *What governance models would be effective for the Institutes to manage governance decisions?*
   CAMA suggests the following governance structures for consideration: A membership managed professional organization (501(c)6) or other not-for profit structure with a board that includes key institute stakeholders (e.g., industry anchor companies, state governments and universities)

6. *What membership and participation structure would be effective for the Institutes, such as financial and intellectual property obligations, access and licensing?*
   CAMA suggests the Federal government consider variations on the Commonwealth Center for Advanced Manufacturing (CCAM) model for managing financial and intellectual property (IP) obligations. Each institute will need to adjust this model for the industry / technology / region, however their IP and financial framework provides a basis for discussion and evaluation.

7. *How should a network of Institutes optimally operate?*
   CAMA suggests that the institutes have an industry lead central coordination point that is perpetually funded or sustained in some manner that supports the longevity of all institutes.

8. *What measures could assess effectiveness of Network structure and governance?*
   To assess the network structure and governance, CAMA suggests the following measures:
   - ***Number of institutes complying with centralized governance***
   - ***Revenues of a centralized institute from industry participants***
   - ***Number of patents / IP filed by all institutes***

Strategies for Sustainable Institute Operations

9. *How should initial funding co-investments of the Federal government and others be organized by types and proportions*
   Initial funding should be provided such that the institutes have an incentive to grow industry-based revenues.

10. *What arrangements for co-investment proportions and types could help an Institute become self-sustaining?*
    CAMA suggests that initial investment proportions be higher from governmental sources, but that this proportion will shift as the institutes prove their value – if institutes do not meet mandated performance targets, their governmental funding should be removed.

11. *What measures could assess progress of an Institute towards being self-sustaining?*
    CAMA suggests that Institute revenues from industry participants, and repeat membership be used as the primary measures for self-sustainment.

12. *What actions or conditions could improve how Institute operations support domestic manufacturing facilities while maintaining consistency with our international obligations?*
    CAMA politely defers. .

13. *How should Institutes engage other manufacturing related programs and networks?*
    CAMA suggests that Institutes identify programs that address each Institute's core value proposition / core mission and make them active partners in the institute operations.

14. *How should Institutes interact with state and local economic development authorities?*
    CAMA suggests that Institutes be encouraged to work with State and Local governments, (in particular economic development offices) as partners, especially with regard to economic development, the identification of institute corporate partners, and with regard to identifying community college and vocational providers.

15. *What measures could assess Institute contributions to long term national security and competitiveness?*
    CAMA politely defers.

Education and Workforce Development

16. *How could Institutes support advanced manufacturing workforce development at all educational levels?*
   Using the business model provided, (i.e., flowchart provided in question 5) advanced manufacturing would be supported at both the University / design level and the vocational level by providing avenues for funding both initiatives.

17. *How could Institutes ensure that advanced manufacturing workforce development activities address industry needs?*
   ***CAMA** suggests that the attached business model be considered for identifying participating workforce development programs.*

18. *How could Institutes and the NNMI leverage and complement other education and workforce development programs?*
   ***CAMA** suggests that the NNMI identify workforce development programs actively associated with each Institute. By identifying these programs early on, NNMI may be able to identify economies of scale – such as texts and training that are common among programs that should be standardized. Additionally, NNMI could identify overlapping programs serving the same geographic base or the same technology related programs to eliminate waste.*

19. *What measures could assess Institute performance and impact on education and workforce development?*
   CAMA suggests the following measures:
   - **Number of graduates hired into industry from institute-affiliated vocational programs**
   - **Number of engineers graduated in institute-affiliated programs**
   - **Reduction in unfilled manufacturing positions**
   - **Growing manufacturing firms**

20. *How might institutes integrate R&D activities and education to best prepare the current and future workforce*
   ***CAMA** suggests that the attached business model be considered for integrating R&D and educational activities.*