
1

Integrating Strategy and Evaluation in the Manufacturing Extension Partnership

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Introduction

From the outset, the NIST Manufacturing Extension Partnership (MEP) has been committed to evaluation and continuous improvement. This commitment is manifest in a broad range of activities. The MEP requires all affiliated manufacturing extension centers to submit extensive data on program resources and activities on a monthly basis. It also has supported a pilot project involving 17 centers from nine different states to develop a set of measures that can be used by management to monitor internal performance. (See the paper by Wilkins in these proceedings, pp. 83-90.) These efforts are intended to ensure center accountability, chronicle important performance trends, and highlight operating *efficiencies*. However, like other public programs, the MEP is *also* being asked to document program *effectiveness*. Congress, state legislatures and other sponsors are all interested in program results, though different sponsors have different expectations. The very public nature of the MEP program makes it difficult to arrive at a clear and consistent statement of both program objectives and the basic principles under which it should operate. These differences are part of legitimate debate within the political process.

To meet the demands of disparate stakeholders, MEP has taken a broad view of program objectives and associated measures of program outcomes. Unlike many programs, the MEP is making a concerted effort at measuring program outcomes using three different techniques:

- A follow-up survey of participating companies conducted nine months after the completion of major projects¹ asking respondents to indicate impacts with respect to sales, labor costs, material costs,

¹ Major projects are defined as activities requiring eight or more hours of center staff or third-party service provider time.

inventory costs, capital investment, and jobs.

- A series of studies employing quasi-experimental designs in which the performance of participating manufacturers is compared to that of similar, non-participating firms.
- A series of case studies of exemplary engagements based on a conceptual model linking services to program outcomes.²

Finally, the MEP conducts formal reviews of manufacturing extension centers as part of the funding process. These periodic reviews provide feedback on strengths and weaknesses of individual centers based on inputs from the regional manager and panel members, including representatives of other centers.

Preliminary Results and Challenges

The picture that emerges from these evaluation efforts is generally positive. In a relatively short period of time, MEP has been successful in establishing a nationwide program that has already reached tens of thousands of manufacturers. Substantial time and energy has been devoted to establishing new organizations, building necessary partnerships, conducting extensive outreach campaigns, and providing services to companies across the country. Moreover, despite expected growth pains, the MEP has already witnessed a return on its investment. All attempts to measure outcomes to date have reached the same basic conclusion – many companies benefit from participation in the program, some enormously.

The MEP is to be commended for its early success, but it should not rest on its laurels. It needs to grapple with the hard

realities of forging a national program dedicated to continually expanding its effectiveness while simultaneously improving operating efficiencies and moving closer to self-sufficiency. For example, centers need to figure out how they can devote a greater share of staff time to project work – based on the initial results of the pilot center benchmarking project, it appears that in a typical center roughly 30 percent of field staff time is spent on project work conducted under a signed written agreements with manufacturing clients. The rest of the time is spent on informal services, client relationship-building, marketing and sales, administration and other necessary functions. All centers need to take a hard look at core business processes with the express purpose of identifying areas for improvement. Similar to the demands facing American manufacturers, manufacturing extension centers need to identify any resources that are not being used as productively as they could and take corrective action. Any waste, if it exists, should be eliminated.

In a related vein, centers need to figure out how to broaden and deepen impacts within the manufacturing community. While the MEP has had an impact on numerous companies, it appears that some manufacturers have benefited substantially more than others – a small percentage of firms account for the bulk of measured impacts. In this regard, the level of effort devoted to firms matters. Manufacturers that receive more assistance from manufacturing extension centers tend to reap the greatest benefit. However, there are probably a host of other factors in terms of both the nature of services and characteristics of firms that contribute to higher performance. Manufacturing extension centers need to identify these factors in order to replicate them in as many companies as possible.

At the same time, centers are under pressure to serve the broadest market possible. As a result, given finite resources, many small

² See U.S. Department of Commerce (1997), *MEP Successes: A Case Study Approach*. Gaithersburg, MD: NIST Special Publication 916.

manufacturers receive only limited assistance. The tension between intensive work with a small number of firms and broad outreach is common among public programs, reflecting the competing objectives of program sponsors. Here again, manufacturing extension centers need to identify the best ways to reconcile these conflicting interests.

Asking Different Questions

Evaluation can play a role in helping the MEP and affiliate centers address these and other concerns. However, to be most useful, evaluation efforts within the MEP system need to place greater emphasis on learning, focusing more attention on ways to strengthen the program in addition to providing a solid justification for continued funding. The evaluation should provide program managers and staff with information needed to improve performance over time – it should carefully document what works, what doesn't and why.

In this regard, the evaluation system should be designed to provide answers to the following questions:

- What are the characteristics of high performance companies? Why are some companies more “globally competitive” than others? What manufacturing practices have high performance companies adopted that others have not?
- What specific services are most likely to cause companies to adopt manufacturing practices that lead to higher performance?
- How can centers best reconcile the competing objectives of maximizing impacts and market penetration while achieving self-sufficiency? How can center strike a appropriate balance among conflicting interests of program stakeholders?

Answers to these and other similar questions are central to the continued success of the American manufacturing extension system.

Specific Recommendations to Improve the Evaluation System

We propose five specific recommendations to improve the MEP evaluation system.

- **Refine performance measures.**

Current outcome measures – as reflected in the follow-up survey – include changes in sales, labor costs, material costs, inventory costs, and capital investment, as well as job creation and retention. The MEP should review these measures to ensure that they are *valid* measures of what the program is trying to accomplish. In particular, given its emphasis on competitiveness, the MEP should measure productivity gains within manufacturing firms served by affiliated centers. Increasing productivity underlie improvements in profits and wages and is arguably the most important objective of the program. The current Follow-Up Survey does not capture the data required to calculate measures of productivity such as sales per employee or value-added per employee.

In addition, downstream impacts such as a change in sales may be subject to significant measurement error due to their distance from the actual substance of projects (e.g., nine months later, how could a company make a reasonable estimate of the effect of a 16-hour project on LAN selection on its sales?) Many intermediate impacts with respect to new skills and capabilities and improved manufacturing performance (e.g., scrap, customer rejects, machine run-time, etc.) may be missed – yet, these impacts are much more closely tied to the immediate project objectives and may be huge. If implemented, these measures serve as leading indicators of desired policy outcomes and provide program

managers with the most useful guidance on directions for service delivery.

- **Help individual centers address questions raised by state legislators.**

The MEP should devote resources to providing evidence of the extent to which the program contributes to an increase in jobs and regional economic growth – two important issues often raised by legislators. Each center is under pressure to document results, but are hard pressed to collect necessary data and perform credible analyses. The follow-up survey should be revamped to meet this need and greatly simplified in the process.

For example, the MEP could conduct a straightforward *annual* survey of all companies that have participated in the program aimed at getting a simple, yet defensible estimate of the economic and fiscal impact of the program. One could go a long way with just two questions: How many people do you currently employ? How many people would you have employed had you not received MEP services? Job impacts can be translated into estimates of changes in gross state product as well as fiscal impacts using standard ratios after adjusting for displacement effects. The MEP should assume responsibility for calculating these impacts and reporting results back to the respective centers.

The follow-up survey also should be used to obtain direct feedback from clients concerning different elements of the program model. For example, it could include a series of Yes/No questions such as: Have you received information that you otherwise would not have been able to obtain on your own at an affordable cost? Have you changed your operations as a direct result of the assistance provided? Did manufacturing performance at this plant improve as a result of these changes? Is the company more competitive than it otherwise would have been? Is the company more profitable? Has it grown? Would the

company have survived in the absence of assistance? Are you satisfied with the services received? Answers to these questions would round out the analysis, providing further evidence of impacts based on the underlying logic of the program. To the extent possible, the results of the survey should be used to test hypotheses concerning the distribution of reported benefits among participating companies.

The MEP should consider whether a stratified, random sample of participating companies might make more sense than a complete census. All companies served in the previous year would be eligible. Centers should not be allowed to remove companies from the sample frame by using the reporting code “N” in activity data logs submitted to the MEP. Oversampling certain strata would help ensure that companies most likely to have registered large impacts would be included in the sample. A well-designed sampling strategy would allow the MEP to extrapolate results to companies that received assistance, but were not surveyed.

- **Continue to support large-scale quasi-experimental studies as part of summative evaluation.**

The follow-up survey should be supplemented with more rigorous evaluation methods that provide more definitive assessments of program impacts. The follow-up survey relies on clients to report impacts based on self-assessments without benefit of baseline data. This approach may be open to criticism. It presumes that clients are able to provide an objective and accurate estimate of what would have happened in the absence of assistance. Furthermore, it assumes that this can be done even though some of the measures are far afield of specific projects and therefore results are subject to a wide range of other contributing factors. In contrast, quasi-

experimental studies – like the Census Longitudinal Research Database Study – compare actual changes in performance of participating companies to that of similar, non-participating companies, using statistical techniques to isolate program impacts. The MEP should continue to support large-scale studies that employ this technique to determine the extent to which the program has had a material impact, particularly on plant productivity.

- **Undertake comprehensive studies to identify best practices within high performance firms and manufacturing extension centers.**

MEP should support studies employing a combination of rigorous quantitative and qualitative techniques to determine the factors contributing to success within manufacturing firms *and* manufacturing extension centers. All of these studies should be oriented toward explicit recommendations for decision-makers with sufficient detail for implementation. The research agenda should evolve as questions are answered and new issues emerge.

With respect to companies, these studies should pay particular attention to developing a better understanding of the factors that contribute to the highest levels of performance found in the distribution, including the underlying characteristics of firms and the nature of services provided to them. Rigorous case studies should be used in conjunction with broader surveys to provide insights into important causal relationships. Case study work should include cross-case analysis that gets at underlying reasons for different levels of performance.

- **Integrate evaluation with ongoing strategic planning and operations.**

One of the major challenges facing those involved in evaluation is to make it more

useful to decision-makers within the MEP community. Many of the current activities are focused on program justification. Less emphasis has been placed on systematic learning in terms of drawing out clear implications for program improvements from the results of evaluation efforts.

To some extent, people have been unwilling or unable to use information gleaned from evaluation efforts to make decisions about the program. A number of factors contribute to low utilization, including issues related to the relevance of the subject matter, the reliability of data and quality of analysis, and the form in which results have been communicated. To encourage greater utilization, program managers need to be more closely involved in the design of evaluation efforts and better appraised of their results. All evaluation studies should have a clear strategy for disseminating results in a manner that is accessible to program managers and staff throughout the MEP system.

Given resource constraints within affiliated centers, the burden for evaluation should continue to rest primarily with the MEP. However, the MEP should encourage centers to perform their *own* evaluations as well, focusing on issues of particular concern to center directors and other local stakeholders. The MEP should provide technical assistance for these efforts to help ensure quality and, where appropriate, share findings with the entire MEP community. Simplifying the follow-up survey for administration on an annual basis will free valuable bandwidth that can be used by MEP and affiliated centers to undertake a broader range of evaluation activities.

The MEP has made great headway over the last few years and has established a solid foundation for continued success. As part of this effort, the organization has invested considerable resources in performance measurement and program evaluation. The

challenge is now to make evaluation more relevant to the day-to-day activities of program managers, center directors and field staff. In a political environment where resources are tight, the natural tendency is to focus on program impacts. However, continuous improvement requires organizations to examine all aspects of their operations with a critical eye, constantly searching out weaknesses and crafting appropriate responses to effect necessary change.