

Advanced Manufacturing Initiatives: A National Imperative

A NAMRI/SME Position Paper



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EXECUTIVE SUMMARY

Introduction

The North American Manufacturing Research Institution of SME (NAMRI/SME) brings together researchers from leading companies, government laboratories, academic institutions and industrial think tanks located around the world for the advancement of the scientific foundation of discrete-parts manufacturing. NAMRI/SME's annual conference, the North American Manufacturing Research Conference (NAMRC), is a prominent international forum for the presentation and discussion of technical innovations and manufacturing research.

This position paper identifies specific, actionable tasks in response to recommendations outlined in in the President's Council of Advisors on Science and Technology (PCAST) report of the Advanced Manufacturing Partnership (AMP) Steering Committee³ and expresses NAMRI/SME's support for these specific initiatives and others to ensure that the economic and social climate promotes the domestic manufacturing sector.

Since 2011, a series of significant policy documents¹⁻⁴ has been developed that raises the profile of advanced manufacturing and its place in the United States economy. Recognizing that the manufacturing sector has a larger economic multiplier than any other sector, and considering its vital importance in exploiting and driving the American innovation infrastructure, these policy documents address current shortcomings in the manufacturing environment. A number of provocative

recommendations have been put forward to capture the domestic competitive advantage in American manufacturing. If enacted, these recommendations promise to profoundly impact the economy and well-being of the entire nation, and therefore their importance cannot be overstated.

NAMRI/SME is encouraged by ongoing progress on some of the PCAST recommendations and is ready to lead the sustained efforts and actions by all stakeholders to assure the success of these programs.

NAMRI/SME also supports the additional manufacturing initiatives announced by President Barack Obama in the 2014 State of the Union address. The president declared that the United States is well-positioned for economic growth, and numerous economic indicators suggest a strong resurgence of domestic advanced manufacturing, as long as a proper environment can be secured and maintained.

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Summary of NAMRI/SME Positions

The recommendations of NAMRI/SME contained in this position paper are summarized here and identified in bold-faced type within the body of the full paper that follows. The sequence of discussion corresponds with the organization of the PCAST report³ and does not indicate prioritization; indeed, all recommendations are considered to be essential.

1. A review of the National Advanced Manufacturing Strategy every five years, facilitated by NAMRI/SME, in conjunction with the annual NAMRC.
 2. Funding of the AMTech program be expanded to at least \$30 million per year.
 3. Immediate congressional action to enact the National Network for Manufacturing Innovation (NNMI) program, including an expanded investment (\$5 billion annually) for the establishment of at least 60 institutes in the U.S.
 4. The vision of the NNMI program as described in the preliminary design document⁴ to maximize industry impact by bringing together all stakeholders in the manufacturing sector.
 5. An annual meeting of institute representatives as required by the program, facilitated by NAMRI/SME in conjunction with the annual NAMRC.
 6. Investigation of a waiver mechanism in regard to Revenue Procedure 2007-47.
 7. Foster a robust environment for commercialization of advanced manufacturing technologies, especially incorporating manufacturing impact measures in evaluation of innovation ecosystems.
 8. Increase the percentage of SBIR funding directed toward manufacturing.
 9. Develop a public service announcement campaign to improve the image of manufacturing and can provide suitable images for the project.
 10. A training module developed by DOD on career opportunities in advanced manufacturing through the DOD Transition Assistance Program.
 11. Reward incubation institutes and manufacturing contributions to the institutes, through the combined efforts of NAMRI/SME and ABET, as well as ranking boards such as *U.S. News & World Report*.
 12. Augment existing engineering curricula with manufacturing content and programs.
 13. Additionally NAMRI/SME supports recommendations to:
 - Create a national network of manufacturing educators.
 - Align solicitations for federally funded research to encourage partnerships with community colleges.
 - Require community colleges participating in NNMI to demonstrate that they are working with feeder high schools to align programs, resulting in well-articulated secondary/post-secondary career pathway programs to assure that students are prepared to succeed in manufacturing skills programs.
 - Assure that NNMI strategies encourage appropriate utilization of funds under the Perkins Career and Technical Education Act, the Workforce Investment Act and workforce training opportunities funded by the DOL.
 - Establish internship programs, whether through the AMNPO, the NNMI program or as a separate program, that are well-aligned with industry needs.
- Success requires mobilization of partnerships between industry, government, academia and professional societies. NAMRI/SME supports the recent proposed legislative actions and encourages their expansion and immediate funding at proper scales.

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Introduction

In the last several years, a series of significant policy documents and initiatives has raised the profile of advanced manufacturing and underscored its importance in the United States economy. The manufacturing sector has a larger economic multiplier than any other sector and is vital in exploiting and driving the American innovation infrastructure.

Reports addressing shortcomings in America's advanced manufacturing environment were presented by the President's Council of Advisors on Science and Technology (PCAST) in June 2011¹ and July 2012², the latter including 16 significant recommendations from the Advanced Manufacturing Partnership (AMP) Steering Committee. The proposed national strategic plan for advanced manufacturing³ and the National Network for Manufacturing Innovation (NNMI) design⁴ and pilot institute were other landmark recommendations for capturing the domestic competitive advantage in American manufacturing. The importance of these proposals and activities to transform and profoundly impact the economy and well-being of the entire nation cannot be overstated.

In the 2014 State of the Union address, President Barack Obama declared that the United States is well-positioned for economic growth and announced additional manufacturing initiatives. Numerous economic indicators suggest a strong resurgence of domestic advanced manufacturing, as long as a proper environment can be secured and maintained.

The North American Manufacturing Research Institution of SME (NAMRI/SME) brings together researchers from leading companies, government laboratories, academic institutions and industrial think tanks located around the world for the advancement of the scientific foundation of discrete-parts manufacturing. NAMRI/SME's annual conference, the North American Manufacturing Research Conference (NAMRC), is a prominent international forum for the presentation and discussion of technical innovations and manufacturing research.

This NAMRI/SME position paper expresses support for the 16 recommendations presented in the July 2012 PCAST/AMP report, entitled *Report to the President on Capturing Domestic Competitive Advantage in Advanced Manufacturing*³. Progress on the stated initiatives, and others, will ensure that the economic and social climate promotes the domestic manufacturing sector.

Through various administrative, legislative and private-sector actions, there is momentum on several key PCAST/AMP recommendations, including an additional three announced and four projected institutes in the NNMI, support for community college-industry workforce development collaboration and a sustained policy of investment in advanced manufacturing R&D emphasizing the accelerated launch of technologies from lab to market.

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Manufacturing Research Funding Worldwide

A June 2011 PCAST report, *Report to the President on Ensuring American Leadership in Advanced Manufacturing*¹, noted that the environment for research in the United States is very healthy, with fundamental research leading to life-changing technologies that continue to astound the public. Flat-screen displays, lithium-ion batteries, solar panels, and so on, are fruits of American research. However, these American technologies are not manufactured domestically, even though labor is a small portion of the product cost.

One of the reasons for this situation can be understood from Figure 1, which illustrates the distribution of investment compared with the level of development in a product. In the United States, government-sponsored research is predominantly done in the early stages of product development, and industry concentrates on the very late stages. The gap in between is a space that is owned by neither entity—the so-called “valley of death.”

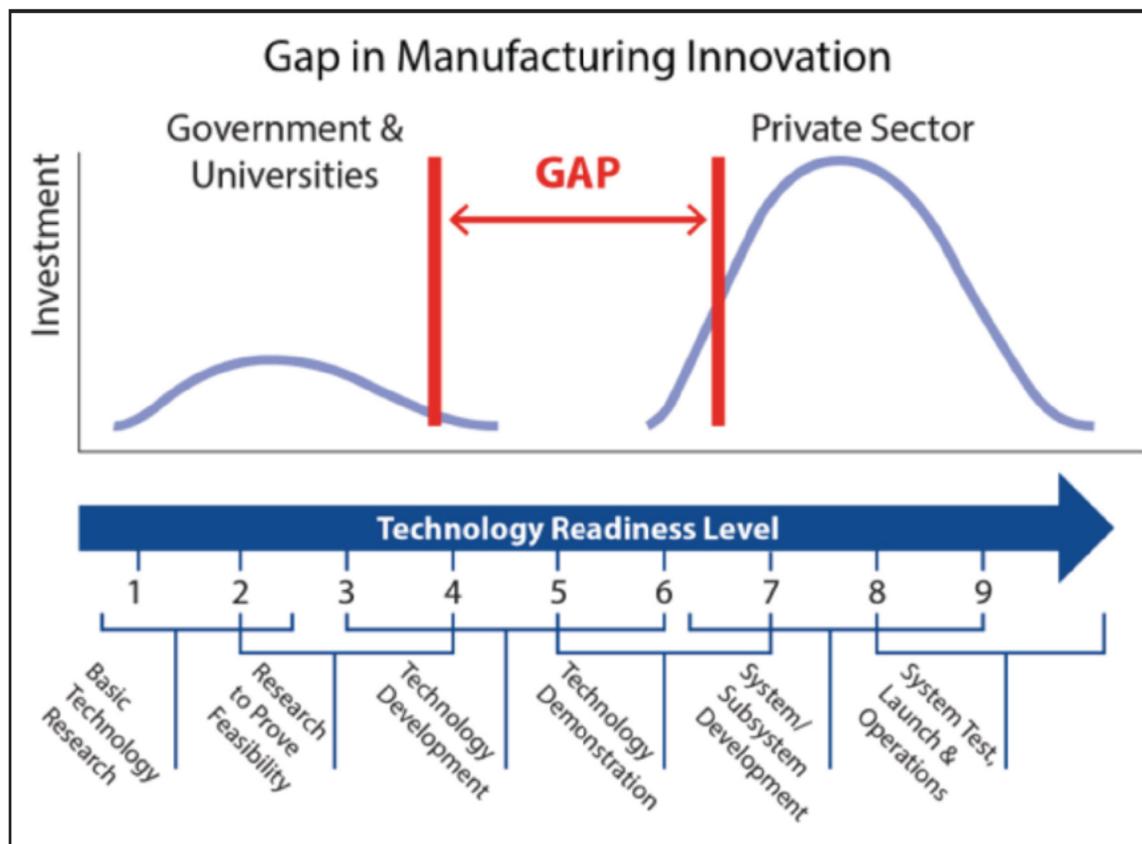


Figure 1: Distribution of investment in technology development in the United States⁵.

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In other countries, significant funds are made available for manufacturing infrastructure, research and demonstration and to promote the manufacture of products invented everywhere, including in the United States. If a product has developed to a prototype, it is relatively easy to locate manufacturing scale-up and demonstration activities anywhere in the world; once these tasks have been performed, there is an impetus to keep manufacturing near the pilot production facilities. This has been the practice and experience of the German Fraunhofer Institutes, where the establishment of a new institute leads quickly to industrial development.

In a free-trade world, manufacturing infrastructure

provides a competitive advantage to a nation; this is recognized by most advanced and developing economies. Established programs directed toward advanced manufacturing are summarized in Table 1. For comparison, the United States invests roughly \$0.15 billion annually in the Hollings Manufacturing Extension Partnerships program and \$0.37 billion in manufacturing through the National Science Foundation (NSF).¹⁵ NSF funds fundamental research, including the Materials Genome Initiative and the National Robotics Initiative, neither of which have strong ties to manufacturing. Regardless, even with NSF funding that is nominally relevant, the U.S. lags behind the world in its support of manufacturing research. This is a dangerous condition—and one that needs to be corrected immediately.

Table 1: Comparison of levels of investment in manufacturing research

Country	Program and Summary	Investment in U.S. dollars ¹ (billions)	Equivalent U.S. investment ² (billions)
Germany ⁵	Fraunhofer Program. World's most established and premier manufacturing research program; complements Max Plank Institutes (German analog to National Science Foundation).	1.0 ³	3.0 ³
	Spitzencluster. Supports the best or 'leading-edge' German industrial clusters.	0.25 ³	0.75 ³
	Central Innovation Program. Provides grants to small and medium enterprises to finance research and innovation projects.	0.64 ³	1.92 ³
United Kingdom ⁶	The Catapult Program. Established seven centers in advanced manufacturing.	0.26 ⁴	1.6
Australia ⁷	Industry and Innovation Program. Collaborations between academic, government and industry researchers to commercialize discoveries; \$500 million over four years.	0.50	5.0
Japan ⁸	New Energy and Industrial Technology Development Organization. Promotes R&D for energy and industrial technologies.	1.64 ³	4.89 ³
	Other programs (Kohsetsushi Centers, Technology Advanced Metropolitan Area Association, Kawasaki Business Incubation Center)	0.51 ³	1.45 ³
Taiwan ⁹	Industrial Technology Research Institute (ITRI)	0.60 ³	18.9 ³
Finland ¹⁰	Finland Science and Technology Council	0.63 ³	35.5 ³
South Korea ^{8,11}	Ministry of Education Science and Technology. Research programs in the 577 initiative target semiconductors, automobiles, machinery, health care and software.	12.8 ³	175.0 ³
Singapore ¹²	Future of Manufacturing Program	0.5 ³	25.5 ³
	Other programs (Satellite Industry Development, Collaborative Industry Projects)	0.19	9.7
France ¹³	Competitiveness Clusters. Similar to the German Fraunhofer program; 71 competitive clusters in "cutting edge and key technology sectors."	0.75 ³	4.9 ³
China	No government figures. Estimates are 1.7% of GDP, 82.7% of which supports manufacturing sector. ¹⁴	108 ³	222 ³

Notes: 1. Investment by federal government only; often matched by local governments.
2. Scaled by size of GDP.
3. Annual investment.

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Recapturing America's Competitive Advantage: The PCAST Report

The President's Council of Advisors on Science and Technology (PCAST) is an advisory group of the nation's leading scientists and engineers, appointed by the president to augment the science and technology advice originating from cabinet departments and other federal agencies. In June 2011, the Advanced Manufacturing Partnership (AMP) effort was launched, which became a steering committee under PCAST. The AMP committee investigated the advanced manufacturing sector, identified reasons that U.S. leadership in this vital area is in jeopardy and also made recommendations for recapturing American competitive advantage.

The AMP committee filed a report³ that clearly stated the challenges and opportunities for the manufacturing sector. While it is recognized that low-wage jobs have been offshored to low-wage countries, it is less commonly appreciated that high-technology products have also been increasingly manufactured offshore. This is disturbing because labor costs are a low contribution to total cost of these products, and therefore these are products where U.S. manufacturing should be extremely competitive. The reasons that these products are not manufactured domestically are numerous and have far-reaching implications for the nation.

Even so, there are many opportunities for investment that could have a profound effect on the manufacturing sector and result in a renaissance in American manufacturing. The AMP committee made 16 recommendations, shown in Table 2, that were published in the PCAST report.³ These recommendations are scientifically and economically sound, well-reasoned and impactful. They should be enacted without delay.

In 2012, the multiagency Advanced Manufacturing National Program Office (AMNPO) was formed, located at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD. AMNPO has begun the process of implementing the PCAST recommendations, but a proper effort requires a whole-of-society approach, including partnerships and involvement of government (federal and local), industry and academia.

With this position paper, NAMRI/SME is expressing its strong support of the PCAST report³ and urges action be taken to enact each recommendation immediately. NAMRI/SME strongly supports the efforts of AMNPO and recommends that professional societies, industry and academia dedicate themselves to the important task of transforming society through partnerships in research/demonstration, training, education and investment in the domestic manufacturing sector.

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Table 1: Comparison of levels of investment in manufacturing research

Pillar	No.	Recommendation/Summary
Enabling Innovation	1	Establish a National Advanced Manufacturing Strategy. The AMP Steering Committee proposes establishing and maintaining a national advanced manufacturing strategy by putting in place a systematic process to identify and prioritize critical cross-cutting technologies.
	2	Increase R&D Funding in Top Cross-Cutting Areas. In addition to identifying a “starter list” of cross-cutting technologies that are vital to advanced manufacturing, the AMP Steering Committee proposes a process for evaluating technologies for research and development (R&D) funding.
	3	Establish a National Network of Manufacturing Innovation Institutes (MIIs). The AMP Steering Committee proposes the formation of MIIs as public-private partnerships to foster regional ecosystems in advanced manufacturing technologies. MIIs are one vehicle to integrate many of the Committee’s recommendations.
	4	Empower Enhanced Industry/University Collaboration in Advanced Manufacturing Research. The AMP Steering Committee recommends a change in the treatment of tax-free bond-funded facilities at universities that will enable greater and stronger interactions between universities and industry.
	5	Foster a More Robust Environment for the Commercialization of Advanced Manufacturing Technologies. The AMP Steering Committee recommends that action is taken to connect manufacturers to university innovation ecosystems and create a continuum of capital access from start-up to scale-up.
	6	Establish a National Advanced Manufacturing Portal. The AMP Steering Committee recommends that a searchable database of manufacturing resources be created as a key mechanism to support access by small and medium-sized enterprises to enable infrastructure.
Securing the Talent Pipeline	7	Correct Public Misconceptions About Manufacturing. Building excitement and interest in careers in manufacturing is a critical national need, and an advertising campaign is recommended by the AMP Steering Committee as one important step in this direction.
	8	Tap the Talent Pool of Returning Veterans. Returning veterans possess many of the key skills needed to fill the skills gap in the manufacturing talent pipeline. The AMP Steering Committee makes specific recommendations on how to connect these veterans with manufacturing employment opportunities.
	9	Invest in Community College Level Education. The community college level of education is the “sweet spot” for reducing the skills gap in manufacturing. Increased investment in this sector is recommended, following the best practices of leading innovators.
	10	Develop Partnerships to Provide Skills Certifications and Accreditation. Portability and modularity of the credentialing process in advanced manufacturing is critical to allow coordinated action of organizations that feed the talent pipeline. The AMP Steering Committee supports the establishment of stackable credentials.
	11	Enhance Advanced Manufacturing University Programs. The AMP Steering Committee recommends that universities bring new focus to advanced manufacturing through the development of educational modules and courses.
	12	Launch National Manufacturing Fellowships and Internships. The AMP Steering Committee supports the creation of national fellowships and internships in advanced manufacturing to bring needed resources but, more importantly, national recognition to manufacturing career opportunities.
Improve the Business Climate	13	Enact Tax Reform. The AMP Steering Committee recommends a set of specific tax reforms that can “level the playing field” for domestic manufacturers.
	14	Streamline Regulatory Policy. The AMP Steering Committee recommends a framework for smarter regulations relating to advanced manufacturing.
	15	Improve Trade Policy. Trade policies can have an adverse impact on advanced manufacturing firms in the United States. The AMP Steering Committee recommends specific actions that can be taken to improve trade policy.
	16	Update Energy Policy. The manufacturing sector is a large consumer of energy, and consequently, domestic energy policies can have a profound impact on global competitiveness. The AMP Steering Committee makes specific policy recommendations regarding energy issues of importance in manufacturing.

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RESPONSE

NAMRI/SME's recognizes the importance of the recommendations in the PCAST report and emphasizes the urgent need for response and action in the following areas.

PILLAR 1: ENABLING INNOVATION

Establish a National Advanced Manufacturing Strategy

The February 2012 National Science and Technology Council (NSTC) report² serves as an initial National Advanced Manufacturing Strategy. The AMP report³ includes a specific recommendation of a five-year interval between reviews of the program. **NAMRI/SME supports review of the strategy every five years and proposes the venue to be the annual NAMRC.** Such a review will be led by the AMNPO and facilitated by NAMRI/SME.

The AMP report also called for the development of technology roadmaps to guide investments in advanced manufacturing. While technology roadmaps exist for some areas, such as the semiconductor and forging industries, such roadmaps do not exist or are not sufficiently detailed in others. A national need exists to assist professional societies and leading companies to create such roadmaps. In 2013, the U.S. Department of Commerce Advanced Manufacturing Technology Consortium (AMTech) program was launched for exactly this effort, with \$15 million made available. This level of funding can result in the development of perhaps 10 roadmaps, which is woefully inadequate, as this effort is seen as a "feeder" program for the network of Manufacturing Innovation Institutes (MIIs). Therefore, **NAMRI/SME recommends that the AMTech program be significantly expanded to at least \$30 million per year.**

Increase R&D Funding in Top Cross-Cutting Areas and Establish a National Network of Manufacturing Innovation Institutes

As recognized by PCAST, the National Network for Manufacturing Innovation (NNMI) program fundamentally addresses most of the 16 recommendations of the AMP Steering Committee, especially the need to increase funding in cross-cutting areas. The AMNPO has developed a design guideline for such institutes⁴, and it is felt that this design is outstanding.

The U.S.'s free-trade partners invest in similar programs, notably the German Fraunhofer Institutes, the British Catapult Centers and other investments by France, Singapore, Japan, Finland and, especially, China (see Table 1). The one-time, \$1 billion initially requested to establish up to 15 MIIs is significantly less than the investment by U.S. free-trade partners and allies but is still an important start. However, recognizing that the German model has an annual investment of this amount, and involves 60 Fraunhofer Institutes in a nation with an economy one-third the size of the American economy, the \$1 billion is too small.

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President Obama has called for legislation for the past three years to establish the full NNMI network, but Congress has not passed the required legislation. In addition to the pilot institute announced in August 2012, three institutes were announced in January 2014. By executive order, the president has announced competition for the formation of four more institutes in 2014. While these actions are commendable, establishment of a properly scaled NNMI program requires action by Congress. **NAMRI/SME strongly encourages immediate congressional action to enact the NNMI program. Further, NAMRI/SME strongly recommends that the NNMI program be expanded to at least the equivalent of Germany's level of national investment (\$5 billion annually) for the establishment of at least 60 institutes in the United States.**

NAMRI/SME strongly supports the vision of the NNMI program as described in the preliminary design document⁴ as a program that can maximize industry impact by bringing together all stakeholders in the manufacturing sector. The vision of the NNMI program was put together through great effort and input from industry, academia, government laboratories and industry organizations and should be enacted.

NAMRI/SME is ready to participate in and promote the NNMI program. Educational resources available from NAMRI/SME will be made available to all MII partners. **Further, NAMRI/SME proposes NAMRC as the venue for the required annual meeting of institute representatives.**

Empower Enhanced Industry/ University Collaboration in Advanced Manufacturing Research

The PCAST report³ identifies a shortcoming in Revenue Procedure 2007-47 whereby industry research activity is limited in university buildings that have been funded with tax-exempt bonds. NAMRI/SME recommends investigation of a waiver mechanism in regard to Revenue Procedure 2007-47.

Foster a More Robust Environment for Commercialization of Advanced Manufacturing Technologies

The PCAST report³ recommends better integration of manufacturers into the innovation ecosystems that have evolved at universities in the past few decades. To accomplish this goal, PCAST recommends that a manufacturing component be built into university innovation ecosystems and that manufacturing impact measures be included in the annual performance reports issued by the Association of University Technology Managers. Additional recommendations are directed toward development of "Phase o" of the Small Business Innovation Research (SBIR) program to expand resources available for start-up interaction with manufacturers and to aid procurement programs to benefit start-ups.

NAMRI/SME supports the goals of fostering a robust environment for commercialization of advanced manufacturing technologies, especially incorporating manufacturing impact measures in evaluation of innovation ecosystems. NAMRI/SME also recommends increasing the percentage of SBIR funding directed toward manufacturing. It is not the intent to increase total SBIR funding, but rather to include more advanced manufacturing topics within existing SBIR programs and/or provide equipment supplements for SBIR on manufacturing.

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Establish a National Advanced Manufacturing Portal

In 2012, the AMNPO established the Advanced Manufacturing Portal at www.manufacturing.gov. This is intended to be a single portal where technical problems can be posed, information can be obtained and activities of national Cooperative Research Centers (CRCs) can be detailed. Content was initially provided by the CRCs to ensure quality. Early results are very promising. **NAMRI/SME supports this initiative.**

PILLAR 2: SECURING THE TALENT PIPELINE

Correct Public Misconceptions about Manufacturing

The PCAST recommendation is very succinct: create “an aggressive, integrated ‘Image of Manufacturing’ public service announcement campaign that would raise awareness and correct misconceptions about manufacturing in the United States.” **NAMRI/SME strongly supports the participation of all stakeholders in developing a public service announcement campaign to improve the image of manufacturing.**

Tap the Talent Pool of Returning Veterans

Veterans have many of the work-life and job skills that are in high demand in manufacturing, but the U.S. Department of Labor (DOL) Bureau of Labor Statistics reports that the unemployment rate for veterans is very high.

The PCAST report³ recommends a training module on the career opportunities in advanced manufacturing be added to the U.S. Department of Defense (DOD) Transition Assistance Program. In addition, the report recommends that the DOD accelerate its efforts to “categorize military occupational codes and translate them to civilian skills.” NAMRI/SME strongly supports recommendations that the DOD develop a training module on career opportunities in advanced manufacturing through the DOD Transition Assistance Program.

In addition, it is important to ensure that soldiers who train for military technical occupations obtain post-secondary credits with recognized value in the civilian sector. Therefore, such programs should be developed, to the extent practical, in cooperation with civilian post-secondary institutions to coordinate DOD training needs with corresponding civilian occupational requirements through systems of stackable or otherwise complementary defense/civilian credentials. The Veterans Administration should play a leading role in developing this recommendation with the DOD and should draw on occupational expertise provided by the DOL.

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Invest in Community College Level Education

The manufacturing sector has changed, requiring a workforce that is highly skilled and technologically affluent. Community colleges play an essential role in educating and training individuals with the skills needed for modern advanced manufacturing. The AMP report³ recommends that the Department of Education (DOEd) modify the Graduate Assistance in Areas of National Need (GAANN) program so that there is a focused solicitation for manufacturing fellowships/scholarships that encourages collaboration among community colleges, universities and industry. The AMP report also recommends creation of a national network of manufacturing educators by integrating programs of NSF, DOEd and DOL. Finally, the AMP report recommends implementation of changes to align ongoing solicitations for federally funded research programs to encourage partnerships with community colleges.

NAMRI/SME recommends:

- Create a national network of manufacturing educators (integrating NSF, DOEd, DOL) that can build off the institutional infrastructure of NNMI and the Advanced Manufacturing Portal.
- Align solicitations for federally funded research to encourage partnerships with community colleges.
- Require community colleges participating in NNMI to demonstrate that they are working with feeder high schools to align programs, resulting in well-articulated secondary/post-secondary career pathway programs to assure that students are prepared to succeed in manufacturing skills programs.
- Assure that NNMI strategies encourage appropriate utilization of funds under the Perkins Career and Technical Education Act, the Workforce Investment Act and workforce training opportunities funded by the DOL.
- Establish industry internships whether through the AMNPO, the NNMI program or as a separate program that are well-aligned with industry needs, for community college students to ease the financial pressure on students and their families and that can ensure continued enrollment.

Develop Partnerships to Provide Skills Certification and Accreditation

The AMP report³ discusses the need for education and training to produce workers capable of operating and troubleshooting modern factory equipment. To support this pipeline of talent, standards, credentials and certifications are critical to provide a consistent baseline ability. The AMP report recommends support for a “coalition of industry associations, professional societies and educational organizations to establish a national framework of standards, accreditations and certifications at each level of the advanced manufacturing competency model.”

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Enhance Advanced Manufacturing University Programs and Launch Manufacturing Fellowships and Internships

Indirect methods can have a long-term effect on R&D funding. Expanding the presence of manufacturing at universities has a “large shadow” and impacts the standing and influence of manufacturing in academia.

In addition, recognizing the key contributions of business incubators affiliated with universities, NAMRI/SME recommends working with ABET, as well as ranking boards such as *U.S. News & World Report*, to reward incubation institutes and manufacturing contributions to the institutes.

Major research universities play a key role in defining the fundamental elements of advanced manufacturing and developing the next generation of educators and industry leaders. However, universities often are uncertain about where the discipline of manufacturing best fits in academia. NAMRI/SME supports the AMP report recommendation of augmenting existing engineering curricula with manufacturing coursework and creating new graduate-level programs.

PILLAR 3: IMPROVING THE BUSINESS CLIMATE

The recommendations of Pillar 3 involve tax reform, regulatory policy and commerce concerns such as free-trade zones. While NAMRI/SME is not forwarding specific opinions regarding these four recommendations, NAMRI/SME is supportive of the recommendations in the PCAST report.³

CONCLUSIONS

After more than a decade of stagnation—if not contraction, the manufacturing sector is experiencing prolonged, although slow, growth. A once-in-a-generation opportunity exists to reestablish America’s competitive advantage in advanced manufacturing. This requires mobilization of partnerships between industry, government, academia and professional societies. NAMRI/SME supports the recent proposed legislative actions and encourages their expansion and immediate funding at proper scales.

This document presents a number of recommendations to enact the PCAST plan and expresses support for the stated initiatives. The recommendations are generally not executable by only one party; instead, action must be taken by all stakeholders in manufacturing.

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ONGOING PROGRESS

NAMRI/SME recognizes the ongoing efforts to move the U.S. forward in advanced manufacturing leadership. The following paragraphs give a brief summary of recent developments.

Renewed as a PCAST working group in September 2013, AMP Steering Committee 2.0 is continuing to guide implementation of the original AMP recommendations and identify strategies for securing U.S. leadership in emerging technologies, scaling needed manufacturing workforce development solutions and addressing open policy questions on the path from technology innovation to production. In its efforts, AMP 2.0 works closely with the White House's National Economic Council and Office of Science and Technology Policy and the Department of Commerce.

Following on the baseline AMP recommendations that address issues in three broad categories—enabling innovation, securing the talent pipeline and improving the business climate, AMP 2.0 is engaging the broader manufacturing community through regional forums and working sessions, including a meeting at NAMRC in June 2014, along these five workstreams:

1. Transformative technologies
2. Demand-driven workforce solutions
3. NNMI implementation
4. Technology scale-up policy
5. Improving the image of manufacturing

Additionally, focusing on four technology areas,

- Advanced Materials, Design, Synthesis and Processing
- Advanced Sensing, Measurement, Process Control
- Visualization, Information and Digital Manufacturing
- Industrial Robotics

AMP 2.0 is seeking to identify the barriers to wider implementation, especially by small and medium-sized enterprises, and how universities and research institutions can enable technology and equipment access to manufacturers. Intellectual property (IP) concerns, particularly within the NNMI, are also an impediment to wider success and technology development.

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