

BY JAN YOUTIE, PHILIP SHAPIRA & J. DAVID ROESSNER



TOOLS FOR PRACTICE

MANUFACTURING ASSISTANCE PROGRAM NEEDS ASSESSMENT GUIDE

===== VOLUME 2: =====
Firm-Level Needs Assessment Approaches

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The Aspen Institute
Community Strategies Group

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PREFACE

A manufacturing assistance program must—by definition—assess the needs of the manufacturers in its service area. Needs are manufacturing practices that fall short of, or can be improved with reference to, a benchmark or standard. Because no standard, validated benchmarks exist, however, definitions of need are often influenced by the goals and missions of the parties involved. Elected officials emphasize the need to save and create jobs; program administrators focus on upgrading manufacturing capabilities; manufacturing firms are concerned with profitability and survival. Even within a firm, the president, managers, and workers may each have different opinions about what the problems are and how to solve them.

Thus, needs assessments have a large subjective component. This subjectivity is compounded by the fact that programs have little opportunity to formally exchange information about the assessment tools and methods they use, and their strengths and limitations in various program contexts.

One way to reduce this subjectivity is to set down systematic approaches that draw on the collective experience of programs from around the country. The purpose of this guide is to describe approaches used and recommended by assistance program staff to assess manufacturers' needs.

The *Manufacturing Assistance Program Needs Assessment Guide* consists of two volumes:

- **VOLUME 1 COVERS REGIONAL-LEVEL NEEDS ASSESSMENT APPROACHES.** Regional-level assessments aim at identifying and describing the characteristics of the manufacturing sector within the service area so as to best match program resources with needs across the area. This volume was written for directors of technical and management assistance programs serving private industry to help them during program start-up.

- **VOLUME 2 IS AN OVERVIEW OF APPROACHES FOR CONDUCTING FIRM-LEVEL NEEDS ASSESSMENTS.** These assessments involve one-on-one interactions between program staff and client firms to match program services and staff to clients based on individual firm needs. This volume was written primarily for directors of ongoing technical and management assistance programs.

These volumes can be used together or as stand-alone documents. The material they contain is complementary; taken together, it represents a resource

compendium on various approaches to conducting manufacturing needs assessments. As such, it may be used by audiences other than those listed above, including manufacturing assistance program planners and marketing staff, researchers of industrial policy and technology diffusion, people involved in economic development activities serving business, private sector management consultants, and industry and technology policymakers.

In using the material in these volumes, note the following:

- **THIS MATERIAL IS NOT INTENDED TO REPRESENT “BEST PRACTICES.”** At this time, it is premature to think of best practices in this discipline, since the number of manufacturing assistance programs with long histories is small and represents an enormous diversity of experience.
- **ASSESSMENT TOOLS AND METHODS ARE CONTINUALLY EVOLVING.** Because the practice of conducting needs assessments is rapidly evolving, this report is necessarily incomplete. New tools have been introduced, and older tools refined, since the writing of this guide. There has been no intent to exclude particular tools in this guide. The emphasis is on *approaches* to assessing need, rather than particular tools.
- **THE INCLUSION OF PARTICULAR CASE EXAMPLES, REFERENCES AND CONTACTS ARE NOT INTENDED TO BE ENDORSEMENTS.** The case examples represent typical approaches used rather than endorsed best practices.
- **THERE IS NO ONE “RIGHT” APPROACH.** Manufacturing assistance programs differ substantially in terms of their mission, size and scope. They have broadly divergent client bases, and are located in economic regions with widely varying structures and conventions. Consequently, what works in one place and time may not in another. Tools and methods must be appropriately tailored.

INTRODUCTION TO VOLUME 2

A basic function of a manufacturing assistance program is to assess the needs of the manufacturers in its service area. A **NEEDS ASSESSMENT** is a primary tool for allocating manufacturing assistance program resources such as field office locations and number and expertise of staff. Unless this critical first step is done—and done well—the assistance program cannot provide its services effectively or efficiently.

Needs assessments are not only applicable in the planning stages of a program, however. They are an important component of the service package to individual manufacturers. They play a major role in post-service evaluation efforts. And information from needs assessments is often required by funding sources.

NEEDS can be defined as manufacturing practices that fall short of, or can be improved with reference to, a benchmark or standard. Manufacturing assistance programs typically broaden this definition to include the likelihood that their services will be used—and used effectively. The key issue is not just that a firm needs assistance, but also that it seeks or is receptive to program services.

Needs assessments are conducted to determine assistance needs either at a regional level (that is, for the entire service area) or for an individual firm.

■ **REGIONAL-LEVEL ASSESSMENTS** consider issues such as “what are the important industry sectors in the service area?” “are there concentrations of manufacturers in certain regions within the service area?” and “where should field offices be located?” The tools and methods for conducting these assessments are described in Volume 1 of this *Manufacturing Assistance Program Needs Assessment Guide*.

■ **FIRM-LEVEL ASSESSMENTS** are one-on-one interactions between program staff and client firms and involve such tools and methods as plant tours, on-site interviews, flow diagrams, benchmarks and other analytic techniques. These assessments, which are described in this volume of the *Manufacturing Assistance Program Needs Assessment Guide*, are used to match program service offerings, field staff and/or referral resources to client firms based on individual firm needs.

Firm-level needs assessments are valuable analytical tools for allocating limited manufacturing assistance resources. More specifically, firm-level needs assessments can be used to determine which assistance services should be allocated to which firms.

**What Is
a Needs
Assessment?**

**Types of
Needs
Assessments**

**Purpose of
Firm-Level
Assessments**

TABLE 1. SUMMARY OF REGIONAL NEEDS ASSESSMENT APPROACHES

APPROACH	DESCRIPTION (STRENGTHS/WEAKNESSES)	USE	COMMENTS
1. COMPANYWIDE ASSESSMENTS	Examines all aspects of a firm's business using various tools and methods to describe current operations and problem symptoms, separate these symptoms from underlying problems, make recommendations about how to correct them; includes manuals, training	Match service offerings, field staff and/or referral resources to client firms based on problems identified and recommendations made in assessment	Objectivity, comprehensive approach; but hard to adjust to situation, intrusive, time-consuming and expensive
2. FUNCTIONAL ASSESSMENTS	Focus on problem or broader functional area such as information systems or quality	Match service offerings, field staff and/or referral resources to client firms based on problems identified and recommendations made in assessment	Less intrusive and time consuming, but lack comprehensive information about company; multiple functional assessments may be inefficient
3. SELF- ASSESSMENT	Questionnaires administered to a manufacturing firm to allow a company to identify areas of improvement without the intervention of a staff engineer	Can provide insight into operational improvements; useful to reduce number of outreach visits; can lead to more focused functional area assessments and benchmarking tools	Cost efficient, but ignores company/ industry-specific issues; lack representative, up-to-date benchmarks
4. OUTREACH	Informally identify a firm's critical needs and determine what types of assistance might be most appropriate through broader marketing efforts and one-on-one visits	Market program to manufacturers, starting with an on-site assessment; can informally produce market information about potential clients	Potentially costly, must overcome resistance and identify receptivity and resources used
5. PRE- ASSESSMENT QUESTIONNAIRES	Obtain opinions and information from client firms prior to on-site visit	Organize the on-site phases of a firm-level assessment, including allocating staff expertise	Enhances efficiency of on-site visit, but may appear impersonal, sometimes information is sketchy or hard to get
6. PLANT TOURS	Plant manager takes the assessment team through plant and explains operations	Helps in matching services with clients based on understanding firm's production environment; verify impressions gained from other assessment tools	May be costly for serving many very small manufacturers
7. INTERVIEW GUIDES	Predefined methods for selecting interviewees and sets of questions to obtain perceptions of current operations and needs	Contribute to matching services with clients based on understanding firm's functional areas; verify impressions gained from other assessment tools	Focus on company problems rather than assessor expertise; avoid appearing stiff, incompetent or overbearing

APPROACH	DESCRIPTION (STRENGTHS/WEAKNESSES)	USE	COMMENTS
8. DATA COLLECTION	Off-the-shelf and compiled statistical information to supplement plant tours and interviews	Organize on-site time; characterize nature of particular problems for matching services with clients; verify impressions gained from other assessment tools	In some cases, data are difficult to obtain
9. FINANCIAL REVIEW	Analyzes a company's financial indicators and ratios and compares them to industry financial benchmarks	Focuses on-site activities; verifies observations; helps prioritize projects for matching services with clients	Is a complex field
10. PROCESS FLOW ANALYSIS	Charts the flow of manufacturing activity from receipt of materials to distribution of end product to identify inefficiencies	Matches production process services with clients; verifies observations and impressions obtained during plant tour	May not be cost efficient for very small firms
11. MANUFACTURING BENCH- MARKING	Best practices among firms in a similar operating environment	Increase the efficiency of outreach efforts and on-site activity; in post-service evaluation, help match clients, projects, delivery modes, and field staff; useful for targeting strategies	Changing nature of best practice, industry specificity required, may be too advanced for non-automated firms
12. MARKET ANALYSIS	Identifies high-growth markets that match operating characteristics of firms selling to customers in declining industries	Matches services to clients based on new market requirements; helps groups involved in conversion activities	Helps firm think beyond current operations—although market growth can be difficult to predict, data can be outdated, and other operating factors may be excluded
13. RECOMMEN- DATION RISK ANALYSIS	Prioritizes recommendations based on, for example, financial impact, risk, relevance to company strategy, ability to implement	Matches certain service offerings, field staff and/or referral resources to client firms based on prioritization of recommendations	Interrelationships among recommendations may be ignored, highest impact recommendations may have lengthy payoff period
14. FIRM-LEVEL ASSESSMENT REPORTING	Conveys problems, recommended solutions and actions through management debriefing, oral presentations and final reports	Communicates follow-on projects, serving a resource allocation function	Can hold up timely completion

Firm-level assessments often require significant in-plant time. Several of the approaches described in this guide can be used to help assessors use their time more efficiently by reducing the on-site hours needed. With less hours required to serve any one client firm, the program can provide assistance to many more firms.

These assessments and tools also provide objective information and analytic techniques so that the service allocation meets the particular client firm's problems—and will be implemented.

Without systematic, information-based firm-level assessments, programs risk allocating service resources that can vary by the staff member assigned, are unnecessarily labor-intensive, do not address the client's root problem, or that client firms will not implement.

Timing of Firm-Level Needs Assessments

The various firm-level needs assessments methods and tools are used along a service delivery time continuum. Thus, the delivery of services to individual firms can be divided into the following phases:

- outreach
- pre-assessment
- on-site information gathering and analysis
- follow-on projects and maintenance of ongoing relationship

The outreach phase concerns efforts to market the program to firms in the service area. All programs, but particularly new ones, engage in a variety of **OUT-REACH** activities. The aim of these activities is to establish a relationship with an individual firm and informally assess its needs. In the pre-assessment phase, program staff identify functional areas within a firm that might benefit from more in-depth assessments. Approaches used in this phase include **PRE-ASSESSMENT QUESTIONNAIRES** and **SELF-ASSESSMENTS**. Although self-assessments may imply an ability to address problems without outside intervention, in practice these tools are often used to help convince a firm of the benefits of an on-site assessment.

Next, data are collected and analyzed regarding the firm. This phase can focus on either: (1) **COMPANYWIDE OPERATIONS**, convincing the client of the need for several follow-on projects outlined in a plan for an ongoing client relationship; or (2) one or more limited **FUNCTIONAL OR PROBLEM AREAS**, which prove the program's credibility, and in turn lead to more limited engagements and ongoing client relationships. Regardless of focus, this phase typically includes **PLANT TOURS, MANAGEMENT AND STAFF INTERVIEWS**, and a variety of **DATA COLLECTION** tools to gather information about firm needs. To analyze this information, assessors may use **FINANCIAL REVIEWS, PROCESS FLOW ANALY-**

SIS, MANUFACTURING BENCHMARKING, and **MARKET ANALYSIS.** Company-wide approaches are more likely to incorporate these approaches in a structured, comprehensive manner than are functional assessments.

Follow-on projects are then identified through **RECOMMENDATION RISK ANALYSIS AND REPORTING.** Companywide assessments tend to identify a plan for ongoing projects, whereas functional assessments tend to generate follow-on projects in a somewhat ad hoc fashion.

Program managers and assessors will decide between companywide and functional area assessments based on their individual philosophy of conducting assessments, cost factors, the characteristics of firm management and the nature of the relationship between the firm and the program. Companywide assessments are more common when program managers desire service consistency, when the companywide approach is cost-effective from firm and program viewpoints, when firm management is open to change, and when program staff have achieved a certain degree of trust and credibility.

This document is organized as a resource guide for conducting manufacturing needs assessments at the individual firm level. Fourteen approaches are presented in all; these are summarized in Table 1. (The order in which these approaches are presented does not imply any sort of ranking or preference.) The discussion of each approach consists of:

- a description
- a statement of its use and intentions
- one or more case examples showing how the approach has been used by actual manufacturing assistance programs (case examples are not presented for certain approaches—that is, plant tours, data collection and firm-level assessment reporting—because of their generic nature)
- summary of its strengths and weaknesses
- sources for more information

These discussions are followed by a section that addresses special considerations in assessing the needs of defense-related manufacturing firms.

This guide focuses on production process needs since these are central to the mission of most manufacturing assistance programs. Other functional areas—management, sales and marketing, and human resources, for example—are mentioned in the context of this focus.

**Document
Organization**

APPROACH 1. COMPANYWIDE ASSESSMENTS

Companywide assessments examine all aspects of a firm’s business operations—product/services, sales and marketing, manufacturing, financial operations, quality, materials management and procurement, product design and engineering, human resources, facilities, management information systems, and environmental impacts and safety. These assessments use several tools and methods to describe the firm’s current operations, describe “symptoms,” separate symptoms from underlying problems, and make recommendations as to how to correct these problems. Assessors are guided by manuals and training programs. Outputs of comprehensive companywide assessments are standardized client reports.

Description

Some programs offer assessments to clients at no cost; others charge fees that can exceed \$10,000. Program decisions about whether to charge for assessments largely depend on the legislative intent behind the program and its funding source.

Companywide assessments are one of a manufacturing assistance program’s initial service offerings to individual firms. They are used as a resource allocation tool, and match service offerings, field staff and/or referral resources to client firms based on problems identified in one-on-one interactions and recommendations made in the assessment. Virtually all of the approaches, tools and methods described in this guide can be used in conducting companywide assessments.

Use

THE MIDWEST MANUFACTURING TECHNOLOGY CENTER (MMTC) uses a 15-step companywide assessment methodology—the Manufacturing Assessment Methodology (MAM)—to serve its clients. These steps follow:

Case Example

- Step 1: Initial Company Contact
- Step 2: Preliminary Data Summary
- Step 3: Plan and Schedule Visit
- Step 4: Kick-Off Meeting
- Step 5: Facility Tour

- Step 6: Data Collection/Interview Key Personnel
- Step 7: Develop Preliminary Concepts/Findings
- Step 8: Focused Areas Assessment and Interim Brief
- Step 9: Develop “As-Is” Description
- Step 10: Outline Recommendations
- Step 11: Rank Recommendations
- Step 12: Develop Detailed Recommendations and Strategic Overview
- Step 13: Prepare Assessment Report
- Step 14: Present Assessment Report
- Step 15: Implementation Planning

MAM features 44 different tools and guidelines, including an interview do’s and don’ts checklist, a sample kick-off meeting agenda, a purchasing/sourcing analysis, and a process and information flow functional model.

Assessment results are presented in an interactive session with client managers and published in an extensive report. MMTC uses MAM as a resource allocation tool to match firm needs with program offerings. Each new MMTC field engineer is required to participate in a three-day training session on MAM. A scaled-down version of MAM, PRISSM, is being distributed for use outside Michigan.

Strengths

1. Formal companywide assessments are objective; consequently, recommendations are less likely to concentrate on areas in which a field assessor has expertise (“a hammer looking for a nail”).
2. Expectations are clear: program assessors explain to the client what to expect during and after the assessment.
3. Assessment information is complete, providing a strong foundation on which to base recommendations.
4. Companywide assessments are generally more efficient than conducting a series of assessments for each functional area.
5. Companywide assessments allow for consistent service provision to all manufacturers.

1. Formal companywide assessments are more difficult to adjust to a particular firm's situation and personnel. Companywide protocol scan appear to treat a firm and its problems as generic rather than unique.
2. Companywide assessments are more intrusive than less formal approaches that avoid asking for potentially sensitive information such as financial statements.
3. These assessments may be more time-consuming and expensive to conduct than functional assessments. For example, a study conducted by Indiana Business Modernization and Technology (BMT) Corporation found that it can take between 24 and 160 person hours to conduct a companywide assessment. Program administrators have used other tools (financial reviews and limited final reporting, for example) to reduce the amount of resources required for these assessments.

SAMPLE METHODOLOGIES:

1. Midwest Manufacturing Technology Center. *Manufacturing Assessment Technology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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2. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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3. Indiana Business Modernization and Technology Corporation. *Business Modernization Tools*. Indianapolis. 1994.

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4. Southeast Manufacturing Technology Center. "Competitiveness Review." Columbia, SC. 1994.

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5. National Center for Manufacturing Sciences. "Achieving Manufacturing Excellence." Ann Arbor. 1994.

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6. U.S. Air Force. Air Force Systems Command, Wright Laboratory. "Maturing, Integrating and Expanding the PRISSM Regional Infrastructure." Manufacturing Technology Directorate prepared by Lawrence Associates, Inc., Wright Patterson Air Force Base, Ohio. March 1993.

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APPROACH 2. FUNCTIONAL ASSESSMENTS

Functional assessments are firm-level assessments that focus on specific problems or functions. Such assessments are conducted when a company has a specific problem in its manufacturing process, design, quality or other area. Functional assessments are typically narrow in scope, probing into a particular functional area (for example, information systems) and giving little consideration to other functions of the firm. Functional assessments aim to verify whether the problem(s) reported by the company in the functional area is indeed the real problem(s). As a result of the assessment, assistance program staff either solve the problem(s) or refer the company to another service provider.

Description

Functional assessments are part of a manufacturing assistance program's initial service offerings. They are used as a resource allocation tool, and match service offerings, field staff and/or referral resources to client firms based on problems identified in one-on-one interactions and recommendations made in the assessment.

Use

Many of the approaches, tools and methods described in this guide are used in conducting functional assessments. For example, a production process functional assessment could involve outreach, plant tours, interviews, data collection, process flow analysis, and manufacturing benchmarking tools and methods.

THE WEST VIRGINIA UNIVERSITY EXTENSION SERVICE offers the following four functional assessments:

Case Example

- production process assessment using process flow analysis
- quality evaluation
- energy audit
- waste minimization assessment

When a potential client indicates interest in the program, extension engineers match initial client needs with one of these four areas. The assessment tools used in each area were developed from other institutional offerings: the University of Tennessee was the source for the waste minimization assessment, for example. Engineers specializing in each functional area conduct the assessments.

These initial four assessments serve as a prelude to functional assessments in other areas, as well as to longer term projects. For example, production process assessments could reveal that a client firm needs follow-on assistance in plant layout, material handling, automation/equipment selection and/or maintenance systems.

GEORGIA INSTITUTE OF TECHNOLOGY'S INDUSTRIAL EXTENSION PROGRAM is also organized around functional areas. These include:

- manufacturing technology, operations planning and control, and facility planning
- management systems (for example, organizational, strategic planning, employee teams, market planning and sales/distribution)
- quality management
- information technologies
- energy management
- environmental/occupational safety and health

The functional assessments yield recommendations regarding product offerings in feasibility analysis, cost/benefit analysis, counseling/problem solving, training, information, implementation and resource matching categories.

Strengths

1. A manufacturing assistance program can use a functional or problem-oriented assessment to introduce a firm to its services without requiring the client to reveal information about all aspects of its business.
2. Because of their narrower scope, the results of functional assessments may be more accessible to and understandable for a client, as well as less expensive and time-consuming.

Weaknesses

1. A functional assessment may not provide field engineers with the comprehensive information for problem definition that a companywide assessment provides.
2. Conducting a series of functional assessments may be less efficient than performing a single companywide assessment.

ABOUT THE CASE EXAMPLES:

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**For More
Information**

APPROACH 3. SELF-ASSESSMENTS

Self-assessments are questionnaires administered to a manufacturing firm to allow its personnel to identify areas for improvement without the intervention of a staff engineer. These questionnaires are highly structured to avoid subjective interpretations of the answers by a staff engineer or specialist. Questions can ask for “yes/no” responses (for example, “Do you have a quality manual?”), multiple choice responses or quantitative responses (such as “What is your internal scrap rate?”). The results are delivered to the client in the form of a report that compares client responses to the distribution of all firms completing the questionnaire. Client results below certain levels of the distribution suggest areas needing improvement.

Description

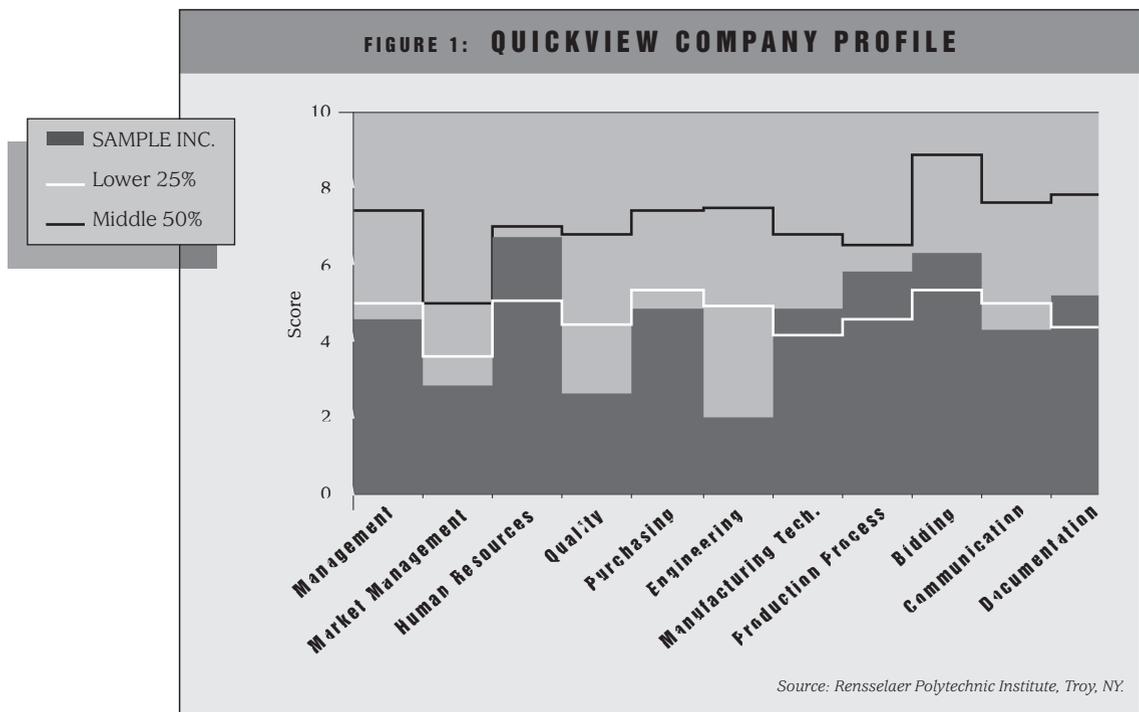
Self-assessments are an initial part of a manufacturing assistance program’s service delivery activities. Results of a self-assessment can provide insight into operational improvements a firm may need to make to remain competitive. Self-assessments are not a substitute for in-depth on-site assessments, but they are sometimes used to reduce the number of outreach visits needed to increase a potential client firm’s receptivity to assistance program services. Self-assessments can lead to more focused functional area assessments; they can also be used to create manufacturing benchmarking tools.

Use

QUICKVIEW is a self-assessment tool for the metal fabrication industry. Researchers collected questionnaires from programs around the country and selected common questions appropriate for this industry. Questions cover 12 areas: bidding, communication, customer satisfaction, documentation, engineering and design, human resources, management, manufacturing technology, market management, production process, purchasing and quality. Several questions are posed in each area, some of a quantitative nature (“What percentage of outgoing orders is on time?”), and others using a scale that ranges from “never/not at all” to “always/to a very great extent.” The questionnaire takes less than 45 minutes to complete.

Case Example

The assessment deliverables include a company profile bar chart that summarizes how the client firm compares with the upper and lower quartiles of the database in each of the 12 areas. (See *Figure 1*.) A more detailed report is also included; this indicates questions on which the client had a low score and available resources (both people and reports) for remediation. The report highlights areas of an operation that may need attention, capital and time investment; and non-technical issues that may inhibit growth and competitiveness. QuickView devel-



opers say that the tool can help reduce the number of visits field personnel need to make to convince a firm to use assistance services.

Strengths

1. Self-assessments can help focus on-site time, narrowing the scope to those areas in which a firm has low scores.
2. These assessments may serve as a primary assessment tool when on-site assessments are economically or otherwise unfeasible.

Weaknesses

1. It can be difficult to apply a common set of questions to manufacturing firms with different characteristics and operating environments.
2. Firms in a comparison database should be randomly selected to avoid bias in the distribution of responses.

For More Information

SAMPLE METHODOLOGY:

1. Simons, Gene. "Using Customer-based Assessment to Evaluate Industrial Extension Programs." Paper presented at "Workshop on the Evaluation of Industrial Modernization Programs: Developing Best Practices," Atlanta. September 1-3, 1993.

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APPROACH 4. OUTREACH

The purpose of outreach is to identify informally a firm's critical needs and determine what types of assistance might be most appropriate for the program to provide. Outreach efforts typically combine broader marketing efforts and one-on-one visits. The broader marketing efforts are aimed at generating awareness of the program and an understanding of its benefits. One-on-one outreach efforts involve preliminary information exchange between program staff and the potential client firm. The firm indicates why it contacted the program and what kinds of assistance it feels would be helpful. Program staff describe the assistance program's organization, staff background and credentials, types of assistance provided, the firm-level assessment process and deliverables the company can expect. Examples of outreach efforts include the following:

- Program staff may call on manufacturers at their site.
- Presentations may be made at meetings of potential clients.
- Program staff may conduct forums, workshops and seminars.
- Direct mail pieces may be designed and distributed.
- Local field offices may be established to promote program awareness and credibility.
- Large manufacturers may be approached about establishing supplier qualification programs of which assessments may be a part.
- Economic development organizations or trade associations may refer manufacturers to the program.
- Manufacturers may recommend the program to others.
- Bankers, accountants, lawyers or venture capitalists may refer troubled clients to the program.
- One part of the company may refer another part to the program.

Outreach efforts are part of a manufacturing assistance program's service delivery activities. They are used to market the program to manufacturers. The goal is to build firms' awareness of, interest in and—ultimately—commitment to using program services (usually starting with a companywide or functional assess-

Description

Use

ment). It may serve a resource allocation function by giving program management an idea of potential workload. Mature programs may regard outreach as a mechanism for screening firms to avoid unreceptive firms or unsuccessful projects. All manufacturing assistance programs conduct some form of outreach.

Case Examples

THE CLEVELAND ADVANCED MANUFACTURING PROGRAM, GREAT LAKES MANUFACTURING TECHNOLOGY CENTER (CAMP/GLMTC) has an extensive program of proactive and reactive marketing approaches. This outreach program consists of direct contact, networking, involvement in professional and business organizations, telemarketing, direct mail, advertising, trade and industrial shows, monthly luncheon forums, manufacturing resource facility demonstrations, monthly focused half- and full-day seminars, and site visits to individual companies. Staff technology application engineers have primary responsibility for conducting outreach to manufacturing firms. This practice contrasts with that followed in most programs, where field engineers are responsible for both outreach and service delivery. As of the third quarter 1993, more than 800 companies had been contacted and had received technical assistance. First-time plant visits were made to more than 400 firms, and more than half of CAMP/GLMTC proposals were accepted.

Strengths

A proactive outreach effort can help a manufacturing assistance program target those firms for which assistance will be most successful—for example, firms in core industries or those most receptive to change.

Weaknesses

1. Outreach efforts can be costly, since it may take several points and types of contact to overcome firms' various objections to the possibility of service delivery by the program (for example, a natural tendency to resist change, concerns about client confidentiality, or feeling that their problems are unique).
2. Outreach efforts are less likely to produce qualified "leads" than are reactive responses to companies seeking help in making changes. To help ensure the success of an outreach marketing effort, mature programs will sometimes "screen" firms, providing outreach only in those cases where: (1) contractual agreement is at the highest authority level; (2) the key contact is a top manager (for example, plant manager or departmental manager); and the company is financially viable.

For More Information

ABOUT THE CASE EXAMPLE:

1. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

David Thomas-Greaves
CAMP/GLMTC
4600 Prospect Avenue
Cleveland, OH 44103
216-432-5300

ABOUT OUTREACH ISSUES FOR MATURE PROGRAMS:

2. Ford, Art, and Paolo Chiappina. "Technological Assistance: Analyzing Project Success Potential." Georgia Institute of Technology, Atlanta. 1992.

Art Ford
Georgia Institute of Technology
1117 Whispering Pines Road
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912-430-4188

APPROACH 5. PRE-ASSESSMENT QUESTIONNAIRES

Pre-assessment questionnaires are used to obtain opinions and information from client firms for focusing staff time inside the plant. Pre-assessment questionnaire items gather information about customers served, primary markets, union/nonunion status, firm's functions, competitiveness issues and client expectations regarding service delivery. This information may be collected in several ways, including:

- during a pre-assessment meeting between the program and the client
- via a letter from the program explaining what the company can expect from the assessment and requesting information prior to the assessment
- a paper- or computer-based intake instrument to collect basic information when the potential client calls to request assistance
- a pre-assessment questionnaire mailed to the client
- a telephone survey in which the program calls the potential client and asks a series of questions

Data collected on pre-assessment questionnaires are used to organize the on-site phases of a firm-level assessment. This approach also helps allocate resources by identifying the expertise needed on the assessment team.

MMTC developed a detailed interview questionnaire tool called **CUSTOMER ASSESSMENT PROTOCOL (CAP)**. CAP is a CATI system-based instrument designed to collect detailed upfront information. Although not currently in use at the MMTC, CAP has been marketed to the Institute for Science and Technology in Canada and programs in Iowa and Wisconsin.

Iowa's Heartland Technology Network evaluation team surveyed program specialists and client firms about their attitudes toward CAP. Specialists gave higher ratings to their understanding of CAP's purpose than to their ability to interpret a CAP report or to select a project team based on CAP results. Most firms who had received CAP felt it was competently administered and that assessment questions focused on the appropriate areas and were useful in identifying company needs. More than two-thirds of the respondents, however, reported that participation in the assessment process had resulted in no changes in the opera-

Description

Use

Case Example

tion of their company. Many felt that there was insufficient follow-up, question-specificity, and interpretation of results.

Strengths

Pre-assessment questionnaires can enhance the efficiency of on-site assessment activities.

Weaknesses

1. Pre-assessment questionnaires can appear impersonal to the client.
2. Some answers received are only marginally useful, because clients may feel uncomfortable about divulging confidential information in a pre-assessment situation.
3. Pre-assessment questionnaires are no substitute for on-site interactions.

For More Information

SAMPLE INSTRUMENT:

1. Daniel Luria
MMTC
P.O. Box 1485, 2901 Hubbard Road
Ann Arbor, MI 48106
313-769-4377

ABOUT THE APPROACH:

2. HTN Evaluation Team. *Heartland Technology Network Evaluation*. Ames, IA: Iowa State University of Science and Technology. May 1994.

Jan Sweeney and John Dugger
Industrial Education and Technology
Iowa State University
116 IED II Building
Ames, IA 50011
515-294-3721

APPROACH 6. PLANT TOURS

A central part of a firm-level assessment is touring that firm's plant. This tour is usually an initial step in the on-site phase of a firm-level assessment. The program's goal for this tour is to encourage the plant manager to talk about the purpose and operations involved in each area of the plant, the equipment used and the general flow of activity. Follow-on plant tours may occur at a later point in order to verify comments or observations, collect data or chart a process flow analysis.

Description

Items that might be reviewed on a plant tour include the following:

- cleanliness and orderliness
- layout and space utilization
- raw materials
- work in process
- scrap and rework areas
- inventory levels and storage
- equipment age and condition
- tooling
- automation
- bottlenecks
- personnel utilization
- employee attitude
- safety

Information obtained from plant tours contributes to the task of matching program services with client needs, and helps deepen understanding of the manu-

Use

facturer's production environment. Plant tours help verify impressions gained through other assessment tools (for example, pre-assessment questionnaires, self-assessments, manufacturing benchmarking, financial review) about manufacturer problems, bottlenecks and possible areas for improvement. Assessors may use other firm-level tools in conjunction with plant tours; these might include interview guides and process flow analysis.

Strengths

Plant tours offer a means for detecting problems by directly viewing the operation. For example, if the plant shows evidence of poor housekeeping practices or has overflowing scrap bins, there is probably a quality problem. If the plant has large inventories, a management production control problem is likely. If employees appear unenthusiastic, the assessment team may want to investigate such aspects as the firm's incentive plans or training programs.

Weaknesses

Plant tours may not be the most cost-efficient approach for assessing the needs of numerous very small manufacturers.

For More Information

ABOUT THE APPROACH:

1. Midwest Manufacturing Technology Center. "Conduct Facility Tour." In *Manufacturing Assessment Technology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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P.O. Box 1485, 2901 Hubbard Road
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2. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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3. Indiana Business Modernization and Technology Corporation. *Business Modernization Tools*. Indianapolis. 1994.

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APPROACH 7. INTERVIEW GUIDES

A central part of an on-site assessment involves interviewing management and staff to ascertain problems recognized by these parties. Interviewing can occur at any point in the assessment process, and reinterviewing individuals to clarify points is common. Many programs have established prescribed methods for interviewee selection and have prepared sets of questions, or interview guides, for use in these interviews.

Description

INTERVIEWEE SELECTION

Assessment team members may set up interviews prior to the on-site visit. The firm might be asked to issue a memorandum to certain managers asking them to set aside time to meet with the team for interviews. Besides top management, other interviewees may be asked questions to provide different perspectives of the firm's most important issues or problems. Depending on the size of the firm, these interviewees could include:

- owner/chief operating officer
- managers from several departments (for example, human resources, sales and marketing, quality and finance)
- shop-floor workers (for example, foreman, welders and painters)

INTERVIEW GUIDES

To interview employees, assessment team members may use interview guides. In these guides, questions are usually grouped by functional area (such as operations, quality, materials, management information systems, or environment/safety). The first set of questions typically asks about companywide issues, such as “What are your expectations of this assessment?” “What distinguishes your business from the competition?” “How are major decisions such as capital acquisitions or marketing and business strategy made?” “What are your most vital issues or bottlenecks?” and “In what areas do you think you need to modernize?”

Each set of questions is directed to the appropriate manager; some questions may be asked of more than one manager to verify responses. Some questions

may seek “hard” information such as descriptions of operation size or of products produced, whether certain practices have been adopted or quantitative benchmarks (for example, internal scrap rates or injury incident rates). Other questions ask for “softer” information such as opinions of problem areas or ratings of how well the firm does relative to the competition. All questions are worded to stimulate conversation with the interviewee.

Despite their structured and comprehensive nature, interview guides are still just that—guides for conducting the interview. Assessors should be flexible when using these guides, rewording and reordering—and sometimes even omitting—the material to fit the given situation. For their part, the guides should be worded in a relatively loose and open-ended manner so questions can be woven easily into conversation. Assessors should record interviewee responses whenever possible, and allay any interviewee concerns about a written record of the conversation.

Use

Interview guides help in matching program services with client needs, based on an understanding of a firm’s functional areas. Findings derived from these guides help verify impressions gained from other assessment tools (for example, pre-assessment questionnaires, self-assessments, manufacturing benchmarking and financial review) about manufacturer problems, bottlenecks and possible areas for improvement.

Case Example

INDIANA BUSINESS MODERNIZATION AND TECHNOLOGY CORPORATION has developed a matrix of potential interview subjects listed by business and technical area. (See *Figure 2*.) The matrix guides the assessor in selecting staff members to interview on specific topics during the data collection process.

BMT provides its field engineers with a 26-page interview guide organized into the following functional areas:

- business, product or service (understanding the overall business thrust)
- sales (sales and marketing issues)
- manufacturing operations (issues related to producing the company’s products/services)
- financial (internal accounting and finance issues)
- quality (overall quality assurance processes and issues throughout the company)
- materials management (issues involving procurement and movement of materials)

FIGURE 2. POTENTIAL INTERVIEW SUBJECTS BY BUSINESS AND TECHNICAL AREA

	Business and Its Product or Service	Sales/Marketing	Manufacturing	Financial	Quality	Material Management	Design/Engineering	Personnel	Facilities	M.I.S.	Environment/Safety
Owner/President	●	○	○	○	○	○	○	○	○	○	○
Manufacturing Mgr.		○	●		○	○	○	○	○	○	○
Quality Manager					●	○				○	○
Purchasing Manager					○					○	○
Engineering Manager			○		○	○	○	○			
Financial Officer		○	○	●						○	○
Sales Manager	○	●			○					○	○
Personnel Manager							○	○			○
Materials Manager			○		○					○	○
Plant Engineering Mgr.								○			○

● Principal Source
○ Alternate or Back-Up Source

Source: Indiana Business Modernization and Technology Corporation, Indianapolis, IN.

- product design/engineering (issues related to designing and procuring products/services)
- personnel (personnel and human resource issues)
- facilities (building and ground issues)
- management information systems (managing data collection, reporting and computer systems)
- environmental/safety (managing the company's safety and environmental issues)

Each section of the guide includes a mix of broad open-ended questions, "yes/no" questions, quantitative information-gathering questions and ratings of company practices relative to the competition. All sections end with questions about the three most vital issues or bottlenecks in that particular area.

Interview guides keep the assessment focused on company problems rather than on areas of assessor expertise.

Strengths

Weaknesses

1. Interviews can yield poor results if the subject has not been properly handled and made to feel comfortable with the process—for instance, if the interviewee feels overwhelmed due to multiple interrogators, or feels that the interviewer is stiff or inexperienced because he or she read the guide rather than asked cogent questions.
2. Interview results can be skewed when interviewers lead the client by suggesting answers.

For More Information

SAMPLE METHODOLOGIES:

1. Indiana Business Modernization and Technology Corporation. *Regional Planning and Operations Guide Book*. Indianapolis. 1993.

Robert B. Bassler
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Indianapolis, IN 46204-2242
317-635-3058
2. Midwest Manufacturing Technology Center. "Interview Key Personnel." In *Manufacturing Assessment Technology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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313-769-4377
3. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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APPROACH 8. DATA COLLECTION

Firm-level assessors typically collect a wide variety of data to supplement their observations and interviews. Some of these data can be obtained more or less “off-the-shelf”; other data need to be prepared either through compilation or synthesis. Typical data collected include the following:

Description

- information on business type
- product literature
- organization chart
- list of primary markets
- customer list
- customer order documents
- balance sheet and income statement
- sales forecasts
- sales histories
- marketing plans
- quality manual
- personnel manuals
- list of suppliers
- inventory breakdown
- manufacturing costing
- Occupational Safety and Health Administration compliance logs
- plant layout sketch including identification of all major equipment
- equipment lists

- systems documentation
- production records
- normal product lead time through the plant
- market-preferred lead time
- machine downtime

Use

In general, data collection enables understanding of a manufacturer's business environment. Pre-assessment data collection can help organize on-site time. On-site, data can be collected to characterize the nature of particular problems, facilitating the task of matching program services with client needs.

Data collection helps verify impressions gained from other assessment tools (for example, pre-assessment questionnaires, self-assessments, manufacturing benchmarking, financial review, plant tours, and management and staff interviews) about manufacturer problems, bottlenecks and possible areas for improvement.

Strengths

1. As a pre-assessment activity, data collection improves problem definition by helping target the assessor's questions posed to management and staff.
2. As part of the assessment process, data collection verifies and validates firm and assessor observations and opinions.

Weaknesses

Some information may be difficult for certain firms to provide. For example, very small manufacturers often cannot provide an organizational chart. Privately held firms may not wish to reveal confidential financial information. BMT addresses these latter concerns by explaining that the assessment's efficiency and accuracy is greatly enhanced by reference to these data.

For More Information

ABOUT THE APPROACH:

1. Indiana Business Modernization and Technology Corporation. *Business Modernization Tools*. Indianapolis. 1994.

Robert B. Bassler
 Indiana BMT Corporation
 One North Capitol Avenue, Suite 925

Indianapolis, IN 46204-2242
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2. Midwest Manufacturing Technology Center. *Manufacturing Assessment Methodology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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3. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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APPROACH 9. FINANCIAL REVIEW

Financial review provides trends of a company's financial indicators and ratios and compares them to industry financial benchmarks. The most common source for financial benchmarks is Robert Morris and Associates (RMA). Banks have used RMA as an indicator of company performance since 1915.

Description

Following is the standard approach to financial review:

1. Obtain financial statements and information from client:
 - income statement—sales revenue, cost of goods sold, general and administrative expenses, operating expenses
 - balance sheet—assets such as accounts receivable, depreciation, equipment; liabilities such as accounts payable, stock, retained earnings, short-term debts, long-term debts
2. Enter financial information into RMA software.
3. Construct a comparison group by entering the standard industrial classification (SIC) code that best describes the client's industry.
4. Generate a printout showing financial information over the past three or four years and any variance from industry group norm.

Financial review is part of a manufacturing assistance program's service delivery offerings, useful before and after service has been provided. Financial reviews can help organize and focus an on-site assessment. They lend weight to recommendations for using assistance services by indicating the financial impact on the client's bottom line. In addition, the results of financial reviews can be captured in a historical database to provide feedback for allocating service resources to produce the greatest financial impact.

Use

Conducting financial reviews can pose certain difficulties for some field staff. For example, it may be difficult to identify a sufficiently large and valid industry comparison group for some firms. Also, field staff may not be able to determine the appropriateness of certain client-provided financial data. Finally, staff—particularly those whose primary discipline is not finance—may have trouble interpreting or relating the many financial ratios that RMA software generates to a particu-

Case Examples

lar client's operational situation. One approach to this last problem has been to key in on certain ratios such as the Altman Z-score, which was originally developed to predict bankruptcy.

BMT

BMT has developed a financial review tool called **BENCHMARKING INFORMATION AND FINANCIAL ANALYSIS REPORT (BI-FAR)** to address some of these difficulties. BI-FAR translates and organizes the financial review in order to guide the field engineer toward the operational issues to be addressed during the site visit and data collection phases of the assessment process. The BMT field engineer uses the suggested action items highlighted in the BI-FAR executive summary during the client interviews to focus on key questions to ask. (See *Figure 3*.) The suggested action items developed from BI-FAR are included in the report presented to the client.

BI-FAR helps users unfamiliar with financial reviews to understand the impact of operational issues on financial performance. BI-FAR information provides a complete financial profile for use by the client and in the ongoing measurement of the progress of the assessment action plan.

BMT also established a central support group that helps field engineers collect appropriate financial data. For example, the group helps engineers deal with ambiguous SIC comparison groups by providing information about competitor financial information from such sources as Dun and Bradstreet and Valueline.

MMTC

Another method of financial analysis is **ACTIVITY-BASED COSTING**. This is a cost-accounting method used by the Midwest Manufacturing Technology Center to assign costs to products rather than to overhead. The benefit of activity-based costing is that it allows the firm to see the true cost of producing high-volume items versus customized orders. The following basic steps are involved in activity-based costing:

1. List each product manufactured.
2. Associate as many activities as possible with each product.
3. Estimate the cost of each product based on estimates of the cost of its component activities.
4. Allocate remaining indirect (that is, overhead) costs.

FIGURE 3. BI-FAR EXECUTIVE SUMMARY

Client #: Company X
SIC# 35453

Today's Date: 12/22/93
Analysis Processed On: 12/22/93
For Income/Balance On: 06/30/93
Assessor Initials: _____

BENCHMARKING INFORMATION AND FINANCIAL ANALYSIS REPORT

KEY BALANCE SHEET AND INCOME STATEMENT INDICATORS (%)

LINE ITEM	COMPANY (%)	IND. STD. (%)	VAR. (%)	SUGGESTED ACTION ITEMS
Inventory	29.84	28.6	4.3	Inventory trend is upward. Ratio poor. Increase unit sales and review manufacturing flow.
Cost of Goods Sold	71.81	70.4	2.0	Watch direct material, direct labor and overhead expenditures. Improve overall production efficiencies.
Gross Profit	28.19	29.6	-4.8	Significant decrease in gross profit. Trend is downward. Analyze current product mix and competitive pricing.
Operating Costs	27.35	24.8	10.3	Reduce spending. Trend downward.
Total Current Liabilities	54.85	37.4	46.7	Trend is upward. Consider equity infusion to reduce short term notes payable.

KEY RATIO INDICATORS

RATIO	CO.	IND. STD.	% VAR.	BENCHMARK	ACHIEVE BY	SUGGESTED ACTION ITEMS
Quick Ratio	.3	.8	-61			Cash position is low. Increase sales, sell assets to obtain new cash.
COGS/ Inventory	2.3	4.5	-49			Reduce inventory levels by improving scheduling of production. Sell from existing inventory to raise cash.
COGS/ Payables	6.6	13.4	-51			Sell from existing inventory to raise cash and use cash to reduce accounts payable.
Total Debt/ Net Worth	3.2	1.4	126			Obtaining new paid-in capital or equity infusion and use proceeds to restructure debt.

Source: Indiana Business Modernization and Technology Corporation, Indianapolis, IN.

1. Financial review can highlight those areas on which to focus in the operational assessment.
2. This review may bolster the conclusions of an assessment by indicating how various courses of corrective action might affect the client's bottom line.

Strengths

3. Financial benchmarking templates are helpful to those field engineers with little or no expertise in financial analysis.
4. Financial reviews provide useful information for lenders and can therefore facilitate a client firm's access to financing.

Weaknesses

1. Valid financial review requires a certain level of expertise, without which incorrect conclusions could be drawn about a client's situation and/or problems.
2. Even with a financial benchmarking template, field staff sometimes are not able to understand the connection between financial ratios and operational attributes. Programs may want instruction or on-site guidance from a financial analyst before undertaking financial reviews.
3. Some firms may feel that financial information is too sensitive to provide to assessors.

For More Information

SAMPLE METHODOLOGIES:

1. Bassler, Robert B. "Technology Assessment and Financial Benchmarking." Paper presented at Technology Transfer Conference, Ann Arbor, June 28-29, 1993.

Robert B. Bassler
 Indiana BMT Corporation
 One North Capitol Avenue, Suite 925
 Indianapolis, IN 46204-2242
 317-635-3058

2. Midwest Manufacturing Technology Center. "Develop Preliminary Concepts and Recommendations." In *Manufacturing Assessment Methodology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

David Arnsdorf
 MMTC
 P.O. Box 1485, 2901 Hubbard Road
 Ann Arbor, MI 48106
 313-769-4377

SOFTWARE TOOL:

3. Robert Morris Associates
 Annual Statement Studies
 One Liberty Place
 Philadelphia, PA 19103
 215-851-0585

APPROACH 10. PROCESS FLOW ANALYSIS

Process flow analysis charts the flow of manufacturing activity from receipt of materials to distribution of end product. Its objectives are to describe the way a particular process is accomplished at a specific firm and to identify inefficiencies or areas for improvement in this process.

Description

Process flow analysis may be applied to several types of processes, including those relating to material or paperwork. It may be conducted for an entire function or for a small part of a function. This last, because of its manageability, represents the most efficient approach: that is, focusing on a component, subassembly, and so forth. The segment chosen may not necessarily be the most complicated part, but it should be a typical part. In this way, even though focusing on a particular segment does not provide an assessment of all processes, it does provide the client with a method that it can apply to other processes.

In a process flow analysis, the assessor asks the client to literally “walk” through the process; the assessor poses questions throughout. The process flow may then be depicted in a drawing or chart. The analysis should identify operations, transportation methods, inspection points, delays, storage points, distances traveled and time consumed.

Assessors calculate the percentage of time spent on the value-added part of the flow—the operations—and the percentage spent on the cost producers—transportation, inspection, delays and storage. Detailed explanation of cost components is provided. Possible outcomes of the assessment include eliminating the cost element, combining tasks, resequencing, changing the location or operator, or installing automated equipment.

Process flow analysis contributes to the task of matching program services with client needs, based on an understanding of a firm’s production process and cost drivers. The approach also helps verify observations and impressions obtained during a plant tour.

Use

WEST VIRGINIA’S INDUSTRIAL EXTENSION SERVICE conducted a production process assessment of a small family-owned company that manufactures digging equipment. The assessment included a process flow analysis of one component of this equipment. A form was used to list, categorize and obtain time estimates for steps required to produce the component. (*See Figure 4.*) The results

Case Example

FIGURE 4. FLOW PROCESS CHART

SUMMARY						
	PRESENT		PROPOSED		DIFFERENCE	
	NO.	TIME	NO.	TIME	NO.	TIME
<input type="checkbox"/> OPERATIONS						
<input type="checkbox"/> TRANSPORTATIONS						
<input type="checkbox"/> INSPECTIONS						
<input type="checkbox"/> DELAYS						
<input type="checkbox"/> STORAGES						
DISTANCE TRAVELED		FT.		FT.		FT.

PROJECT: _____
 INFO PERSON MATL _____
 CHART BEGINS _____
 CHART ENDS _____
 CHARTED BY: _____ DATE _____

DETAILS OF (<input type="checkbox"/> PRESENT <input type="checkbox"/> PROPOSED) METHOD	POSSIBILITIES										NOTES	
	OPERATION	TRANSPORT	INSPECTION	DELAY	STORAGE	DISTANCE IN FEET	QUANTITY	TIME	EQUIPMENT	MATERIALS		CHANGE ORDER
1	<input type="checkbox"/>											
2	<input type="checkbox"/>											
3	<input type="checkbox"/>											
4	<input type="checkbox"/>											
5	<input type="checkbox"/>											
6	<input type="checkbox"/>											
7	<input type="checkbox"/>											
8	<input type="checkbox"/>											
9	<input type="checkbox"/>											
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20	<input type="checkbox"/>											
21	<input type="checkbox"/>											
22	<input type="checkbox"/>											
23	<input type="checkbox"/>											
24	<input type="checkbox"/>											

1991 T.A. Schar

Source: West Virginia University Extension Service, West Virginia Northern Community College, Wheeling, WV.

indicated that nearly half of the time to produce the component consisted of cost drivers. The team recommended reducing cost-driving bottlenecks by changing plant layout, installing a computer numerical control, implementing a quality program and changing work schedules. Follow-on projects related to plant layout and quality were proposed.

Strengths

Process flow analysis is a systematic approach for identifying cost-added methods in a process.

This approach may be unnecessarily labor-intensive for very small manufacturers using relatively simple processes; it therefore may not be a cost-efficient way to assess the processes of these manufacturers.

Weaknesses

SAMPLE METHODOLOGIES:

**For More
Information**

1. Thomas R. Bodnar
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West Virginia Northern Community College
1704 Market Street
Wheeling, WV 26003-3699
304-233-5900, ext. 288
2. Midwest Manufacturing Technology Center. "Develop Preliminary Concepts and Recommendations." In *Manufacturing Assessment Methodology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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3. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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APPROACH 11. MANUFACTURING BENCHMARKING

Virtually all needs assessments include some sort of benchmarking. Informal benchmarks are the mental images that a field assessor has of best practices among firms in a similar operating environment. This image may not reflect a practice of any single company, but a composite drawn from many companies' operations.

The most common source for this "picture" of best practice is an industry expert hired as a field engineer/assessor. Trade publications, seminars and conferences, advertisements, press releases, profiles of the competition, and new technological developments also contribute to formulating an image of best practice. The assessor then compares the client's practice to this composite image or benchmark, considers barriers in reaching this benchmark and recommends moves toward adopting best practice.

In many cases, the mental image to which a client is compared may not be "best practice." If a client is not automated and has not thought about how to streamline its operations, the assessor establishes a benchmark of low-technology firms with streamlined operations. Recommendations will emphasize simplifying processes rather than automation.

A more systematic approach to benchmarking than subjectively tinged mental impressions is to compare company practice against an industry average or distribution. Financial review and self-assessments are subsets of this approach to manufacturing benchmarking.

Benchmarking is part of a manufacturing assistance program's service delivery activities. Before conducting an assessment, benchmarking can organize and increase the efficiency of outreach efforts and intensive on-site activity. It is also valuable during post-service evaluation. Benchmarking provides program managers with extensive information about the manufacturing practices and performance of firms in their service area. It helps inform judgments about matching proposed projects to client problems. It provides program managers with information to coordinate clients, projects, delivery modes and field staff. Benchmarking is particularly useful for programs targeted to particular industry sectors, supporting sector-specific improvement strategies.

The most extensive benchmarking program among manufacturing assistance programs to date is **MMTC'S EVALUATION AND BENCHMARKING PROGRAM**. (See

Description

Use

Case Example

Benchmarking Report Features

Whom You'll Be Compared Against

More than 250 companies took part in the 1993 wave. Here's a profile:

Panel	Company Sales (\$ Millions)		Firms Signed Up
	75% Below	Median	
Metforming	\$ 26.0	\$12.4	75
Plastics Processing	19.5	4.0	52
Machined Parts & Assemblies	9.8	5.2	40
Tooling	7.2	3.3	48
Machine-Building	15.4	5.6	45
Total			260

How Your Report Will Present Performance

For more than 80 key measures, your report will show what level of performance is necessary to be in the top 5%, 10%, 25%, 50%, and 75%. Here's an example for one measure--Actual Press Running Hours as a Percent of Scheduled Hours--we reported to a stamping company.

Panel Performance: Based on 50 Responses	
Lowest Value in Top 5%	94.2
Lowest Value in Top 10%	89.5
Lowest Value in Top 25%	83.3
Lowest Value in Top Half	70.0
Lowest Value in Top 75%	59.0
Your Performance . . .75%	

Selected Findings and A Chance to Rate Your Plant

The box on the top of the next page presents some findings from the 1993 wave. The levels of performance needed to be in the top 10%, top quarter, and top 75% turned out to be reasonably similar across all five of our industries on these four. Use the formulas on the right to see how your plant stacks up.

(continued on other side)

Measure	Lowest Value in:			Calculate Your Performance
	Top 10%	Top Qtr.	Top 75%	
Value Added Per Employee	\$107,800	\$78,800	\$54,900	<u>Sales-Purchased Parts & Material</u> = Employment
Total Inventory Turns	28.3	20.1	7.7	<u>Sales</u> = Raw Stocks + WIP + Finished Stocks
On-Time Delivery	99.3%	96.9%	84.9%	<u>Deliveries with in On-Time Window</u> = Total Deliveries
Training Per Employee	\$527	\$213	\$ 41	<u>Training Expenditures</u> = Employment

Measures That Matter to Your Business

Your report will show you how you stack up on measures that fit your business and not just compare you to all manufacturers. We've selected measures that companies in each panel told us matter most. Here are some examples:

**Mid- and High-Volume
Production Shops**

- Change in Sales and Employment
- Collection Period
- Quoting Practices
- Change in Design Lead Time
- Change in Order-to-Delivery Time
- Inventory Turns
- Schedule Integrity
- On-Time Delivery
- Value-Added per Employee
- Unexcused Absences per Employee
- Training Expenditures per Employee
- Customer Reject Rate
- Use of CAD, EDI, and MRPII

For Metalformers

- Percent of Presses with Strain Gauges
- Time from First Hit to First Part Approval

For Plastics Processors

- Molding Machines with Servo Proportional Hydraulics
- Automatic Alarming to Notify of Out-of-Control Condition

For Production Machining Shops

- Employees Trained in Both CNC Operation and CAM Programming
- Percent of Cutting Tools in Quick-Change Holders

**One-Off, Low-Volume,
Engineer-to-Order Shops**

- Change in Sales and Employment
- Export Business
- Actual vs. Quoted Material
- CNC Spindle-Turning Time per Month
- Percent of CNC Programs That Run First Time From CAM Output
- Value Added per Shop Employee
- Percent of Trades Completing Apprenticeships
- Use of Coordinate Measuring Machines
- Tool Management Practices
- Percent of Machines Less Than 5 Years Old
- Conformance to Maintenance Schedules
- Gauge Calibration and Certification

For Machine-Builders

- Unplanned Service and Warranty Costs as a Percent of Sales
- Use of PERT and GANTT Charting
- Percent of Assembly Floorspace Devoted to Designated Subassembly Areas

Between You and Us

Your performance is your business. No one except our three-person Benchmarking Program staff will see or have access to your answers or your customized report.

Source: Industrial Technology Institute, Midwest Manufacturing Technology Center, Ann Arbor, MI.

Figure 5.) Although plans are under way to broaden the program’s database to include many other industries, the MMTC program currently focuses on five industry sectors: low-volume tooling and machining; metal forming (dominated by stamping); plastics processing (dominated by injection molding); powered machine building; and mid-volume machined parts and assemblies (most often for aerospace, auto, and heavy truck).

Once a year, selected personnel (some MMTC clients, some not) in these sectors participate on one of five panels. Each panelist receives and completes a 12-page questionnaire covering:

- estimating and quoting
- scheduling, order entry, inventory management
- design and engineering
- manufacturing floor/production area
- quality
- organization, workforce teams, training

These questionnaires are scored by MMTC researchers and distributions are established. A client firm is subsequently scored and compared to these distributions. The client receives a 50-page customized report consisting of a series of tables that present each question, describe the problem(s) that a low score might indicate, and compare the client firm’s score to the distribution. The MMTC has used its Evaluation and Benchmarking Program to reconfirm or redirect project content, influence field staff hirings, and develop strategies for improving the modernization of the select sectors.

Strengths

1. Manufacturing benchmarking allows an assessor to pinpoint those operating areas in need of assistance.
2. Benchmarking suggests a potential client’s readiness for certain services by demonstrating that client’s level of sophistication relative to other manufacturers in the industry sector.

Weaknesses

1. Benchmarking is a costly and complex activity.
2. Best practices may vary depending on the client’s industry sector and position in the customer chain. For example, if the client is the packager of the

product, best practice regarding order scheduling is fewer days than if the client is the original equipment manufacturer.

3. Views on best practice continually evolve. Changing global business conditions and the emergence of new ideas may make current notions of best practice outdated.

SAMPLE METHODOLOGY:

1. Luria, Daniel, and Edie Wiarda. "Metrics for Evaluating the Impact of Industrial Modernization Programs on Their Customers." Paper presented at "Workshop on the Evaluation of Industrial Modernization Programs: Developing Best Practices," Atlanta. September 1-3, 1993.

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**For More
Information**

APPROACH 12. MARKET ANALYSIS

Market analysis identifies high-growth markets for firms selling to customers in declining industries. It matches firm characteristics (core technologies, equipment and employee skills, for example) with those same characteristics for industries in high-growth market niches or segments. In addition to estimated growth rate, factors such as the size of the market and its competitive environment are considered in highlighting prospective markets.

Traditional market analyses are data-intensive. They include reviews of government and trade publications about particular industries, database searches for information about competitors in these industries, and surveys of existing customers, existing suppliers and prospective customers. Recently, less data-intensive market analysis methodologies have been developed.

Market analysis helps in matching program services with client needs by indicating new market requirements for products and processes. Market analysis can be combined with on-site assistance to implement the product, process and sales changes needed to serve new high-growth civilian markets. Findings from this approach are an important information source for groups involved in conversion activities—individual firms, economic development agencies, community groups, unions and trade associations.

MMTC developed a model to automate the data-gathering aspects of market analysis. **MARKET SCOUT** selects “hot” growth industries based on similar employee skills and equipment. The model can be used in two ways: (1) finding new markets for a current product or (2) finding new products using current machinery and human resources.

Client firms complete two questionnaires—one about equipment, the other about employee occupational levels. The client’s distribution of equipment and skills is then matched against the database of relevant four-digit SICs. For equipment, for example, the process involves analyzing the sum of differences between the client’s equipment capabilities and the database to match markets with similar equipment attributes. The Market Scout database combines information from several sources—the Census Bureau’s *Annual Survey of Manufacturers*; occupational distributions from the Department of Labor; *American Machinist* magazine’s inventory of equipment, published in 1982 and 1989—to create a time series from 1972 to 1991 that is constantly updated. Other MMTC market-

Description

Use

Case Example

ing products include customized market analyses and “How to Sell to . . .” industry-specific reports.

MMTC has used Market Scout to help suppliers in the metalworking and machine tools industries diversify their markets in the face of cutbacks in the automotive industry. For example, Market Scout offered a product suggestion to apply to the civilian aerospace industry in a report presented to an automotive supplier. The supplier changed its tolerances, fabricated the new part and used its automotive contacts to locate a civilian aerospace customer across the country. Market Scout is currently being used in a pilot project in Indiana to assist conversion efforts of defense-dependent firms.

Strengths

1. The external, future-oriented perspective of market analysis enables a firm to think beyond its current internal operations.
2. Market analysis data serve as a “reality check” for managers’ perceptions of a firm’s market and future.

Weaknesses

1. Market shifts and growth can be difficult to predict accurately.
2. Data sources used in market analysis may be outdated or proprietary (and therefore unavailable).
3. Market analysis—since it does not typically account for certain factors, such as company financial condition—may lead to oversimplifications.

For More Information

SAMPLE METHODOLOGY:

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APPROACH 13. RECOMMENDATION RISK ANALYSIS

Firm-level assessments, particularly companywide assessments, can produce long lists of recommendations that may seem overwhelming. Assessors typically list observations and recommendations by section to ensure completeness. They might check for cross-sectional relationships or agreement among assessment team members to narrow the number of recommendations.

The purpose of recommendation analysis is: (1) to prioritize and/or reduce the number of recommendations and (2) to account to the client firm about the risk in implementing the recommendations.

There are several means by which recommendations can be prioritized/reduced; these include ranking by:

- financial impact (for example, cost reduction, productivity improvement)
- likelihood of taking action
- ability of the program to provide assistance at no or low cost
- relevance to the firm's strategic direction in the context of the competitive environment
- degree of financial, technical and organizational risk (does the perception of risk exceed the perception of value?)

Recommendation risk analysis is a resource allocation tool. It matches certain service offerings, field staff and/or referral resources to client firms based on prioritization of recommendations.

CAMP/GLMTC

The Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center, conducts cost, benefit and risk analyses of recommendations as part of its **SERVICES TO IMPROVE YOUR TECHNICAL EDGE (SITE)** assessment. Examples of these analyses are summarized in the following:

- total output divided by the sum of prevention cost and failure cost

Description

Use

Case Examples

- cash flow analysis comparing the cost of maintaining conventional production equipment against the cost of purchasing new equipment
- return on investment (ROI), yearly savings divided by total investment, and payback period calculations, total investment minus yearly savings calculated over time
- net present value comparing the return on capital investment to putting the money in an account earning interest

Assessors emphasize those recommendations that yield the highest rate of return.

MMTC

MMTC takes a participatory approach to prioritizing recommendations in its **MANUFACTURING ASSESSMENT METHODOLOGY**. The assessor presents the client management group with pairs of company goals and asks group members to rank each goal in the pair according to firm priorities. The assessment team then focuses on detailed recommendations that will contribute most to the highest priority goals. The idea is that management is more apt to implement recommendations that: (1) are tied to company priorities and (2) they had a role in selecting.

BMT

The **INDIANA BUSINESS MODERNIZATION AND TECHNOLOGY CORPORATION'S BUSINESS MODERNIZATION TOOLS** helps prioritize recommendations by areas having the greatest impact on improving financial indicators. For example, if the cost of goods sold is significantly lower than the industry standard, recommendations would emphasize specific improvements in manufacturing methods or processes to lower costs. The analysis can be repeated at a later date to see if the cost of goods sold had improved as a result of implementing the recommended action items.

Strengths

Prioritized recommendations encapsulate company problem areas, actions needed to improve them and expected payoff.

Weaknesses

Even prioritized lists of recommendations may seem overwhelming. Therefore, assessors should include some short-term “quick-fix” recommendations among

the more long-term items on the list. Short-term recommendations producing tangible results at little risk are important in demonstrating the value of the assessment to the client and in garnering acceptance for longer term issues.

ABOUT THE CASE EXAMPLES:

**For More
Information**

1. Tabac and Associates. *GLMTC SITE Assessment Procedures Manual*. Cleveland: Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center. December 1990.

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2. Midwest Manufacturing Technology Center. *Manufacturing Assessment Methodology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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3. Indiana Business Modernization and Technology Corporation. *Business Modernization Tools*. Indianapolis. 1994.

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APPROACH 14. FIRM-LEVEL ASSESSMENT REPORTING

Firm-level assessment reporting conveys problems, recommended solutions, and approaches for implementing these solutions. Reporting may be handled through management debriefing, oral presentations or written final reports.

Description

MANAGEMENT DEBRIEFINGS

Management debriefing usually occurs after on-site review and analysis of observations. The assessment team relates information to the client about the next steps in the process, initial observations and preliminary recommendations. For short, informal, problem-specific assessments, this debriefing may be the assessment's final deliverable of the assessment. For formal, comprehensive assessments, the management debriefing may be used to give the client information that can be used or applied immediately in the interim before final report delivery. Debriefings also allow the assessor to test client reactions to sensitive recommendations.

ORAL PRESENTATIONS

Final reporting may range from informal presentations to comprehensive, standardized documents. In some cases, oral presentations are the most appropriate format. Companies sensitive about confidentiality issues and those unlikely to read a formal written report are good candidates for oral reports. Almost all assessments, however, have an oral presentation component to them; in this presentation, the assessment team explains recommendations in plain language so that clients can understand them. For some clients, it is appropriate to sit down with a few managers and go over the findings and recommendations in a draft report. Other clients need to inform a wider audience; for these presentations, audiovisuals and supporting handouts are useful.

WRITTEN REPORTS

A formal final report for a companywide assessment might include the following sections:

- executive summary of recommendations
- brief description of the program and assessment approach

- description of company’s current operating environment
- observations and recommendations
- action and prioritized implementation plan
- appendices of supporting information (for example, financial analysis, process flow, statistical tables, graphic sketches or layouts)

A final report for a functional assessment might also include sections on

- value-added versus cost-added operations
- reduction of costs and waste
- production bottlenecks
- lead time reduction
- production methods and technology considerations
- recommendations for short- and long-term operations improvements

Observations and recommendations should be listed in an order that will build a case for change—for example, from highest to lowest priority—rather than according to any initial assessment tool or boilerplate.

Some programs feel consistency is an important feature of their final reports; these programs want each client to feel it is receiving the same quality product. Note, however, that although a program may wish to provide equivalent services to all firms, comprehensive final reports may not be warranted in some cases.

Confidentiality is another issue to be considered in preparing written reports. Some clients prefer not to have their names appear in formal reports, but rather use a code name or number. For these clients, the assessment team might wish to prepare a draft or outline to ensure that all information proposed is appropriate to appear in the final report.

Use

Assessment reporting is part of a manufacturing assistance program’s service delivery activities. Reporting is used to communicate follow-on projects, thereby serving a resource allocation function.

Strengths

Final reports let program staff communicate company needs, solutions and follow-on projects.

Final reporting can sometimes hold up timely completion of an assessment.

Weaknesses

SAMPLE METHODOLOGIES:

**For More
Information**

1. Midwest Manufacturing Technology Center. *Manufacturing Assessment Methodology: MAM Toolkit*. Ann Arbor: Industrial Technology Center, 1992.

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FIRM-LEVEL NEEDS ASSESSMENTS FOR DEFENSE CONVERSION

To date, few programs have allocated significant resources to identifying the special needs of defense-dependent firms. Defense conversion thus provides a good case study on how needs assessments might be conducted for a targeted industry group. At the strategic level, the primary need is to diversify products or make a transition to or enter commercial markets. This need involves all business facets, including marketing and sales, product development, production management and quality.

Defense conversion assessments are likely to be companywide ones because they require a refocusing of business strategies. Also, these assessments are likely to focus on particular problems common to defense-dependent firms moving to commercial markets—for example, marketing and sales, cost and time-to-market.

The Long Island Defense Initiative has developed a Defense Diversification Methodology for conducting needs assessments. This methodology consists of the following five stages:

- I: **ORGANIZATION.** Establish a defense conversion team and leader within the client firm.
- II: **EXTERNAL ANALYSIS.** Perform analysis of target commercial markets.
- III: **STRATEGY DEVELOPMENT.** Via interactive process, turn market requirements into a strategic business plan.
- IV: **TACTICAL PLANNING.** Establish plans for activities, organizational roles, budgets and evaluation measures to enter commercial markets.
- V: **IMPLEMENTATION.** Establish reward and evaluation systems to monitor progress.

Other programs use a similar approach to that employed in private-sector firm-level needs assessments. The emphasis of the approach may be modified to address problems common to defense-dependent firms.

Initial contact may be made through traditional channels. To focus specifically on defense firms, however, a program might work closely with the local Government Procurement Assistance Center. Networking with large defense prime contractors might provide leads as well.

**Outreach and
Pre-Assessment**

Because defense conversion requires such a major refocusing, it may be helpful to prequalify firms based on several key characteristics. For example, to ensure that candidates were qualified for assistance, the Long Island Defense Initiative compiled a list of defense contractors from several sources and invited them to a conference. Those interested in participating were asked to complete a 100-question screening form. The form provided:

- background information such as company characteristics, percentage of sales to the Department of Defense and long-range goals and objectives
- market information describing markets served, market share, competitor attributes and opportunities for diversification
- executive profiles including prior work and educational experience, particularly in nondefense areas
- financial position of the company

Personal interviews further narrowed the field. The interviews focused on products and services, organization, production, and suppliers and customers. Final selection criteria included the following:

- consistency of corporate vision
- sales and marketing
- promoting a climate for change
- capital performance
- time-to-market urgency
- design-to-cost importance

The PRISSM program, piloted under MMTC's direction, distinguished "marathoner" firms from "jogger" firms. The program characterized marathoner firms as those ready for companywide assessments; jogger firms needed to take smaller steps, via problem-oriented or functional assessments. Marathoners have:

- a committed management team
- well-defined and developed core capabilities
- state-of-the-practice machine technologies

- effective organizational structures
- an executable business plan
- an openness to change

On-site information-gathering may focus on particular areas in a defense-conversion assessment. These areas include the following:

- **ORGANIZATIONAL STRUCTURE AND PLANNING**—including management skills and experience in commercial markets
- **QUALITY**—including the difference between private sector standards and defense-industry standards; understanding of generally accepted quality assurance standards in the private sector; and quality-versus-cost considerations
- **ESTIMATING AND QUOTING**—including amount of overhead needed to handle the smaller amount of paperwork in private sector; understanding of cost of manufacturing the product; inclusion of factors such as competitive pricing and value-to-customer; production; time issues such as order backlogs, short lead times and make-to-order contracts; cost considerations such as materials used; integration of defense and nondefense work (integrated production lines); flexible manufacturing processes; relationships with suppliers
- **ENGINEERING AND DESIGN**—including innovation; customer acceptance; short product life cycles; time-to-market; cost-of-design; marketing and sales; market analysis; competitive positioning; market implications for pricing, quality, production, engineering and design; distribution channel structure; sales force experience in commercial markets; international marketing and sales

**Plant Tours,
Interviews, and
Data Collection**

ANALYSIS

Most standard functional or companywide assessment tools can be used in defense conversion assessments. One important tool is market analysis; this identifies the commercial industries to which a defense-dependent firm can make a transition. Two market analysis approaches follow:

1. **CUSTOMIZED DATA GATHERING AND ANALYSIS.** This approach identifies the client's core technologies and matches them to commercial market niches or segments based on the size of the market, its prospects for growth and the competitive environment within these niches or segments. The process includes:

**Analysis and
Reporting**

- management interviews to identify core technologies
- database searches by industry and reviews of government and trade publications
- surveys of existing customers, existing suppliers and prospective customers
- analysis of the competition
- assessment of internal strengths and weaknesses

The Long Island Defense Initiative established its Core Technology/Market Mapping methodology to conduct a market analysis. It consisted of working sessions in which participants were led to consider several facets of their firm’s operations, including core technologies, current applications, potential commercial applications, potential markets and rationales for pursuing these markets.

These sessions involved discussions of product/market combinations, participant investigations of market prospects, and prioritization and selection of one or two markets to pursue based on a suitable rationale.

2. **MARKETING MODELS.** Marketing models automate the data-gathering aspects of a market analysis. MMTC’s Market Scout is currently being piloted; this model selects “hot” growth industries based on similar employee skills and equipment.

Reporting

Because defense conversion assessments involve a redirection of the client’s strategic focus, reporting typically includes an aspect of direct client participation. The client should fully “buy into” the recommendations. The assessor may lead or participate in a strategic planning process in which a new corporate vision is articulated for the client and companywide strategies are developed to incorporate new market directions.

For More Information

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The project team based the two volumes of this *Needs Assessment Guide* primarily on results from a survey of manufacturing assistance programs in the United States. We interviewed representatives from more than a dozen programs by phone. Additionally, we made site visits to four programs; the programs we selected varied by age, sponsorship (federal versus state) and the degree of formality of their assessment approach. These site visits were critical in obtaining a broad variety of perspectives on the assessment process. During the visits, we interviewed a number of program staff (including information specialists, researchers, field agents and engineers); reviewed various materials (for example, population-level reports, assessment guides and tools, and final reports); and observed actual assessments conducted at one or more plants.

The following programs participated in the survey; site visits were conducted at those indicated with an asterisk.

- California Manufacturing Technology Center
- University of California, Manufacturing Extension Program
- Georgia Institute of Technology, Economic Development Institute*
- Illinois Institute of Technology, Manufacturing Productivity Center
- Indiana Business Modernization and Technology Corporation*
- Mid-America Manufacturing Technology Center (Kansas)
- Massachusetts State Department of Commerce
- Industrial Technology Institute, Midwest Manufacturing Technology Center (Michigan)
- Science and Technology Foundation, Northeastern Manufacturing Technology Center (New York)
- Industrial Extension Service, North Carolina State University
- Cleveland Advanced Manufacturing Program, Great Lakes Manufacturing Technology Center (Ohio)*

- Industrial Resource Centers (Manufacturing Resource Center, Southwestern Pennsylvania Industrial Resource Center)

- Industrial Extension Service (West Virginia)*

APPENDIX B. REFERENCES AND RESOURCES

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THE COMMUNITY STRATEGIES GROUP (CSG)

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Originally established at The Aspen Institute in 1985 as the Rural Economic Policy Program, and renamed Community Strategies Group in 2000, CSG strives to have a positive impact on communities by -designing, facilitating and participating in ongoing peer-learning and networking opportunities that enhance the efforts of organizations and practitioners working to achieve more widely shared and lasting prosperity in communities, and that sustain the impact of funders' investment in them. CSG's core business focuses on the fields of community and economic development, civic capacity, family and regional livelihood, and community-based philanthropy. CSG also designs and convenes occasional one-time gatherings of foundation or community practitioners working on issues critical to the collective learning of a larger field. In addition, CSG analyzes and packages guiding lessons and strategies from its various learning initiatives.

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For more information about CSG, please contact us at the following address or visit our website.

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To obtain a complete list of CSG publications and place an on-line order, please visit the Aspen Institute website at www.aspeninstitute.org. Search for Community Strategies Group Publications. You may also contact CSG Program Associate Kelly Malone at 202-736-5804 or kelly.malone@aspeninst.org.



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