## Comments for the Request for Information on Proposed New Program: National Network for Manufacturing Innovation (NNMI)

## Technologies With Broad Impact

1. What criteria should be used to select technology focus areas?
    a. The technologies selected should have broad industry applicability.
    b. The technologies selected should enhance the position of advanced manufacturing in the U.S.
    c. The technologies selected should have the potential to increase the competitiveness of U.S. manufacturing.
    d. Technologies that are relevant to emerging markets in the U.S.
    e. Technologies that increase productivity while also creating advanced manufacturing jobs.
    f. Technologies with export potential.

2. What technology focus areas that meet these criteria would you be willing to co-invest in?
    a. Robotics and automation technologies focused on advanced manufacturing opportunities.

3. What measures could demonstrate that Institute technology activities assist U.S. manufacturing?
    a. Number of companies contacted/served and 3rd party surveys.
    b. Number of companies using technologies developed by the Institutes.
    c. Consider measuring progression of "Technology Readiness Levels" associated with technologies.

4. What measures could assess the performance and impact of Institutes?
    a. 3rd party surveys completed by small to mid-sized manufacturers who come to an Institute for assistance could reveal efficiency data or jobs data.
    b. Deliverable performance.
    c. Technology transitioned to industry.
    d. Consider adopting metrics similar to the ones used for the Manufacturing Extension partnership (MEP).

## Institute Structure and Governance

5. What business models would be effective for the Institutes to manage business decisions?
    a. Establish an Institute that is supported by a host organization/institution that is led by a center director and an advisory board
    b. Consider encouraging independent non-profit applied R&D firms, that currently serve technology transfer roles in the U.S., to lead IMIs.
    c. Consider a model that provides some level (beyond the 5 years) of sustained federal investment into subsidized research, similar to Fraunhofer and MEP.

6. What governance models would be effective for the Institutes to manage governance decisions?
    a. Consider use of a consortium. Establish a board, with each consortium member and at large members having a representation on the board. Establish an Executive Board overseeing the network of Institutes and that each Institute would have its director serve on the Executive Board.

7. What membership and participation structure would be effective for the Institutes, such as financial and intellectual property obligations, access and licensing?
    a. Regarding IP, I recommend that a range of IP rights be supported, from a member retaining IP rights on preexisting technology, to shared rights among members developing arising IP, to open source where appropriate.
    b. Conduct contract-based R&D.
    c. Fund research collaborators as domain experts.

8. How should a network of Institutes optimally operate?
    a. Have an Executive Board overseeing the network of Institutes where each Institute would have its director serve on the Executive Board.
    b. Conduct quarterly workshops (in-person and virtual) where representatives of the various Institutes meet to review activities across the network and identify opportunities to collaborate or leverage each other's work.
    c. Consider a peer review process where a group of industry experts and other IMI directors review IMIs on a bi-annual basis.

9. What measures could assess effectiveness of Network structure and governance?
    a. The level of cross Institute collaboration.
    b. A measure of economic impact based on U.S. manufacturing output, productivity, and job growth as viewed at the network level.

## Strategies for Sustainable Institute Operations

10. How should initial funding co-investments of the Federal government and others be organized by types and proportions?
    a. Because these Institutes are intended to support companies who are not traditional government contractors, an "Other Transaction" vehicle should be considered acceptable.
    b. A broad interpretation of approved co-investment types should be supported, including the value of facilities, equipment, in kind services, man power, cash, on-going and previously conducted relevant R&D, training, differences between actual overhead and allowable overhead.

11. What arrangements for co-investment proportions and types could help an Institute become self-sustaining?

a. Fund the Institutes initially heavily with federal funds, with the level of federal funding being reduced over a 10 year period. After 10 years, they would be expected to be self-sustaining.
b. An Institute should be considered as self-sustaining even if it is bringing in the same level of non-federal revenue after the federal funds expire.

12. What measures could assess progress of an Institute towards being self-sustaining?
    a. If the model described in #11 above is utilized, then measure the financial impact on the Institute each year that the government funding declines. If the overall finances of the Institute do not decline, or if they increase, then the Institute would be succeeding on its path toward being self-sustaining.

13. What actions or conditions could improve how Institute operations support domestic manufacturing facilities while maintaining consistency with our international obligations?
    a. International participation should be allowed in some fashion because there are lessons to be learned from international partners, but the program should be incentivized in some fashion toward the benefit of domestic partners.
    b. Allow International participation but without the direct use of federal funds to support R&D assistance.

14. How should Institutes engage other manufacturing related programs and networks?
    a. There should not be restrictions that inhibit leveraging other manufacturing related programs, consortiums, and networks. For example, an MEP should be viewed as an asset to an Institute.

15. How should Institutes interact with state and local economic development authorities?
    a. It should be up to the individual Institutes to determine this. State and local economic development agencies may be partners to assist with the job creation aspects of an Institute.

16. What measures could assess Institute contributions to long term national security and competitiveness?
    a. It will likely be difficult to measure this directly at the level of a particular Institute. Our nations long term national security and competitiveness will be enhanced by a stronger economy and if the Institutes are successful in strengthening the manufacturing sector in the U.S., they will contribute to our long term national security and competitiveness. Therefore the measures described in #3 & 4 above are relevant.
    b. Track the trend in the number of manufacturing jobs that are sent overseas. A decline in that number may be an indication of the Institutes' overall impact on domestic manufacturing.
    c. Fraunhofer has metrics that they must meet and should be considered.

## Education and Workforce Development

17. How could Institutes support advanced manufacturing workforce development at all educational levels?
    a. An Institute could work with local school districts to expose students in middle and high schools to advanced manufacturing and dispel ideas often formulated early about manufacturing lacking advanced technology and being an occupation for those not college bound.
    b. An Institute could work with high school vocational programs and community colleges to teach skills required by the work force for modern manufacturing processes.
    c. An Institute could work with universities to provide hands-on capstone project opportunities and internships to students.
    d. Institutes should have training and laboratory space co-located so that staff can both research and train at the same facility.
    e. Some portion of Federal funds should be ear-marked for STEM education.
    f. Each project should have a STEM education element.
    g. Use of virtual spaces and advanced technologies could provide a means for broad exposure to multiple educational levels.

18. How could Institutes ensure that advanced manufacturing workforce development activities address industry needs?
    a. An Institute could establish an industry advisory group to provide input on what industry needs.
    b. Topics for training would be identified through members of the consortium.
    c. Work with the workforce boards within the region to formulate training projections, plans, and programs.
    d. Collaborate with community colleges to assist in the development of training and education programs.

19. How could Institutes and the NNMI leverage and complement other education and workforce development programs?
    a. Other programs, such as MEP, could provide a portion of the training that the Institute offers.
    b. Conversely, an Institute could conduct training on advanced manufacturing concepts and offer that training to clients of an MEP, or other program.
    c. Through partnerships with both workforce boards and community colleges.
    d. Institutes should identify programs that already support the goals and objectives of the IMIs and work with the leaders of those programs to grow them in support of the IMIs.

20. What measures could assess Institute performance and impact on education and workforce development?
    a. If an Institute provides training to employees whose jobs are being replaced by advanced technology, a measure of success could be the percentage of the workforce who successfully transition into new job responsibilities as a result of the training provided by the Institute in the advanced technology.

b. Independent 3rd party surveys. Number of individual trained, number of hours trained.

21. How might institutes integrate R&D activities and education to best prepare the current and future workforce?
    a. Internships and capstone projects involving students from partnering universities.
    b. Faculty renewal programs.
    c. Collaborative R&D projects with university faculty and students.
    d. Institutes should have training and laboratory space co-located so that staff can both research and train at the same facility.
    e. Support visiting guest researchers from industry.