

Commercialization Needs of Small Business Innovation Research Firms



U.S. Small Business Innovation Research Program

**COMMERCIALIZATION NEEDS
OF SMALL BUSINESS INNOVATION
RESEARCH FIRMS**

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FOREWORD

Innovation Associates conducted the national SBIR survey to help program administrators, policy makers, and others who provide assistance and financing to SBIR firms better understand the needs of small technology firms. The survey findings show that most SBIR firms need business, technical, and financial services, and believe these services are very important to develop and commercialize SBIR results. The survey findings suggest that SBIR policy and program initiatives that assist SBIR firms in marketing, corporate partnering, commercialization planning, patenting and licensing, and other business and technical areas are important in promoting SBIR commercialization. Moreover, survey findings suggest that some financial support and assistance in obtaining private investment for SBIR commercialization, particularly for very small firms, may help promote SBIR results.

The SBIR survey is part of Innovation Associates' efforts to improve technology-based economic development through information, technical assistance, and program services. IA offers services to communities, states, universities and the private sector. IA's current SBIR efforts focus on improving identification of and access to services for small technology firms, and other activities aimed at helping firms achieve commercialization goals. A major initiative underway is IA's on-line Technology Business Resource Service TM which helps small firms identify and access service providers at federal, state, and local levels.

We invite interested parties to visit our web site at www.InnovationAssoc.com and contact us at IA@InnovationAssoc.com or 703.925.9402 for more information.

Diane L. Palminteria
President

A NOTE ABOUT COLLECTION OF NATIONAL SBIR DATA

There is surprisingly little consistent data available at the federal level on many important SBIR factors such as firms size, type of effort, and sales. Some of these data are collected by individual agencies, by GAO through periodic studies, or by contractors through ad hoc contracts. Although confidentiality is always a consideration, data collected on a voluntary, but systematic basis by all participating SBIR agencies is essential for policy makers and program administrators to understand the types of firms participating in the program, outcomes, and factors affecting outcomes.

We believe that firms are anxious to communicate their commercialization needs to sponsoring agencies. This is supported by a 24 percent response rate to Innovation Associates' survey. We received many comments from SBIR firms such as "this was the first time anyone bothered to ask us about our needs." We urge agencies to include voluntary questions in their SBIR data collection efforts about firms' business, technical, and financial assistance needs, ability to access services, constraints to accessing services, and importance of specific services. We believe that, if asked, firms will provide valuable input that help agencies shape future program guidelines and commercialization assistance.

ACKNOWLEDGMENT

Innovation Associates wishes to thank the Cooperative State Research, Education, and Extension Services, U.S. Department of Agriculture for sponsoring the national survey of SBIR firms. We appreciate the assistance and support of Dr. Charles Cleland, Director and Ms. Ruth Lang, Assistant Director of USDA's SBIR Program.

The Office of Technology, U.S. Small Business Administration (SBA) supplied contact information and national statistics that facilitated survey administration and analysis. Mr. Maurice Swinton, Director of Innovation and Technology, was particularly helpful in providing information and, in some cases, generating special data on SBIR firms for this report. Mr. Ron Cooper, technology policy analyst in SBA's Office of Technology, Drs. Bruce Hamilton and Kesh Narayanan of the National Science Foundation's Industrial Innovation Program, Mr. Vinny Schaper of the U.S. Department of Navy's SBIR Program, Dr. Robert Berger and Ms. Arlene De Blanc of the U.S. Department of Energy's SBIR Program, and professionals from other SBIR programs provided comments on the report and some provided input on survey design. More recently, Mr. Ivory Fisher, SBIR Director, U.S. Department of Defense has provided suggestions and encouragement for services based on survey findings.

We most appreciate the CEO's and representatives from over 600 firms who took the time to complete IA's survey. Many of these representatives offered insightful comments and suggestions, some of which were incorporated in IA's recommendations.

COMMERCIALIZATION NEEDS OF SMALL BUSINESS INNOVATION RESEARCH FIRMS

EXECUTIVE SUMMARY

OVERVIEW

Innovation Associates, Inc., under a Small Business Innovation Research (SBIR) grant, designed, administered, and analyzed results of a national survey sent to all firms awarded SBIR Phase II grants/contracts (FY 94-97) from all participating agencies. IA conducted the survey to assess business, technical, and financial needs of SBIR Phase II firms and services used by the firms to meet their needs. Of particular interest were firms potentially disadvantaged because of remote locations, small size, or minority ownership. The survey findings were intended to lay the foundation to help SBIR firms: (a) identify and understand their commercialization needs, (b) locate service providers, and (c) expediently access services. In response to findings, IA's current efforts focus on improving technology firms' access to resources and meeting commercialization goals. Efforts already underway include the Technology Business Resource Service (TBRS), a Web-based system to target and match the needs of small technology firms with federal, state, and local service providers.

Twenty-four percent of firms, or 615 firms representing 1,408 awards, completed the survey. The majority of respondent firms employed 15 or fewer people, and about one-third of respondent firms employed five or fewer people. Almost half of all respondent firms had received awards from the U.S. Department of Defense and more than one-fourth had received awards from the National Institutes of Health. Based on distribution by year, agency, and minority status, respondent firms appeared to be similar to that of most SBIR Phase II firms (FY 94-97).¹

HIGHLIGHT OF SURVEY FINDINGS

Need for Business, Management, and Technical Assistance

- Sixty-three percent of firms said they needed business, management, and/or technical assistance to develop or produce SBIR-related products, processes, and services.

¹Data on the distribution of all SBIR Phase II firms and awards by agency, fiscal year, and minority status were provided by the Office of Technology, U.S. Small Business Administration.

- More than one-third of firms that needed assistance could not obtain all the assistance they needed. This was true more often for very small firms.
- The greatest portion of firms that said they needed assistance with (in descending order): (a) patenting and licensing, (b) partnering with other firms, (c) commercialization planning, and (d) market assessments.

Sources and Importance of Assistance

- Almost three-fourths of firms that met their needs in one or more areas did so by hiring a consultant. More than one-fourth of firms also received assistance from universities and community colleges.
- Of the firms that received assistance, 88 percent believed that this assistance had helped or was likely to help them "produce and sell SBIR-related products, processes, and services or shorten the time needed."
- Of the firms that received assistance, the greatest portion reported that: (a) patenting and licensing, (b) partnering with other firms, and (c) R&D-related technical assistance were "very important" in helping them commercialize SBIR results.

Need for Capital to Develop and Commercialize SBIR Results

- More than half of firms that tried to obtain capital to help them develop, produce, and sell SBIR products, processes, and services had not succeeded.
- Firms that reported selling SBIR-related products, processes, and services were more likely to have obtained all the capital they sought.
- Very small firms of five or fewer employees were more likely to need capital than larger firms and, when they sought capital, were less likely to obtain it. Minority-owned firms also were more likely to need capital and less likely to obtain it.

Sources of Financing

- The firm's owner was the greatest source of financing for SBIR development and commercialization. Firms that received SBIR Phase II awards in FY 97, reported that venture capitalists and angels were the second greatest source of financing.
- Very small, woman-owned, and minority-owned firms were less likely than other firms to obtain financing from banks and financial institutions, and venture capitalists and angels.

CONCLUSIONS AND RECOMMENDATIONS

IA's survey findings show that many SBIR firms have multiple business, technical, and financial needs, and some of these needs are not being met. This is more often true for very small firms, and woman- and minority-owned firms. Whether SBIR firms have access to business and technical services such as patenting and licensing, marketing, and corporate partnering may affect the firms' ability to commercialize results. Almost all firms that report selling SBIR results said that business and technical assistance were very important in helping them develop and sell these results. Very small firms operate at a disadvantage; they are more likely than larger firms to need most types of assistance, and less likely to receive it. Very small and minority-owned firms also find it more difficult to obtain private financing, particularly angel and venture capital, to commercialize SBIR results. The following recommendations stem from these and other IA's findings. Many recommendations incorporate direct input from SBIR firms.

- 1) **Implement systems to identify and link service providers to meet SBIR firms' needs.** IA's survey showed that SBIR firms need services in many business and technical areas. Thousands of service providers are available to help small technology firms nationwide, and yet these firms often find it difficult to locate and access service providers. Firms must be able to identify specific needs, expediently locate and target service providers to meet specific needs, and easily access those providers.
- 2) **Help very small firms and minority-owned firms obtain financing from private sources.** The IA study showed that very small firms and minority-owned firms less often obtain financing when they seek it than larger firms and non-minority-owned firms. Very small, minority-owned, and woman-owned firms need greater assistance to obtain financing, particularly from venture capitalists and angels, which are becoming an increasingly important source of financing for SBIR commercialization.
- 3) **Provide additional assistance in marketing, commercialization planning, and patenting and licensing to SBIR firms.** Firms consistently reported that they needed assistance with marketing, commercialization planning, and patenting and licensing, and that these services were very important in helping them develop and commercialize SBIR results. Future services to SBIR firms by agencies and organizations should focus on these key areas.
- 4) **Establish a corporate partnering system.** Firms also consistently rated corporate partnering as one of the top three services they considered "very important" in helping them commercialize SBIR results. SBIR Phase II firms, particularly very small firms, need assistance with identifying potential partners and help in developing agreements.

- 5) **Implement a system of SBIR mentors.** A number of firms suggested that a mentoring system would help them. Through the Federal and State Technology Partnership program (FAST), some states are implementing mentoring programs. Any mentoring system should match commercially successful SBIR firms with new firms, and provide help in multiple areas. These areas include preparing Phase II proposals, marketing, corporate partnering, and seeking private investment.
- 6) **Help SBIR firms identify potential end-users of SBIR results, including federal and state government procurement opportunities.** Many firms said they wanted more assistance from government and other sources to help them identify potential buyers of SBIR results. Identifying purchasers of SBIR products, processes, and services, along with other marketing services, could give SBIR firms an important boost in a traditional area of weakness. DOD recently has taken a lead in this area, and other agencies should follow their example.
- 7) **Agencies should make use of provisions that allow funding for technical assistance.** Agencies are permitted to use \$4,000 per firm of SBIR funds for technical assistance, and yet few agencies have taken advantage of this provision. IA's findings suggest that more agencies should make use of these funds to provide services to SBIR firms. Policy makers also might consider ways to allow more flexibility in the use of SBIR Phase II funds for market assessments and other "pre-commercialization" activities.
- 8) **Implement SBIR Phase III.** Numerous firms reported that some government funding for Phase III was important in promoting commercialization of SBIR results. Moreover, survey findings showed that it was difficult for very small technology firms to attract private investment at early stages of development. Some funding of a Phase III program, particularly for very small firms, may increase their chances of commercializing SBIR results by filling a gap in private investment and providing "seed money" to leverage additional private investment.
- 9) **Collect better and more consistent national data on SBIR firms.** As part of the survey analysis, IA attempted to retrieve data on firm size and other characteristics for all SBIR firms, and found that data were not available from all agencies. Better data collection across all participating agencies is needed to identify SBIR program issues and gaps. Data collection on firm size, minority status, type of effort, and SBIR sales should be minimum specifications. Any new data collection mechanisms also should include routine inquiries about firms' needs, access to services, and an opportunity for firms to identify program weaknesses and provide suggestions.

COMMERCIALIZATION NEEDS OF SMALL BUSINESS INNOVATION RESEARCH FIRMS

I. INTRODUCTION AND METHODOLOGY

INTRODUCTION

Innovation Associates, Inc. (IA), under a U.S. Department of Agriculture Small Business Innovation Research (SBIR) Phase I grant, designed, administered, and analyzed results of a national survey sent to all firms awarded SBIR Phase II grants/contracts between FY 94 and FY 97. IA conducted the survey to assess business, management, technical, and financial needs of SBIR Phase II firms and resources used by the firms to meet their needs. Of particular interest were firms potentially disadvantaged because of remote locations, small size, or minority ownership that might limit their access to resources.

The survey findings were intended to lay the foundation for developing systems to help SBIR firms: (a) identify and understand their needs, (b) locate existing resources, and (c) access and utilize the resources in the most effective manner. IA's current efforts focus on improving access to resources for small technology firms and achieving commercialization goals. One major effort involves implementing Web-based systems to help SBIR firms identify and access service providers.

METHODOLOGY

Survey Sample and Administration

Innovation Associates sent surveys by mail to a total of 2,575 firms. The mailing covered all firms that received SBIR Phase II awards from FY 94 to (and including) FY 97 from all agencies participating in the SBIR program. The agencies were:

- Department of Agriculture (DOAG),
- Department of Commerce (DOC),
- Department of Defense (DOD),
- Department of Education (DOED),
- Department of Energy (DOE),
- Department of Health and Human Services (HHS),
- Department of Transportation (DOT),
- Environmental Protection Agency (EPA),
- National Aeronautics and Space Agency (NASA),

- National Research Council (NRC), and
- National Science Foundation (NSF).

Three rounds of surveys were sent in 1998 and 1999 and surveys were returned from March 1998 to October 1999. In the first round, surveys were sent to all SBIR Phase II firms, and in subsequent rounds were sent to firms that had not returned surveys from previous rounds. The Office of Technology, U.S. Small Business Administration supplied lists of SBIR Phase II firms and contact information. For all surveys that were returned because of defunct addresses, IA attempted to locate the firms and re-send surveys.

Six hundred fifteen firms, or 24 percent of all SBIR Phase II firms (FY 94-97) returned surveys. The 615 firms represent 1,408 awards, with about one-third of respondent firms having multiple awards.² IA compared the sample of SBIR Phase II firms; that is, those firms that returned surveys, with the universe of SBIR Phase II firms on: (a) portion of firms by year, (b) portion of firms sponsored by individual agencies, and (c) portion of minority- and woman-owned firms. We attempted, but were unable, to compare the survey sample with the universe on other factors such as firm size and revenue because the data for the universe of firms was not available from all agencies.

Based on data that was available, the sample appeared to be similar to that of the universe of SBIR Phase II firms that received awards from FY 94-97, with a few exceptions. The sample was more heavily represented by firms that received SBIR Phase II awards in FY 96-97 than firms that received Phase II awards in earlier years. (See Table 1.) The sample distribution by agency sponsor was similar to that of the universe, except slightly less representative of DOD and DOED firms and more representative of DOE firms. (See Table 2.) The sample of firms was similar to that of the universe for woman-owned and "other" firms, but somewhat less representative of minority-owned firms. (See Table 3.) In addition, we assume that respondent firms were generally more motivated than other SBIR firms and therefore more likely to have: (a) recognized assistance needs, (b) located sources to meet needs, and (c) succeeded in commercializing products, processes, and services than the universe of SBIR Phase II firms.

Survey Design and Analysis

IA designed the survey to: (a) provide a profile of respondent firms, (b) identify business, management, technical, and financial needs, (c) identify resources used by firms to meet needs, (d) indicate the importance and potential impact of assistance, and (e) solicit suggestions from firms regarding their needs and services they find most useful.

The survey included a set of questions that were used to develop a profile of respondent

²Data on the total number of SBIR firms and awards by fiscal year, agency, and minority status was supplied by the Office of Technology, U.S. Small Business Administration.

firms: (a) number of employees, (b) annual sales during the last full fiscal year, (c) primary and secondary products, processes, or services, (d) technology category of the SBIR Phase II award(s), (e) portion of time and expense devoted to research and development (R&D), production, and services, and (f) whether the firm was owned (51 percent or more) by a minority, woman, and/or disabled person. (We did not include a disabled person category in our analysis because there were too few respondent firms in that category.)

IA asked firms about the status of their award(s) at the time of the survey, and about the result of the SBIR award; that is, if they "had sold products, processes, and services as a result of the SBIR Phase II award." If the firm had not sold SBIR-related products, processes, and services, they were asked how likely it was they would make future sales. Firms that reported it was "highly likely" or "likely" they would make future sales were asked about how much time it would take to make the sales, and whether they had "in place or pending" the financial capacity or commitments to produce and sell their SBIR-related products, processes, and services.

Most survey questions were designed to provide information on the firms' needs. IA asked firms if they had business, management, and/or technical assistance needs from the beginning of their SBIR grant/contract until the time of the survey and, if so, the types of needs. IA provided a list of 14 business, management, and technical assistance categories and firms were instructed to check all that was applicable. IA additionally provided an open-ended "other" category in which firms could write assistance needs not covered by categories. The categories provided were:

- (a) Business planning,
- (b) Commercialization planning,
- (c) Market assessments,
- (d) Technical (R&D-related),
- (e) Management,
- (f) Partnering with other firms,
- (g) Facilities and location assistance,
- (h) Meeting government, international, and regulatory standards,
- (i) Patenting and licensing,
- (j) Accounting and bookkeeping,
- (k) Legal,
- (l) Human resources,
- (m) Marketing, and
- (n) Exporting.

If firms reported that they needed assistance, they were asked if they had tried to meet those needs. Firms were given the options of: (a) have met the needs, (b) tried, but did not succeed, or only partially succeeded in meeting needs, and (c) have not tried. If firms said they had not tried to meet their needs or they had not fully succeeded, they were asked the reason(s). Firms were given categories and also the option to write answers in an open-ended "other" category.

IA asked firms that received assistance about the importance of the assistance in helping them produce and sell their SBIR-related products, processes, and services. Firms were given three response choices: (a) very important, (b) somewhat important, and (c) not important. Firms that had needs but had not received assistance also were asked how important they felt the assistance would have been in helping them produce and sell their SBIR-related products, processes, and services.

IA also asked firms about their financial needs. IA asked if firms had tried to obtain financing (in addition to their SBIR award) to help them develop, produce, and/or sell their SBIR-related products, processes, and services, and the result of their effort. If firms had succeeded in obtaining financing, they were asked: (a) source of the financing, (b) if they had received assistance in identifying or obtaining the financing, and (c) importance of the assistance. If firms had not tried to obtain additional financing, or if they had tried but had not fully succeeded, they were asked the reason(s).

Lastly, IA asked firms to comment on additional types of assistance not mentioned in the survey that would help them "develop, produce, and sell their SBIR-related products, processes, and services or shorten the time needed." Many firms used the open-ended question to reiterate and highlight previously noted needs and to offer a variety of suggestions aimed at improving the SBIR program.

Answers to all questions were analyzed by: (a) agency sponsor, (b) fiscal year of the SBIR Phase II award, (c) technology area of the SBIR Phase II award, (d) number of employees, (e) minority status, (f) if the firm reported selling products, processes, and services as a result of their SBIR Phase II award, and (g) if they had not made SBIR-related sales, the likelihood that they would make sales. Reported sales of SBIR-related products, processes, and services were further analyzed according to whether or not one or more SBIR Phase II award had been completed by the time of the survey. Some additional cross-tabulations were performed to show: (a) type of needs by sources of assistance, (b) source of assistance by success in meeting needs, and (c) reason(s) for not meeting needs by type of need.

IA analyzed data by firm rather than by award. Firms with multiple Phase II awards were instructed to combine answers on one survey. However, where we analyzed data by agency sponsor, a firm that received awards from more than one agency was represented once in each agency category from which it had received an award. In addition, where we analyzed data by fiscal year, a firm that had received awards in more than one fiscal year was represented once in each year for which it had received an award. For all other analysis in which agency or year was not a factor, each firm was represented only once regardless of multiple agency or year awards.

In order to promote a high response rate, we instructed firms not to answer any questions that they were uncomfortable with answering. Moreover, we assured them that the survey was completely voluntary, and that all surveys were strictly confidential. For most questions, the response rate was 98 percent or greater. All tables appear in the Appendix.

Note About Definitions and Interpretation of Data

Some terms were used throughout the report that require explanation. Minority status was divided into three categories: woman-owned, minority-owned, and "other" firms. "Other firms" represent firms that did not report being woman- or minority-owned. Woman- and minority-owned firms represent firms that were at least 51 percent owned, controlled, and operated by a woman- and/or minority. Minority status encompasses African-American, Indian/Alaska Native, Asian or Pacific Islander, and Hispanic people. The seven SBIR technology categories referenced throughout the report were those designated for the SBIR program by SBA's Office of Technology.

Reported "sales" represent responses to the survey question "have you sold products, processes or services as a result of the SBIR Phase II award(s)." Reported "sales" were not independently verified, and relied solely on the firms' answers to survey questions. "Likelihood of sales" represents responses to the survey question (if your firm has not sold SBIR results) "how likely is it that products, processes, or services that are the subject of the SBIR Phase II award will be sold?"

It is important for the reader to note that data that was stratified by sponsoring agency may be misleading, particularly for some questions, because of two factors. Firstly, there was a wide divergence in the total number of firms represented in individual agency categories, ranging from NRC's 5 firms to DOD's 278 firms. Secondly, there were few total answers to some questions (because of the nature of the question) which, when further stratified by 11 agency categories, made distinctions between those categories less meaningful. Data stratified by eight technology categories also may be misleading for the same reasons, particularly where subsets of questions resulted in few total responses. Nevertheless, we included these data not for comparison purposes but to provide more detail for interested government agencies. Where data is shown by agency or technology category, we encourage the reader to examine the table referenced in the text and to take into account the total number of responses.

II. FINDINGS AND ANALYSIS

BUSINESS, MANAGEMENT, AND TECHNICAL ASSISTANCE NEEDS

IA asked firms "from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?" **Sixty-three percent of all respondents, or 385 firms, said that their firm had needed business, management, and/or technical assistance to help develop and produce SBIR-related products, processes, and services.** (See Tables 4 and 5.) A greater portion of firms that received awards in FY 96-97 said they needed assistance than in earlier years. (See Table 6.)

The smaller the firm, the more likely it was to need assistance. Seventy-three percent of firms with five or fewer employees compared to 46 percent of firms with more than 50 employees reported that they needed assistance. (See Table 7 and Figure 1.) Slightly more minority-owned firms said that they needed assistance than women-owned firms and "other" firms. (See Table 8.)



We asked firms to report their assistance needs in 14 categories and also offered an "other category" in which firms could provide additional needs not covered. Firms reported that they needed assistance with (in descending order):

- (a) Patenting and licensing,
- (b) Partnering with other firms,
- (c) Commercialization planning,

- (d) Market assessments,
- (e) Marketing,
- (f) Legal,
- (g) Business planning,
- (h) Technical (R&D-related),
- (i) Accounting and bookkeeping,
- (j) Meeting government, international and/or regulatory standards,
- (k) Management,
- (l) Exporting,
- (m) Human resources, and
- (n) Facilities and location.

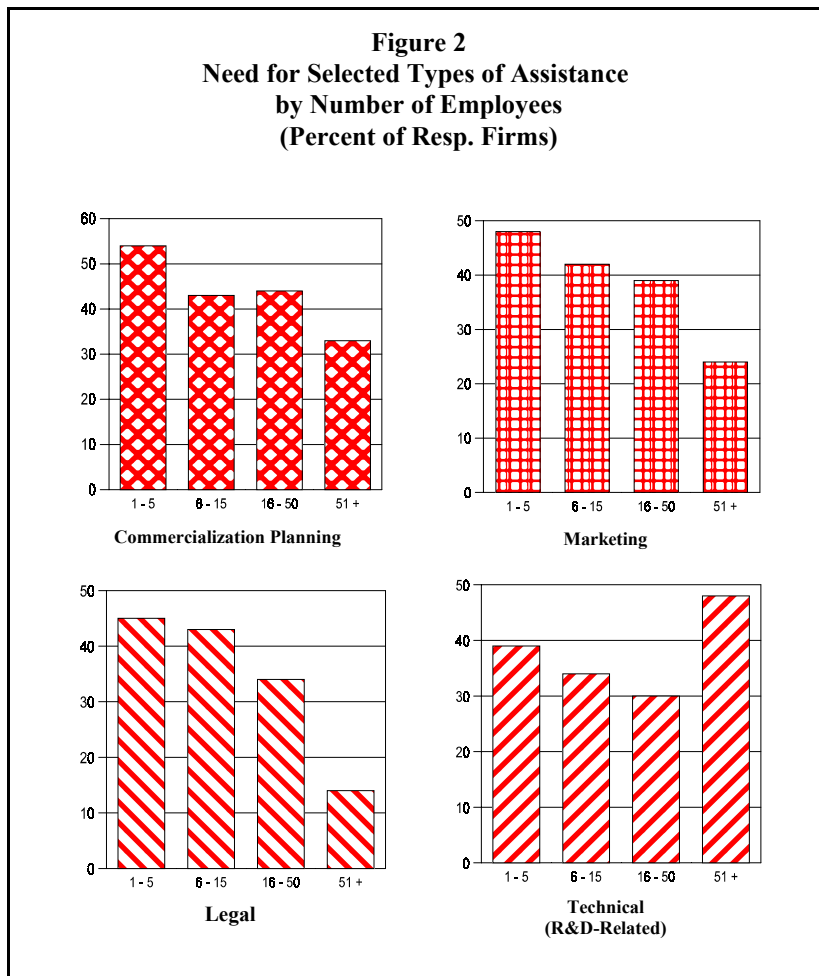
The top five types of assistance were cited by at least two-fifths of the firms that said they needed some type of assistance. (See Table 9.)

A greater than average portion of firms whose SBIR Phase II awards were sponsored by (in descending order): DOED, EPA, DOT, DOC, HHS, and DOAG reported that they needed assistance. The types of assistance needed by firms varied according to the agency that sponsored them. (See Table 9.) A significantly greater portion of firms than the average needed assistance with:

- DOD: Market assessments, marketing, and partnering with other firms.
- DOE: Business planing, commercialization planning, and market assessments.
- DOED: Accounting and bookkeeping, business planning, commercialization planning, legal, management, marketing, market assessments, meeting government, international and/or regulatory standards, patenting and licensing, and technical (R&D-related).
- EPA: Commercialization planning, market assessments, and marketing.
- HHS: Legal, and meeting government, international, and/or regulatory standards.

There were some significant differences in the types and levels of assistance needed by firms in different technology categories. For example, about half of the firms in energy conversion and use and environment and natural sciences said they needed assistance with business planning, while only about 30 percent of firms in computer/information processing said that they needed this type of assistance. Half or more of firms in environment and natural science, energy conservation and use, and electronics said they needed assistance with commercialization planning while less than one-third of firms in mechanical performance needed this assistance. And about half of energy conservation and use firms needed technical assistance related to R&D, but only one-fourth of computer and information processing firms said that they needed this type of assistance. (See Table 10.)

Not only did firms with fewer than 50 employees more often than larger firms need assistance, but smaller firms also needed different types of assistance. Only two types of assistance — technical (related to R&D) and human resources — were needed more by firms with more than 50 employees. A far greater portion of very small firms, those with five or fewer employees, compared to firms with more than 50 employees reported needing assistance with (in descending order): (a) accounting and bookkeeping, (b) legal, (c) marketing, and (d) commercialization planning. (See Table 11 and Figure 2.)



The types of assistance needed varied slightly according to the firm's minority status. Minority-owned firms more often than woman-owned firms or "other" firms reported that they needed help with commercialization planning and market assessments. "Other" firms more often needed assistance with accounting and bookkeeping, management, meeting government, international, and regulatory standards, and patenting and licensing. (See Table 12.)

MEETING FIRMS' NEEDS

Success in Meeting Business, Management, and Technical Needs

Of the 385 firms that said they needed business, management, and/or technical assistance, **over one-third of firms said that they had "tried, but did not succeed in meeting needs or only partially succeeded in meeting needs."** At the same time, most firms had met their needs in some areas. Firms that received awards in later years (FY 96-97) were more likely to have met their needs than those that received awards in earlier years (FY 94-95). Firms that were sponsored by DOED, DOC, EPA, DOE, DOD and NASA (in descending order) reported more than the average that they had "tried, but did not succeed in meeting needs, or only partially succeeded." (See Table 13.)

Smaller firms were much more likely than larger firms to have tried and not succeeded or only partially succeeded in meeting needs. Forty-five percent of firms with five or fewer employees compared to only 17 percent of firms with more than 50 employees reported that they tried but did not fully succeed in meeting needs. (See Table 14.) **Woman- and minority-owned firms also were more likely than other firms to have tried and not succeeded in meeting needs or only partially succeeded in meeting needs.**

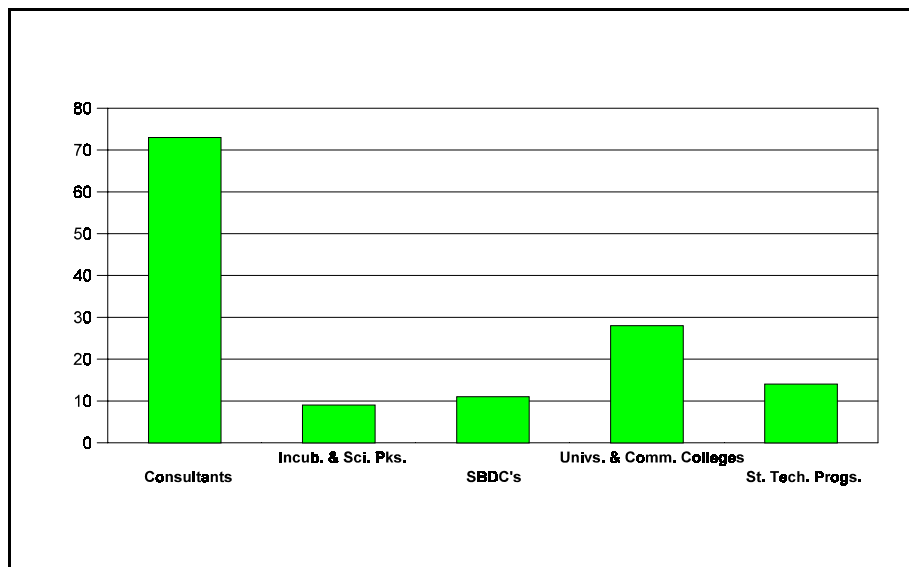
Reason for Not Meeting Needs

Of the 136 firms that needed assistance and reported that they "did not succeed or only partially succeeded in meeting (those) needs," half said that they found sources but could not afford them. Slightly less than one-fourth said that they could not find sources to provide the service(s). (See Table 15.) As expected, **firms with fewer than 50 employees were much more likely than larger firms to find sources and not be able to afford them.** About half or more firms with fewer than 50 employees compared to 29 percent of larger firms that needed assistance said they could not afford services. (See Table 16.) Minority-owned firms slightly more than woman-owned or "other" firms could not find sources of assistance. (See Table 17.)

Sources of Assistance

Of the 318 firms that met their needs in at least some areas, almost three-fourths met their needs by hiring a consultant. Twenty-eight percent of firms met one or more needs through a university or community college, 14 percent through a state technology program, 11 percent through a Small Business Development Center (SBDC), and 10 percent through a small business incubator or research park. (See Table 18 and Figure 3.) Firms that received awards in FY 97 were slightly more likely to use incubators and science parks and less likely to use state technology programs for assistance than firms that received awards in earlier years. (See Table 19.)

Figure 3
Source of Business, Management, and Technical Assistance
(Percent of Resp. Firms)



There were some major differences in the sources of assistance used by firms according to the agency that sponsored the firm. Firms sponsored by (in descending order): NRC, DOC, HHS, DOE, and DOT were more likely than firms sponsored by other agencies to hire a consultant. Firms sponsored by (in descending order): NRC, DOAG, DOT/EPA, DOE, and NASA were more likely than other firms to use the services of a university or community college. And firms sponsored by (in descending order): NRC, DOC, DOE/EPA, NSF, and DOAG were more likely to use the services of state technology programs (not including Agriculture Extension Services) than firms sponsored by other agencies. (See Table 20.) In addition, firms in energy conservation and use more often than other firms relied on consultants, universities and community colleges, and state technology programs. Firms in environment and natural sciences were much less likely than the average firm to hire consultants.

Minority-owned firms were slightly more likely to use the services of universities and community colleges for assistance than woman-owned or "other" firms, and woman- and minority-owned firms were slightly less likely to hire consultants than "other" firms. (See Table 21.) Firms with 15 or fewer employees used incubators and science parks, and Small Business Development Centers more than larger firms. (See Table 22.)

There did not appear to be a correlation between the source of assistance and whether the firm had reported selling products, processes, or services as a result of the SBIR award. (See Table 23.)

Perceived Importance of Assistance

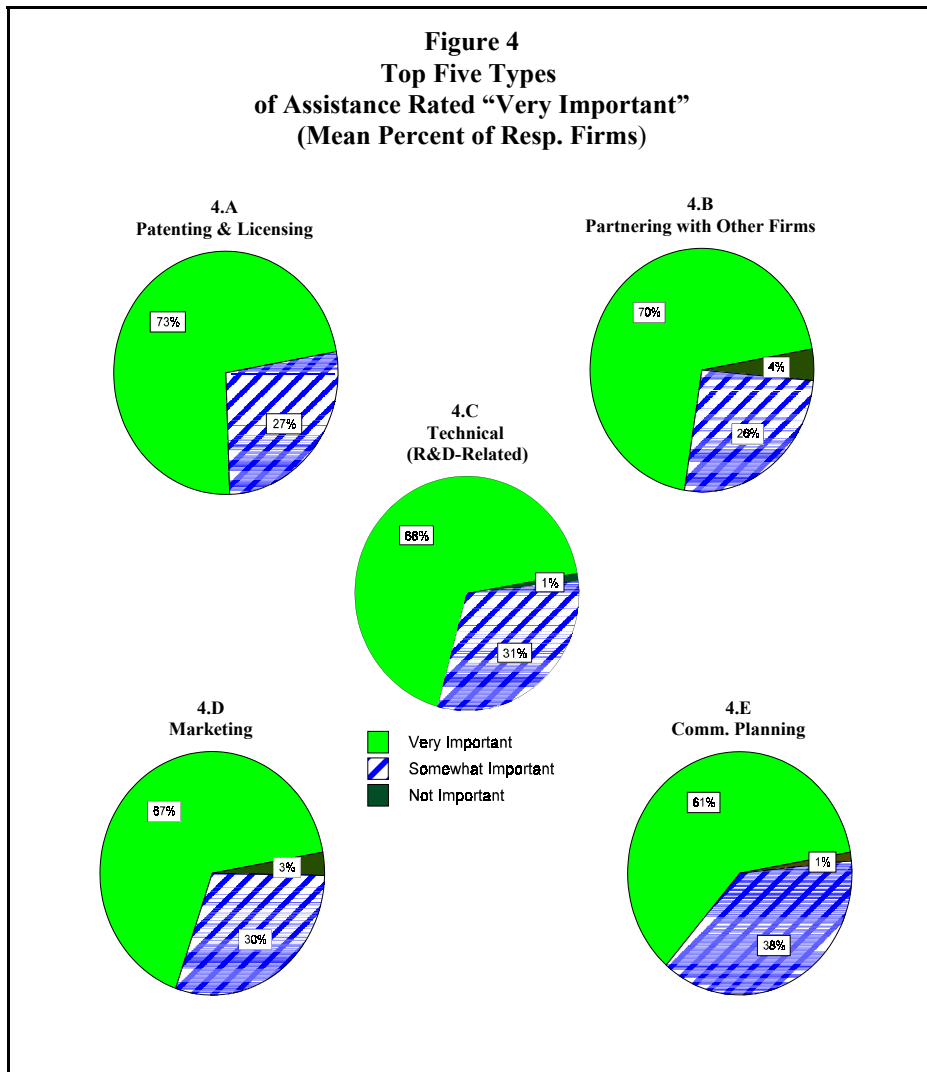
IA asked firms "if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed?" **Of the 330 firms that responded to this question, 88 percent reported that they believed receiving assistance had helped or would help them produce and sell their SBIR-related products, processes, and services or shorten the time needed. Moreover, a greater portion of firms that had reported SBIR-related sales than firms that had not reported sales said the assistance they received had helped.** (See Table 24.) A slightly greater portion of firms that received SBIR Phase II awards in FY 96-97 believed that assistance had helped or would help them compared to firms that received awards in earlier years.

At least half of firms that received assistance in the following areas reported that the assistance was "very important" in helping them "produce and sell SBIR-related products, processes, and services or move (them) toward that goal" (in descending order):

- (a) Patenting and licensing,
- (b) Partnering with other firms,
- (c) Technical (R&D-related),
- (d) Marketing,
- (e) Commercialization planning,
- (f) Exporting,
- (g) Market assessments,
- (h) Business planning,
- (i) Accounting and bookkeeping,
- (j) Facilities and location,
- (k) Legal,
- (l) Management,
- (m) Meeting government, international, and/or regulatory standards, and
- (n) Human resources.

Seventy percent or more of firms that received assistance with patenting and licensing, and partnering with other firms felt that the assistance was "very important" in helping them produce and sell SBIR results. (See Table 25 and Figure 4.) Patenting and licensing and partnering with other firms also were the top two areas in which the greatest portion of firms said they needed assistance. Two other of the top five areas of importance — commercialization planning and marketing — also were among the top five areas of greatest need.

Figure 4
Top Five Types
of Assistance Rated "Very Important"
(Mean Percent of Resp. Firms)



Depending on the agency sponsor, firms reported different types of assistance as being "very important" in helping them produce and sell SBIR-related products, processes, and services. (See Tables 26.) Firms in different technology categories also felt that different types of assistance were "very important." For example, marketing was more important to life sciences firms than firms in other technology areas; (R&D-related) technical assistance was more important to firms in energy conservation and use, and computer and information processing firms than other firms. (See Table 27.) (When examining Tables 26-7, please note that percentages in some categories, particularly exporting, facilities and location, human resources, and management may be misleading because of the small number of total respondents in those categories.)

Different types of assistance were "very important" to different size firms. Firms that employed more than 50 people more often than smaller firms reported that: (a) exporting, (b) facilities and location, (c) human resources, (d) legal, and (e) management assistance were "very important." However, because of the small number of firms that received assistance in exporting, facilities and location, human resources, and management assistance, high percentages in these areas could be (but not necessarily are) misleading. (See Table 28.) In addition, minority-owned firms reported that: (a) facilities and location, (b) marketing, (c) market assessments, and (d) patenting and licensing were "very important" more often than woman-owned and "other" firms. (See Table 29.)

Perceived Importance of Assistance to Firms with Unmet Needs

Firms that needed, but did not receive assistance, were asked how important they felt the assistance would be to helping the firm produce and sell their SBIR-related products, processes, and services. At least half of the firms reported that the following areas would be "very important" (in descending order): (a) marketing, (b) market assessments, (c) commercialization planning, (d) partnering with other firms, (e) business planning, and (f) patenting and licensing. (See Table 30.) **A greater portion of firms that needed, but did not receive assistance with marketing, market assessments, and business planning compared to firms that did receive assistance, reported these categories as "very important."** Patenting and licensing, partnering with other firms, and commercialization planning were slightly more important to firms that had received assistance in these areas than firms that needed, but did not receive assistance. (See Tables 25 and 30.)

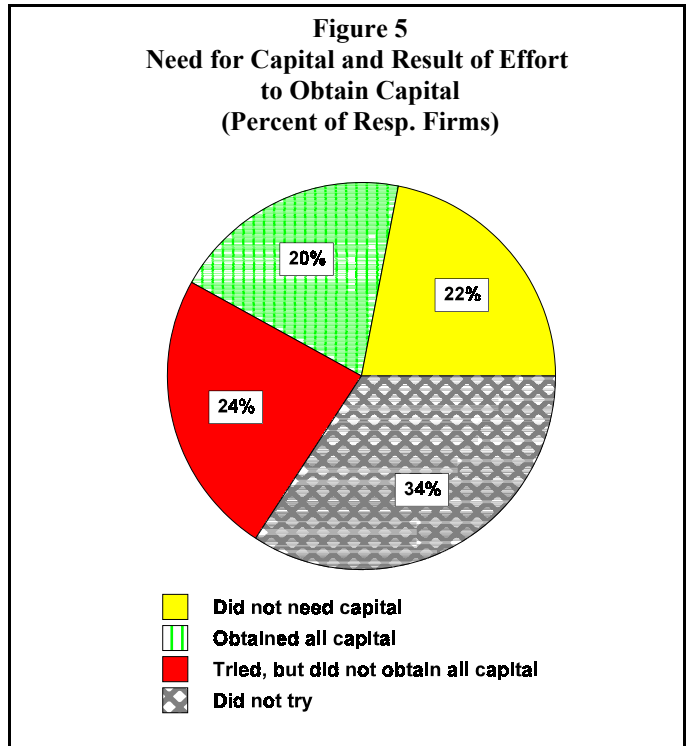
Most types of assistance were more important to smaller firms with unmet needs than to larger firms with unmet needs. A greater portion of firms with 50 or fewer employees than larger firms felt that all assistance categories were "very important" except: (a) technical (R&D-related), (b) patenting and licensing, and (c) meeting government, international, and regulatory standards, which were at least equally important to large and small firms.

FINANCIAL NEEDS AND RESOURCES

Financial Needs

IA asked firms "have you tried to obtain financing (in addition to the SBIR grant) to help your firm develop, produce, and/or sell your SBIR-related products, processes, and services and what has been the result?" Twenty-four percent of respondent firms "tried, but did not succeed in obtaining all capital sought," and twenty percent of firms "successfully obtained all the capital sought." **Therefore, of the 260 firms that tried to obtain capital, more than half (55 percent) were not able to obtain all the capital they sought.** More than one-fourth of firms said that they did not try to seek additional capital because it was "premature," and 10 percent said that they did not try because of another reason. (See Table 31 and Figure 5.)

**Figure 5
Need for Capital and Result of Effort
to Obtain Capital
(Percent of Resp. Firms)**

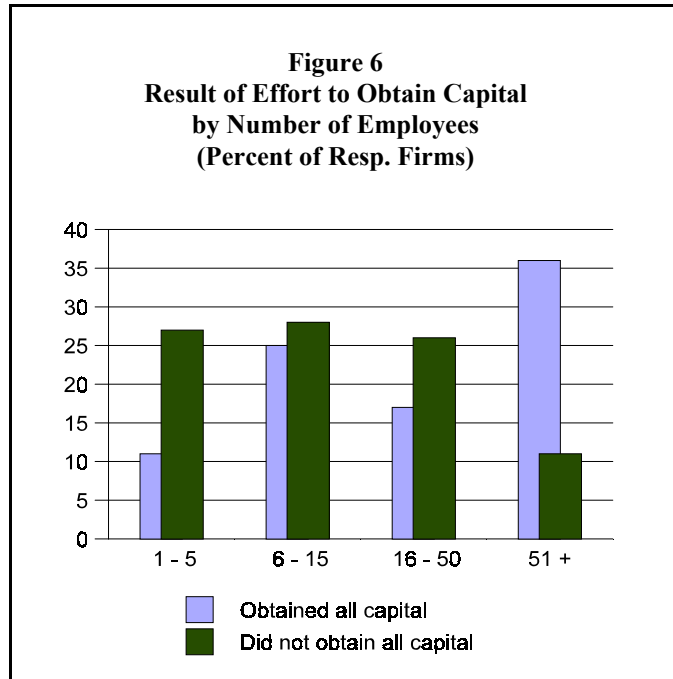


The 142 firms that tried, but did not succeed in obtaining all the capital they sought, gave numerous reasons for not succeeding. These reasons included: "the technology was too risky for most investors," "potential investors offered unacceptable terms," "the business was too small for most investors to be interested," and "there wasn't enough person power or time to pursue financing." About one-fifth of the 142 firms were still trying to obtain financing.

Of the 10 percent, or 59 firms, that were not trying to obtain financing (for reasons other than it was premature), most said there wasn't a market for their technology or the technology "was not proven." The firms also were afraid that investors would present unacceptable terms, and venture capitalists or other investors "would take over their business." A few firms said that they did not need additional capital now but they would need capital in the future. Other firms said that instead of pursuing capital investment, they were trying to partner with other firms or license their technology.

Firms that reported selling SBIR-related products, processes, and services were more likely than those firms that did not sell SBIR results to have "successfully obtained all capital sought." (See Table 31.) A slightly greater portion of firms reported that were sponsored by (in descending order): DOT/EPA, DOC, DOE, NSF and DOED reported that they "successfully obtained all capital sought." Firms that received awards in FY 97 were slightly more successful in obtaining capital than firms that received awards in FY 94, and the portion of firms that "tried, but did not succeed in obtaining all capital sought" decreased with each successive year from FY 94-97. (See Table 32.)

There was a strong correlation between firm size and the firm's need for additional capital, whether it tried to seek capital, and whether it succeeded in obtaining all the capital sought. Larger firms more often than smaller firms said that they did not need additional capital. Twenty-eight percent of firms with more than 50 employees compared to only 15 percent of firms with five or fewer employees said that they "did not need additional capital." When firms sought capital, **36 percent of firms with more than 50 employees "successfully obtained all capital sought" while only 11 percent of firms with five or fewer employees obtained all capital. Moreover, 27 percent of firms with five or fewer employees compared to only 11 percent of firms with more than 50 employees "tried, but did not succeed in obtaining all capital sought."** (See Table 33 and Figure 6.)



Minority-owned firms were much more likely to need additional capital and less likely to succeed in obtaining capital than woman-owned or "other" firms. About 9 percent of minority-owned firms reported that they did not need additional capital compared to 19 percent of woman-owned firms and 23 percent of "other" firms. A greater portion of minority-owned firms also reported that they had "tried, but did not succeed in obtaining all capital sought." (See Table 34.)

Sources of Financing

The most frequent source of financing was the owner(s) of the firm. Forty-two percent of the 264 firms that reported obtaining financing said that the owner(s) of the firm had provided financing for SBIR development and commercialization. Over one-fourth of firms that obtained financing, reported banks and other financial institutions as the source, and one-fifth of firms received financing from venture capital firms and angels. Another 22 percent obtained financing from government programs (in addition to the SBIR program), with about two-fifths of these firms receiving funding from state or local programs, and slightly less than one-fifth receiving funding from federal programs (other than the SBIR program). Other financing came from (a) family and friends, (b) corporate partners, (c) contracts, sales, and royalties, (d) public offerings, (e) employees and shareholders, and (f) licensing and manufacturing agreements. (See Table 35.)

From FY 94-97, financing by venture capital firms and angels grew steadily. Of the firms that received financing, 26 percent of firms that received Phase II awards in FY 97 were financed by venture capital firms and angles compared to 17 percent of firms that received Phase II awards in FY 94. An additional two percent of firms that received awards in FY 97 reported in the "other" category said that they were financed by "private investors" and similar sources that could be construed as additional "angel" investment. At the same time, the portion of firms financed by government programs decreased from 23 percent to 19 percent. (See Table 36.)

The source of financing varied greatly according to firm size. **Very small firms were much more likely to have received financing from the firm's owner(s), and much less likely to have received financing from banks and other financial institutions, and venture capital firms and angels.** Of the firms that received financing, only 20 percent of firms with five or fewer employees compared to 32 percent of firms with more than 50 employees received financing from banks and other financial institutions. Moreover, only nine percent of firms with five or fewer employees compared to 35 percent of firms with 16-50 employees received financing from venture capital firms and angels. However, a smaller portion of firms with more than 50 employees obtained venture capital than firms with 16-50 employees. The smallest (five or few employees) and largest firms (more than 50 employees) were most likely to receive funding from government programs, with the smallest firms receiving the greatest portion of government funding from state and local governments. (See Table 37.)

Minority- and woman-owned firms were less likely to be financed by venture capital firms and angels than were "other" firms. This was particularly true for minority firms, of which only 10 percent reported receiving venture capital financing compared to 25 percent of "other" firms. Woman-owned firms were less likely to receive financing from banks and other financial institutions than were "other" firms, and minority-owned firms were most likely to receive financing from this source. Minority-owned firms were more likely than woman-owned or "other" firms to rely on financing from the owner of the firm. (See Table 38.)

Assistance Used to Obtain Financing

Twenty-nine percent of respondent firms, or 163 firms, received assistance from outside the firm to help them identify and obtain financing. That is, 63 percent of firms that reported they tried to obtain financing received some type of assistance to help them identify and obtain financing. **A greater portion of firms that reported selling SBIR-related products, processes, and services than firms not reporting sales said that they received assistance in obtaining financing.** In addition, of the firms that had not made sales, a greater portion of firms that reported it was "highly likely" they would make sales had received assistance than firms that reported it was "not likely." (See Table 39.) Smaller firms more often received assistance than larger firms. (See Table 40.) Firms sponsored by (in descending order): DOED, EPA, NSF, DOE, and DOT received the most assistance with obtaining financing. (Sources of assistance did not normally involve the agency.)

Of the 158 respondent firms that said they received assistance to identify and obtain financing, about half of the firms hired consultants, more than one-fourth used the services of state technology programs, and 17 percent relied on federal government programs such as a U.S. Small Business Administration loan program or U.S. Department of Energy commercialization assistance programs. (See Table 41.) Other sources of assistance were (a) family, friends, and professional contacts, (b) incubators and research parks, (c) venture capitalists and investment banks, (d) legal, accounting, and financial advisors, and (e) partners and members of the firm's board. Firms sponsored by all agencies except DOAG heavily used consultants to assist in obtaining financing. Firms sponsored by DOAG made more use of state technology programs, incubators and research parks, and family, friends, and professional contacts than firms sponsored by other agencies.

Firms that received Phase II awards in FY 95-97 slightly more often relied on federal government programs and state technology programs to help them obtain financing than firms that received Phase II awards in FY 94. Firms that received awards in FY 95-97 awards slightly less often used the services of incubators and research parks. (See table 41.)

Firms with 15 or fewer employees relied on family, friends, and professional contacts for assistance while no firms with more than 15 employees reported relying on this source of assistance. A greater portion of firms with 15 or fewer employees also more often than larger firms reported using the services of state technology programs, incubators and research parks, and federal government for assistance in obtaining financing. (See Table 42.)

Woman- and minority-owned firms less often relied on federal government and state technology programs to help them obtain financing than "other" firms. (See Table 43.)

Importance of Assistance Used to Obtain Financing

Firms were asked how important specific types of assistance were in identifying and obtaining financing. Of the respondent firms that received assistance, at least two-fifths of firms reported that (in descending order): (a) family, friends, and professional contacts, (b) federal government, and (c) consultants were "very important." In addition, most firms felt that state technology programs were "very important" or "somewhat important." More than half of the firms that received assistance from incubators and research parks did not find their assistance important in obtaining financing. (See Table 44.) Firms that employed more than 50 employees found consultants and state technology programs more important than did smaller firms.

SUGGESTIONS FROM FIRMS

When asked about assistance needed by firms that was not mentioned in the survey, 142 firms provided a wide range of responses. Many firms used the opportunity to reiterate the importance of previously identified needs, and others offered comments and suggestions, particularly aimed at SBIR agency programs. Some of the more frequent responses were:

- **Help With Financing:** More than 30 firms emphasized the need for assistance with locating and obtaining financing. They suggested that the government offer greater tax incentives for investment in technology businesses. Some firms also suggested that government provide venture capital networking services and more low-cost government loans to technology businesses.
- **More Marketing Assistance:** More than 30 firms reiterated the need for greater assistance with marketing and sales. Some firms wanted financial and technical assistance to help them attend trade shows and international conferences. Other firms asked for help with identifying end users of SBIR products, processes, and services, including state and federal government procurement opportunities.
- **Greater SBIR Assistance and Funding Flexibility:** About 20 firms mentioned the need for greater long-term funding commitment from the SBIR program and Phase II follow-on funding. They also mentioned the need for bridge funding between Phase I and II, and shorter time between the two phases. In addition, several firms said that there should be more flexibility in allowable SBIR expenditures, particularly to permit use of program funding for marketing. Firms also mentioned the need for greater assistance with completing SBIR forms, cost accounting, and a couple firms wanted assistance to deal with "unfair practices" within the SBIR program.
- **Provide Networking Programs:** Several firms said that it would be helpful for the government to provide SBIR mentor programs in which more experienced SBIR firms helped less experienced ones. Moreover, they expressed the need for greater networking of SBIR firms to learn from each others experiences.

- **Partnering of Corporations:** Firms reiterated the need for help to locate corporate partners for manufacturing, licensing opportunities, and other purposes.
- **Commercialization Assistance:** Several firms reiterated the need for commercialization assistance. They specified needing help with the "transition from SBIR to commercialization," and long-term business planning. Several other firms said that pricing assistance would help them as they neared product development stages.
- **Patent, License, and Regulatory Assistance:** Firms reiterated the need for help with government regulations. About 10 firms said they needed help to better understand government regulatory processes and wanted direct assistance with "moving applications through the system more quickly." Some firms specifically stated they needed help with Food and Drug Administration and Environmental Protection Agency regulations. Firms also reiterated the need for patenting and licensing assistance, some citing the high cost as an obstacle to commercialization.
- **International Marketing:** Firms said they needed more information about, and assistance with international standards, international marketing, and export assistance. In addition, some firms specified that they wanted more assistance to understand and address international regulations and restrictions governing defense-related products.

III. PROFILE OF RESPONDENT FIRMS

FIRM SIZE

Firms that responded to the survey employed an average of 34 people and the majority of firms employed 15 or fewer people. One-third of firms employed five or fewer people, and only 16 percent of firms employed more than 50 people. The number of employees differed greatly according to the agency that sponsored the firm, ranging from a mean of 6 employees for firms sponsored by DOED to a mean of 72 employees for firms sponsored by NRC. (See Table 45.) The mean number of employees did not differ significantly according to the year of the Phase II award.

MINORITY, WOMAN, AND DISABLED OWNERSHIP OF FIRMS

Minority-owned firms represented 10 percent and woman-owned firms 12 percent of respondent firms. Firms that did not report being either minority- or woman-owned represented 80 percent of respondent firms. A greater portion of minority- and woman-owned firms than "other firms" employed five or fewer people. One percent of respondent firms reported that they were owned by disabled people.

PRIMARY TECHNOLOGY AREA AND SUBJECT OF SBIR AWARD

IA asked firms about the technology area that was the subject of their SBIR Phase II award and the firm's primary and secondary technology areas. The most frequent technology areas that firms reported as the subject of their SBIR Phase II award(s) were: (a) computer, information processing, and analysis, (b) electronics, and (c) life sciences, each of which composed about 18 percent of all respondent firms. These technology areas were followed by: (a) materials, (b) environment and natural sciences, (c) energy conversion and use, (d) mechanical performance of vehicles, weapons, and facilities, and (e) "other." In almost all cases, the subject of the SBIR Phase II award was also the firm's primary product, process, or service, with less than five percent of firm's SBIR awards being performed in other technology areas.

LEVEL OF EFFORT DEVOTED TO R&D, PRODUCTION, AND SERVICES

IA asked firms approximately what portion of their firm's efforts (time and expense) were devoted to (a) R&D, (b) producing products and processes, and (c) services. Firms devoted an average of 53 percent of effort to R&D, 29 percent to production, and 18 percent to services. Firms sponsored by DOED devoted significantly higher than average effort to R&D; firms sponsored by DOC devoted significantly higher than average effort to producing products and processes; and firms sponsored by NRC and DOT devoted significantly higher than average effort to services. (See Tables 46 and 47.) Firms with five or fewer employees devoted more

effort to R&D than other size firms, and firms with more than 50 employees devoted more effort

to production than other size firms. (See Table 48.)

SBIR STATUS AT TIME OF SURVEY

At the time of the survey, 70 percent of respondent firms had completed at least one SBIR Phase II award. Of the total respondent firms, 31 percent had completed their SBIR Phase II award, and an additional 39 percent had completed one or more SBIR Phase II award(s) but still had one or more active Phase II awards.

SBIR-RELATED SALES AND LIKELIHOOD OF SALES

IA asked firms "have you sold products, processes, or services as a result of the SBIR award(s)?" **Fifty-five percent of firms reported that they had sold products, processes, or services as result of their SBIR Phase II survey. Of the firms that had completed at least one SBIR Phase II award, 68 percent reported that they had made sales as a result of the SBIR award.** In addition, 25 percent of firms that had not yet completed their Phase II award also reported SBIR-related sales. (See Table 49.)

Of the 267 respondent firms that had not yet sold products, processes, or services as a result of their SBIR Phase II award, almost forty-five percent believed that it was "highly likely" they would make a future sale. (See Table 50.) Of the 85 percent, or 229 firms, that reported it was either "highly likely" or "likely" they would make a sale, about one-fourth said that they expected to sell products, processes, or services as a result of their SBIR award within one year or less, and about one-half additional firms said that they expected to sell products, processes, and services within one to three years. Moreover, over two-fifths of the firms that reported it was "highly likely" or "likely" they would make SBIR-related sales said they had in place or pending the "financial ability or financial commitment to produce and sell the products, processes, or services." An additional one-fifth said they had in place, pending, or were negotiating a licensing agreement, and another 18 percent said they had in place or pending a joint venture, purchasing agreement, or distribution agreement.

A slightly greater portion of firms in (in descending order): materials, electronics, and environment and natural sciences had sold their SBIR-related products, processes, and services than the average firm, regardless of whether or not they had completed at least one SBIR Phase II award. For those firms that did not make a sale, a greater portion of environment and natural science firms than other types of firms said it was "highly likely" they would make future SBIR-related sales. Moreover, of the firms that said it was "highly likely" they would make future SBIR-related sales, environment and natural science firms also were much more likely to have in place or pending the "financial ability or financial commitment to produce and sell the products, processes, or services."

A greater portion of firms with 26 to 50 employees reported selling SBIR-related products, processes, and services than either smaller or larger firms. But of the firms that

had completed at least one SBIR award, firms with 6 to 15 employees most often reported making SBIR-related sales. (See Table 49.) For those firms that had not yet sold SBIR products, processes and services, firms with 15 or fewer employees more often than larger firms felt they would make future sales. (See Table 50.) But firms with more than 50 employees were more likely than smaller firms to report that they had in place or pending the financial ability or commitment to produce and sell their SBIR-related products, processes, and services.

A greater portion of woman-owned firms than minority-owned or "other" firms reported selling SBIR-related products, processes, and services, whether or not they had completed at least one SBIR award. Sixty-five percent of woman-owned firms compared to 55 percent of all firms sold SBIR-related products, process, and services.

IV. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Firms that responded to IA's survey had multiple business and technical needs. But about one-third of these firms could not meet their needs, mainly because they could not find sufficient services or could not afford the services. Firms repeatedly cited certain types of services as being most important to help them produce and sell SBIR products, processes, and services. **Marketing and market assessments, commercialization planning, partnering with other firms, and patenting and licensing** were cited often by firms of different sizes, technology specializations, and sponsoring agencies. Firms not only frequently reported that they needed assistance in these areas but also consistently rated the assistance as "very important" to their producing and selling SBIR products, processes, and services. Although fewer firms reported needing R&D-related technical assistance, the firms that received this type of assistance also felt that it was "very important" to their commercialization efforts. Testing the validity of firms' perceptions that certain types of assistance correlated with their ability to produce and sell SBIR results was beyond the scope of this study. However, we believe that the high percentage of firms which reported certain types of assistance as being "very important," over 70 percent in some categories, is itself significant.

Many firms were not able to obtain capital (outside the SBIR program) to commercialize SBIR results. When 44 percent of respondent firms had tried to obtain capital, slightly more than half of those firms were not able to obtain all the capital they sought. The inability of firms to obtain financing is particularly significant in light of BRTRC's findings that firms are more likely to commercialize SBIR results when they receive private investment.³ IA found that the owner(s) of the firms were still the most likely source of financing. **But contrary to BRTRC's findings, IA found that venture capital was becoming an increasingly important source of financing for SBIR firms.** About one-quarter of respondent firms that had received FY 97 awards and had obtained financing reported that the financing had come from venture capital firms and angels. Two facts may account for the differences between IA's and BRTRC's studies. IA's survey included "angels" in addition to venture capital firms, and BRTRC's study involved firms that were funded until FY 93. Our findings showed that the importance of venture capital and angels had substantially increased from FY 94 to FY 97.

Very small firms operate at a disadvantage. They are more likely than larger firms to need business, technical, and financial assistance and less likely to receive it. A much greater portion of very small firms (five or fewer employees) than larger firms reported needing almost all types of business, management, and technical assistance. We expected a greater portion of very small firms would need some types of assistance, such as accounting and bookkeeping, and legal assistance more often than larger firms which often have in-house staff in

³BRTRC, "Commercialization of SBIR," Summary Report, July 13, 1999.

these areas. But we were surprised by the significantly greater portion of very small firms that also needed marketing, commercialization planning, and other services that we expected to be needed equally by all size firms. Only two of fourteen types of assistance — human resources and R&D-related technical assistance — were needed more by firms with more than 50 employees than smaller firms. **Smaller firms generally had more assistance needs than larger firms but were less likely to meet all their needs, primarily because they could not afford services, and secondarily because they could not locate services.**

A greater portion of very small firms needed financing, and were much less likely to receive it. Smaller firms were more likely to be funded by the firm's owners and less likely to be funded by banks and financial institutions, and venture capital firms and angels. Since BRTRC's findings showed a strong correlation between private investment and a firm's ability to commercialize SBIR results, IA's findings that very small firms were less likely than larger firms to obtain private investment is worrisome. **Moreover, if the trend of SBIR firms being financed increasingly by venture capitalists and angels continues, very small firms may find themselves at an even greater disadvantage.**

Minority- and woman-owned firms only slightly more often reported needing assistance than "other" firms, but they had somewhat different needs from "other" firms. Minority-owned firms, for example, more often reported that they needed commercialization planning and market assessments than "other" firms. Moreover, when assistance was received, it was much more likely to be viewed as "very important" by minority-owned firms than other types of firms. **Minority-owned firms also were more likely to need capital and to have tried and not succeeded in obtaining all the capital they sought than either woman-owned or "other" firms.** Minority-owned firms also were less likely than other types of firms to have received financing from venture capital firms and angels, but this was offset somewhat by greater portions of minority-owned firms that had received financing from banks and financial institutions.

Firms also differed in their need for assistance, type of assistance needed, and importance of assistance depending on their technology specialization and sponsoring agency. But we hesitate to draw conclusions based on technology specialization or sponsoring agency because for some questions, there were too few firms represented in each of 11 agency categories and 8 technology categories to draw conclusions. In addition, the number of firms represented by individual agencies varied considerably, ranging from five firms sponsored by NRC to 278 firms sponsored by DOD, making comparisons between agencies difficult and potentially misleading. Given these caveats, there is a wealth of data by sponsoring agency and technology specialization shown in the Appendix, and we encourage program administrators to examine the detailed data and draw their own conclusions.

Determining the causal relationship between whether a firm received assistance and SBIR commercialization outcomes was beyond the scope of this study. Although firms reported SBIR-related sales as part of the IA survey, sales were not independently validated, and therefore we hesitate to draw conclusions based on these data. **But, we believe it is significant that 93 percent of respondent firms that reported selling SBIR results said that the business,**

management, and/or technical assistance they received had helped them produce and sell SBIR results or shorten the time needed.

RECOMMENDATIONS

The following recommendations stem from IA's survey findings, and many recommendations incorporate direct input from SBIR firms.

- 1) **Implement systems to identify and link service providers to meet SBIR firms' needs.** IA's survey showed that SBIR firms need services in many business and technical areas. Thousands of service providers are available to help small technology firms nationwide, and yet these firms often find it difficult to locate and access service providers. Firms must be able to identify specific needs, expediently locate and target service providers to meet specific needs, and easily access those providers.
- 2) **Help very small firms and minority-owned firms obtain financing from private sources.** The IA study showed that very small firms and minority-owned firms less often obtain financing when they seek it than larger firms and non-minority-owned firms. Very small, minority-owned, and woman-owned firms need greater assistance to obtain financing, particularly from venture capitalists and angels, which are becoming an increasingly important source of financing for SBIR commercialization.
- 3) **Provide additional assistance in marketing, commercialization planning, and patenting and licensing to SBIR firms.** Firms consistently reported that they needed assistance with marketing, commercialization planning, and patenting and licensing, and that these services were very important in helping them develop and commercialize SBIR results. Future services to SBIR firms by agencies and organizations should focus on these key areas.
- 4) **Establish a corporate partnering system.** Firms also consistently rated corporate partnering as one of the top three services they considered "very important" in helping them commercialize SBIR results. SBIR Phase II firms, particularly very small firms, need assistance with identifying potential partners and help in developing agreements.
- 5) **Implement a system of SBIR mentors.** A number of firms suggested that a mentoring system would help them. Through the Federal and State Technology Partnership program (FAST), some states are implementing mentoring programs. Any mentoring system should match commercially successful SBIR firms with new firms, and provide help in multiple areas. These areas include preparing Phase II proposals, marketing, corporate partnering, and seeking private investment.

- 6) **Help SBIR firms identify potential end-users of SBIR results, including federal and state government procurement opportunities.** Many firms said they wanted more assistance from government and other sources to help them identify potential buyers of SBIR results. Identifying purchasers of SBIR products, processes, and services, along with other marketing services, could give SBIR firms an important boost in a traditional area of weakness. DOD recently has taken a lead in this area, and other agencies should follow their example.
- 7) **Agencies should make use of provisions that allow funding for technical assistance.** Agencies are permitted to use \$4,000 per firm of SBIR funds for technical assistance, and yet few agencies have taken advantage of this provision. IA's findings suggest that more agencies should make use of these funds to provide services to SBIR firms. Policy makers also might consider ways to allow more flexibility in the use of SBIR Phase II funds for market assessments and other "pre-commercialization" activities.
- 8) **Implement SBIR Phase III.** Numerous firms reported that some government funding for Phase III was important in promoting commercialization of SBIR results. Moreover, survey findings showed that it was difficult for very small technology firms to attract private investment at early stages of development. Some funding of a Phase III program, particularly for very small firms, may increase their chances of commercializing SBIR results by filling a gap in private investment and providing "seed money" to leverage additional private investment.
- 9) **Collect better and more consistent national data on SBIR firms.** As part of the survey analysis, IA attempted to retrieve data on firm size and other characteristics for all SBIR firms, and found that data were not available from all agencies. Better data collection across all participating agencies is needed to identify SBIR program issues and gaps. Data collection on firm size, minority status, type of effort, and SBIR sales should be minimum specifications. Any new data collection mechanisms also should include routine inquiries about firms' needs, access to services, and an opportunity for firms to identify program weaknesses and provide suggestions.

APPENDIX

Table 1
Respondent Firms and
All SBIR Phase II Firms
by Fiscal Year (FY 94-97)

Fiscal Year of Award	Total No. of Firms* (N=2,575)	Percent of Total Firms	No. of Resp. Firms (N=615)	Percent of Resp. Firms
1994	650	25.2	162	26.3
1995	641	24.9	206	33.5
1996	653	25.4	243	39.5
1997	1,029	40.0	324	52.7

*Source: Office of Technology, U.S. Small Business Administration.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category. Fiscal year is determined by federal agency sponsor.

Table 2
Respondent Firms and
All SBIR Phase II Firms (FY 94-97)
by Agency Sponsor

Agency Sponsor	Total No. of Firms* (N=2,575)	Percent of Total Firms	No. of Resp. Firms (N=615)	Percent of Resp. Firms
DOAG	107	4.2	39	6.3
DOC	69	2.7	21	3.4
DOD	1,381	53.6	278	45.2
DOED	219	8.5	13	2.1
DOE	53	2.1	77	12.5
DOT	48	1.9	8	1.3
EPA	33	1.3	17	2.8
HHS	742	28.8	168	27.3
NASA	492	19.1	104	16.9
NRC	13	0.5	5	0.8
NSF	236	9.2	62	10.1

*Source: Office of Technology, U.S. Small Business Administration.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category.

Table 3
Respondent Firms and
All SBIR Phase II Firms (FY 94-97)
by Minority Status

Minority Status	Total No. of Firms* (N=2,575)	Percent of Total Firms	No. of Resp. Firms (N=615)	Percent of Resp. Firms
Minority-owned firms	529	20.5	61	9.9
Woman-owned firms	345	13.4	76	12.4
“Other firms”**	1,919	74.5	491	79.8

*Source: Office of Technology, U.S. Small Business Administration.

**“Other firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category.

Table 4
Business, Management, and Technical Assistance Needs*
by Agency Sponsor
(Percent of Respondent Firms)

Response	Total (N=607)	Agency Sponsor										
		DOAG (N=39)	DOC (N=21)	DOD (N=276)	DOED (N=12)	DOE (N=77)	DOT (N=8)	EPA (N=17)	HHS (N=164)	NASA (N=103)	NRC (N=5)	NSF (N=61)
Need Assistance	63.4	64.1	71.4	62.7	84.6	59.7	75.0	76.5	68.9	59.2	40.0	72.1
Do Not Need Assistance	36.6	35.9	28.6	37.3	7.7	40.3	25.0	23.5	31.1	40.8	60.0	27.9

*Data represent responses to the question “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?” Firms were given the choices of “yes” and “no”; “need assistance” represents “yes” responses and “do not need assistance” represents “no” responses.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. Percentages may not add to 100 percent because of rounding.

Table 5
Business, Management, and Technical Assistance Needs*
by SBIR Technology Area
(Percent of Respondent Firms)

Response	Total (N= 607)	SBIR Technology Area							
		Computer Info. / Process. (N=105)	Electronics (N=103)	Materials (N=81)	Mech. Perform. (N=43)	Energy Convr./ Use (N=45)	Envir & Natural Sciences (N=54)	Life Sciences (N=98)	Other (N=37)
Need Assistance	63.4	67.6	68.0	67.9	51.2	62.2	70.4	65.3	43.2
Do Not Need Assistance	36.6	32.4	32.0	32.1	48.8	37.8	29.6	34.7	56.8

*Data represent responses to the question “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?” Firms were given the choices of “yes” and “no”; “need assistance” represents “yes” responses and “do not need assistance” represents “no” responses.

Note: N equals the number of firms. Percentages may not add to 100 percent because of rounding.

Table 6
Business, Management, and Technical Assistance Needs*
by Fiscal Year
(Percent of Respondent Firms)

Response	Total (N=607)	Fiscal Year			
		1994 (N=160)	1995 (N=202)	1996 (N=242)	1997 (N=319)
Need Assistance	63.4	61.3	60.9	66.5	66.1
Do Not Need Assistance	36.6	38.8	39.1	33.5	33.9

*Data represent responses to the question “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?” Firms were given the choices of “yes” and “no”; “need assistance” represents “yes” responses and “do not need assistance” represents “no” responses.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category. The fiscal year is determined by the federal agency sponsor. Percentages may not add to 100 because of rounding.

Table 7

**Business, Management, and Technical Assistance Needs*
by Number of Employees
(Percent of Respondent Firms)**

Response	Total (N=607)	Number of Employees			
		1 - 5 (N=200)	6 - 15 (N=174)	16 - 50 (N=131)	51 + (N=91)
Need Assistance	63.4	73.0	63.8	60.3	46.2
Do Not Need Assistance	36.1	27.0	36.2	39.7	53.8

*Data represent responses to the question “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?” Firms were given the choices of “yes” and “no”; “need assistance” represents “yes” responses and “do not need assistance” represents “no” responses.

Note: N equals number of firms. Percentages may not add to 100 because of rounding.

Table 8
Business, Management, and Technical Assistance Needs*
by Minority Status
(Percent of Respondent Firms)

Response	Total (N=607)	Minority Status		
		Woman- Owned Firms (N=73)	Minority- Owned Firms (N=61)	Other Firms** (N=486)
Need Assistance	63.4	65.8	68.9	62.8
Do Not Need Assistance	36.6	34.2	31.1	37.2

*Data represent responses to the question “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services?” Firms were given the choices of “yes” and “no”; “need assistance” represents “yes” responses and “do not need assistance” represents “no” responses.

**“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Percentages may not add to 100 percent because of rounding.

Table 9
Type of Assistance Needed
by Agency Sponsor
(Percent of Respondent Firms That Needed Assistance)

Type of Assistance	Agency Sponsor											
	Total (N=385)	DOAG (N=25)	DOC (N=15)	DOD (N=173)	DOED (N=11)	DOE (N=46)	DOT (N=6)	EPA (N=13)	HHS (N=113)	NASA (N=61)	NRC (N=2)	NSF (N=44)
Accounting & Bookkeeping	31.2	8.0	40.0	30.1	45.5	21.7	0	30.8	39.8	16.4	0	20.5
Business Planning	37.7	32.0	40.0	42.4	63.6	50.0	50.0	46.2	35.4	34.4	50.0	34.1
Commercialization Planning	46.2	40.0	46.7	49.1	72.7	56.5	50.0	69.2	38.1	49.2	50.0	43.2
Exporting	10.1	8.0	13.3	8.7	0	8.7	0	0	11.5	14.8	0	13.6
Facilities & Location	9.1	8.0	0	6.9	18.2	8.7	0	15.4	9.7	4.9	0	11.4
Human Resources	9.6	8.0	6.7	11.6	0	8.7	0	7.7	9.7	6.6	0	4.5
Legal	38.4	20.0	40.0	34.7	72.7	30.4	16.7	30.8	52.2	34.4	0	36.4
Management	13.8	4.0	13.3	15.0	36.4	6.5	0	7.7	15.9	6.6	0	6.8
Marketing	41.8	36.0	33.3	45.7	90.9	32.6	16.7	53.8	33.6	45.9	50.0	47.7
Market Assessments	46.0	48.0	40.0	53.2	63.6	52.2	83.3	61.5	38.1	55.7	100.0	45.5
Meeting Government, International and/or Regulatory Standards	17.4	16.0	0	14.5	36.4	15.2	0	0	26.5	13.1	0	11.4
Partnering with Other Firms	47.3	32.0	53.3	54.9	36.4	45.7	33.3	46.2	42.5	55.7	100.0	54.5
Patenting and Licensing	48.8	44.0	46.7	51.4	72.7	45.7	33.3	53.8	52.2	52.2	50.0	45.5
Technical (R&D-Related)	36.9	32.0	20.0	32.9	54.5	37.0	33.3	30.8	42.5	37.7	50.0	40.9

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. Firms could have multiple responses.

Table 10
Type of Assistance Needed
by SBIR Technology Area
(Percent of Respondent Firms That Needed Assistance)

Type of Assistance	Total (N=385)	SBIR Technology Area							
		Computer/ Info. Process. (N=71)	Electronics (N=70)	Materials (N=55)	Mech. Perform. (N=22)	Energy Convr./ Use (N=28)	Envir. & Natural Sciences (N=38)	Life Sciences (N=64)	Other (N=16)
Accounting & Bookkeeping	31.2	29.6	32.9	36.4	27.3	14.3	18.4	35.9	37.5
Business Planning	37.7	29.6	35.7	41.8	36.4	50.0	47.4	40.6	31.5
Commercialization Planning	46.2	42.3	50.0	45.5	31.8	57.1	60.5	37.5	50.0
Exporting	10.1	5.6	14.3	3.6	13.6	10.7	15.8	12.5	6.3
Facilities & Location	9.1	8.5	5.7	10.9	9.1	3.6	7.9	14.1	12.5
Human Resources	9.6	7.0	4.3	14.5	4.5	7.1	13.2	14.1	6.3
Legal	38.4	42.3	44.3	34.5	22.7	28.6	26.3	46.9	37.5
Management	13.8	11.3	11.4	16.4	4.5	10.7	13.2	20.3	6.3
Marketing	41.8	42.3	35.7	43.6	40.9	46.4	50.0	39.1	25.0
Market Assessments	46.0	38.0	42.9	54.5	50.0	50.0	52.6	45.3	18.8
Meeting Government, International and/or Regulatory Standards	17.4	9.9	17.1	10.9	13.6	28.6	18.4	29.7	6.3
Partnering with Other Firms	47.3	47.9	48.9	54.5	36.4	46.4	55.3	42.2	25.0
Patenting and Licensing	48.8	40.8	55.7	45.5	31.8	60.7	57.9	51.6	25.0
Technical (R&D - Related)	36.9	25.4	34.3	41.8	27.3	50.0	34.2	45.3	31.3

Note: N equals the number of firms. Firms could have multiple responses.

Table 11
Type of Assistance Needed
by Number of Employees
(Percent of Respondent Firms That Needed Assistance)

Type of Assistance	Total (N=385)	Number of Employees			
		1-5 (N=146)	6-15 (N=111)	16-50 (N=79)	51 + (N=42)
Accounting & Bookkeeping	31.2	41.1	37.8	16.5	9.5
Business Planning	37.7	39.7	33.3	45.6	28.6
Commercialization Planning	46.2	54.1	43.2	44.3	33.3
Exporting	10.1	12.3	11.7	5.1	7.1
Facilities & Location Assistance	9.1	12.3	9.0	7.6	2.4
Human Resources	9.6	5.5	17.1	7.6	9.5
Legal	38.4	44.5	43.2	34.2	14.5
Management	13.8	13.0	20.7	8.9	9.5
Marketing	41.8	47.9	42.3	39.2	23.8
Market Assessments	46.0	44.5	45.9	49.4	42.9
Meeting Government, International and/or Regulatory Standards	17.4	18.5	21.6	13.9	9.5
Partnering with Other Firms	47.3	42.5	52.3	54.4	40.5
Patenting & Licensing	48.8	47.3	55.0	50.6	35.7
Technical (R&D-Related)	36.9	39.0	34.2	30.4	47.6

Note: N equals the number of firms. Firms could have multiple responses.

Table 12
Type of Assistance Needed
by Minority Status
(Percent of Respondent Firms That Needed Assistance)

Type of Assistance	Total (N=385)	Minority Status		
		Woman- Owned Firm (N=48)	Minority- Owned Firm (N=42)	Other Firms* (N=305)
Accounting & Bookkeeping	31.2	27.1	26.2	32.5
Business Planning	37.7	35.4	31.0	38.7
Commercialization Planning	46.2	52.1	57.1	44.9
Exporting	10.1	10.4	14.3	10.2
Facilities & Location	9.1	6.3	7.1	9.8
Human Resources	9.6	12.5	2.4	9.8
Legal	38.4	39.6	35.7	39.2
Management	13.8	8.3	4.8	15.4
Marketing	41.8	45.8	45.2	41.6
Market Assessments	46.0	43.8	57.1	45.6
Meeting Government, International and/or Regulatory Standards	17.4	12.5	11.9	19.0
Partnering with Other Firms	47.3	45.8	45.2	48.2
Patenting and Licensing	48.8	45.8	40.5	50.5
Technical (R&D-Related)	36.9	37.5	35.7	36.7

*“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Firms could have multiple responses.

Table 13
Success in Meeting Business, Management,
and Technical Assistance Needs
by Agency Sponsor
(Percent of Respondent Firms That Needed Assistance)

Status	Agency Sponsor											
	Total (N=385)	DOAG (N=18)	DOC (N=13)	DOD (N=144)	DOED (N=9)	DOE (N=40)	DOT (N=5)	EPA (N=9)	HHS (N=99)	NASA (N=51)	NRC (N=2)	NSF (N=44)
Have met (some/all) needs	82.9	72.0	86.7	83.2	81.8	87.0	83.3	76.9	87.6	83.6	100.0	93.2
Tried, but not did not succeed in meeting needs or partially succeeded	35.3	32.0	40.0	37.0	45.5	37.0	33.3	38.5	28.3	36.1	0	22.7
Have not tried to meet (some/all) needs	93.0	88.0	93.3	91.9	81.8	91.3	100.0	92.3	93.8	91.8	100.0	100.0

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. Firms could have multiple responses.

Table 14
**Success in Meeting Business,
Management, and Technical Assistance Needs
by Number of Employees
(Percent of Respondent Firms That Needed Assistance)**

Status	Number of Employees				
	Total (N=385)	1-5 (N=146)	6-15 (N=111)	16-50 (N=79)	51+ (N=42)
Have met (some/all) needs	82.9	82.9	82.0	81.0	88.1
Tried, but did not succeed in meeting needs or partially succeeded	35.3	44.5	40.5	24.1	16.7
Have not tried to meet (some/all) needs	93.0	89.7	93.7	94.9	97.6

Note: N equals the number of firms. Firms could have multiple responses.

Table 15
Reason for Not Meeting All Business, Management,
And Technical Assistance Needs
By Type of Assistance
(Percent of Resp. Firms That Did Not Meet All Needs)

Reason	Total (N=136)	Type of Assistance Needed													
		Accting. & Bkkgng. (N=42)	Bus. Planning (N=61)	Commercial- ization Planning (N=83)	Export (N=20)	Facil. & Location (N=13)	H.R (N=23)	Legal (N=51)	Mgt. (N=25)	Mrkting. (N=78)	Market Assess. (N=82)	Meeting Reguls. & Stndrds. (N=27)	Partning With Other Firms (N=76)	Patent & License (N=65)	Tech. (R&D-Rel) (N=36)
Could not find sources to provide service	23.5	16.7	16.4	22.9	30.0	7.7	17.4	15.7	16.0	19.2	19.5	18.5	25.0	20.0	13.9
Found sources, but could not afford them	50.0	52.4	67.2	59.0	60.0	69.2	69.6	60.8	60.0	57.7	56.1	51.9	55.3	64.6	58.3
Sources only partially met needs	45.6	57.1	49.2	44.6	40.0	46.2	52.2	45.1	44.0	43.6	47.6	63.0	46.1	49.2	47.2
Discussions in progress	5.1	4.8	3.3	3.6	0	7.7	0	3.9	0	2.6	4.9	3.7	2.6	6.2	5.6
Cost and time too high	2.9	4.8	4.9	3.6	10.0	7.7	13.0	5.9	12.0	3.8	4.9	11.1	5.3	4.6	8.3
(Received help, but) sources provided poor help	2.2	4.8	1.6	2.4	0	0	4.3	3.9	4.0	2.6	2.4	3.7	2.6	3.1	0
Misc.	7.4	2.4	1.6	4.8	5.0	7.7	0	3.9	0	6.4	4.9	11.1	7.9	3.1	11.1

Note: N equals number of firms. Firms could have multiple responses. Data represent a cross tabulation of responses to separate questions on (a) type(s) of assistance needed and (b) reason(s) given by firms that said they had tried, but had not succeeded in meeting all their needs.

Table 16

**Reason for Not Fully Meeting Business, Management,
and Technical Assistance Needs
by Number of Employees
(Percent of Resp. Firms That Did Not Meet All Needs*)**

Reason	Total (N=136)	Number of Employees			
		1-5 (N=65)	6-15 (N=45)	16-50 (N=19)	51+ (N=7)
Could not find sources to provide the service	23.5	24.6	22.2	21.1	28.6
Found sources, but could not afford them	50.0	49.2	53.3	52.6	28.6
Sources only met partially the needs	45.6	49.2	37.8	57.9	28.6
Discussions in progress	5.1	3.1	4.4	5.3	28.6
Cost and time too high	2.9	0	6.7	5.3	0
(Received help, but) sources provided poor help	2.2	3.1	2.2	0	0

*Data represent responses to the series of questions (a) “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services”; (b) if yes, “how have you tried to meet those needs and what was the result”; (b.1) “tried but did not succeed in meeting needs or only partially met needs because:”

Note: N equals the number of firms. Firms could have multiple responses.

Table 17

**Reason for Not Fully Meeting Business, Management,
and Technical Assistance Needs
by Minority Status
(Percent of Resp. Firms That Did Not Meet All Needs*)**

Reason	Total (N=136)	Minority Status		
		Woman-Owned Firms (N=21)	Minority- Owned Firms (N=18)	Other Firms** (N=101)
Could not find sources to provide service	23.5	23.8	27.8	22.8
Found sources, but could not afford them	50.0	52.4	50.0	50.5
Sources only partially met needs	45.6	61.9	38.9	44.6
Discussions in progress	5.1	0	5.6	5.9
Cost and time too high	2.9	0	0	4.0
(Received help, but) sources provided poor help	2.2	0	0	3.0

*Data represent responses to the series of questions (a) “from the time that your SBIR grant started until now, has your firm needed any business, management, and/or technical assistance to help develop or produce SBIR-related products, processes, or services”; (b) if yes, “how have you tried to meet those needs and what was the result”; (b.1) “tried but did not succeed in meeting needs or only partially met needs because:”

**“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Firms could have multiple responses.

Table 18
Source of Business, Management, and Technical Assistance
By Type of Assistance Needed*
(Percent of Resp. Firms That Received Assistance)

Reason	Total (N=318)	Type of Assistance Needed													
		Accting. & Bkkpng. (N=42)	Bus. Planning (N=61)	Commercial- ization Planning (N=83)	Export (N=20)	Facil. & Location (N=13)	H.R (N=23)	Legal (N=51)	Mgt. (N=25)	Mrkting. (N=78)	Market Assess. (N=82)	Meeting Reguls. & Stndrs. (N=27)	Partning With Other Firms (N=76)	Patent & License (N=65)	Tech. (R&D-Rel) (N=36)
Agricultural Extension Service	1.6	2.6	3.4	2.0	9.1	3.1	5.7	1.5	2.0	3.1	2.9	3.3	2.7	1.7	2.3
Consultant	73.0	77.2	82.2	75.5	78.8	68.8	80.0	81.3	75.5	77.2	79.1	80.3	73.2	78.6	80.9
Incubator or Science Park	9.4	11.4	13.6	10.9	18.2	37.5	11.4	11.2	14.3	10.2	7.2	11.5	11.4	10.4	11.5
Manufacturing Extension Service	4.1	4.4	5.1	4.8	15.2	9.4	2.9	6.0	6.1	6.3	4.3	9.8	5.4	3.5	4.6
Small Bus. Dev. Center (SBDC)	10.7	14.9	15.3	17.7	30.3	9.4	25.7	15.7	20.4	17.3	18.7	16.4	16.1	13.9	12.2
SBA Prog. (Other Than SBDC)	5.6	5.3	6.8	7.5	9.1	6.3	8.6	8.2	4.1	10.2	7.9	8.2	7.4	6.9	5.3
State Tech. Program	14.4	12.3	24.6	21.1	18.2	18.8	22.9	14.9	14.3	21.3	21.6	19.7	18.8	16.8	12.2
University or Community College	27.6	30.7	31.4	29.9	24.2	43.8	40.0	33.6	22.4	29.9	33.8	27.9	32.9	31.8	41.2

*Data represent a cross tabulation of separate questions on (a) type(s) of assistance needed and (b) source(s) of assistance.

Note: N equals number of firms. Firms could have provided multiple responses.

Table 19

**Source of Business, Management, and Technical Assistance
by Fiscal Year
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Total (N=318)	Fiscal Year			
		1994 (N=77)	1995 (N=99)	1996 (N=140)	1997 (N=181)
Agricultural Extension Service	1.6	1.3	1.0	2.1	1.1
Consultant	73.3	75.3	76.0	72.9	76.8
Incubator or Science Park	9.4	5.2	6.0	6.4	9.9
Manufacturing Extension Service	4.1	3.9	2.0	7.1	2.2
Small Bus. Dev. Ctr. (SBDC)	10.7	6.5	9.0	13.6	9.9
SBA Prog. (Other Than SBDC)	5.7	6.5	8.0	7.1	5.0
State Technology Program	14.5	20.8	21.0	20.7	14.9
University or Community College	27.7	29.9	25.0	35.7	29.3
Other	26.1	31.2	27.0	22.9	26.5
Attorney	3.8	5.2	2.0	3.6	4.4
Govt. Sponsored Confs., etc.	3.8	6.5	5.0	4.3	1.1
Partner With Other Firms	7.5	9.1	9.0	5.7	8.3
Subcontract to Prof./Tech. Firms	8.5	10.4	6.0	6.4	8.8

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category. Firms could have multiple responses. The fiscal year is determined by the federal agency sponsor.

Table 20
Source of Business, Management, and Technical Assistance
by Agency Sponsor
(Percent of Resp. Firms That Received Asst.)

Source of Assistance	Agency Sponsor											
	Total (N=318)	DOAG (N=18)	DOC (N=13)	DOD (N=144)	DOED (N=9)	DOE (N=40)	DOT (N=5)	EPA (N=10)	HHS (N=99)	NASA (N=51)	NRC (N=2)	NSF (N=41)
Agricultural Extension Service	1.6	0	0	0.9	0	4.3	0	0	0	0	0	3.4
Consultant	73.3	61.1	84.6	70.8	55.6	82.5	80.0	60.0	82.8	78.4	100.0	68.3
Incubator or Science Park	9.4	5.6	0	9.7	0	0	0	10.0	14.1	3.9	0	0
Manufacturing Extension Srvc.	4.1	11.1	7.7	2.1	0	5.0	0	0	4.0	7.8	0	7.3
Small Bus. Dev. Ctr. (SBDC)	10.7	22.2	15.4	12.5	0	10.0	0	10.0	7.1	7.8	0	12.2
SBA Prog. (Other Than SBDC)	5.7	0	0	4.2	11.1	12.5	0	10.0	4.0	9.8	0	9.7
State Technology Program	14.5	27.8	30.8	14.6	11.1	30.0	0	30.0	8.1	23.5	50.0	29.3
University or Community College	27.7	44.4	23.1	27.8	22.2	35.0	40.0	40.0	26.3	31.4	50.0	26.8
Other	26.1	16.7	0	30.6	66.7	22.5	20.0	10.0	23.2	27.5	0	24.4
Attorney	3.8	0	0	2.8	11.1	5.0	0	0	5.1	3.9	0	7.3
Govt. Sponsored Confs., etc.	3.8	0	7.7	4.9	0	17.5	0	0	5.1	4.9	0	0
Partner With Other Firms	7.5	5.6	0	9.0	44.4	7.5	0	0	4.0	5.9	0	9.8
Subcontract to Prof./Tech. Firms	8.5	5.6	0	10.4	11.1	2.5	0	0	8.1	7.8	0	4.9

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. Firms could have multiple responses.

Table 21

**Source of Business, Management, and Technical Assistance
by Minority Status
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Total (N=318)	Minority Status		
		Woman-Owned Firms (N=37)	Minority-Owned Firms (N=29)	Other Firms* (N=257)
Agricultural Extension Service	1.6	2.7	0	1.6
Consultant	73.0	67.6	69.0	74.4
Incubator or Science Park	9.4	5.4	3.4	10.5
Manufacturing Extension Service	4.1	5.4	3.4	4.3
Small Bus. Dev. Ctr. (SBDC)	10.7	10.8	6.9	10.9
SBA Prog. (Other Than SBDC)	5.6	0	6.9	6.2
State Technology Program	14.4	5.4	3.8	15.5
University or Community College	27.6	24.3	34.5	27.9
Other	26.0	32.4	27.6	25.2
Attorney	3.8	8.1	3.4	3.1
Govt. Sponsored Confs., etc.	3.8	5.4	3.4	2.3
Partner With Other Firms	7.5	13.5	13.8	6.2
Subcontract to Prof./Tech. Firms	8.5	3.4	8.5	6.8

*“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Firms could have multiple responses.

Table 22

**Source of Business, Management, and Technical Assistance
by Number of Employees
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Total (N=318)	Number of Employees			
		1-5 (N=120)	6-15 (N=91)	16-50 (N=64)	51 + (N=37)
Agricultural Extension Service	1.6	2.5	2.2	0	0
Consultant	73.0	69.4	71.4	82.8	70.3
Incubator or Science Park	9.4	11.6	13.2	4.7	2.7
Manufacturing Extension Service	4.1	4.1	3.3	4.7	2.7
Small Bus. Dev. Ctr. (SBDC)	10.7	12.4	17.6	3.1	2.7
SBA Prog. (Other Than SBDC)	5.6	6.6	4.4	3.1	10.8
State Technology Program	14.4	18.2	9.9	17.2	10.8
University or Community College	27.6	27.3	29.7	20.3	32.4
Other	26.0	25.6	28.6	25.0	27.0
Attorney	3.8	4.1	5.5	3.1	0
Govt. Sponsored Confs., etc.	3.8	2.5	2.2	3.1	5.4
Partner With Other Firms	7.5	5.8	9.9	12.5	0
Subcontract to Prof./Tech. Firms	8.5	8.3	11.0	6.3	8.1

Note: N equals the number of firms. Firms could have multiple responses.

Table 23

**Source of Business, Management, and Technical Assistance
by SBIR Sales, Amount of Sales,
and Likelihood of Sales*
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Made Sales as a Result of SBIR Award(s)*		Amount of Sales*			Likelihood of Sales*		
	Yes (N=188)	No (N=127)	\$1-\$100K (N=54)	\$100K - \$250K (N=30)	More than \$250K (N=78)	Highly Likely (N=69)	Likely (N=45)	Not Likely (N=11)
Agricultural Extension Service	1.6	1.6	1.9	0	1.3	2.9	0	0
Consultant	72.0	74.8	74.1	66.7	76.9	76.8	75.6	63.6
Incubator or Science Park	6.9	13.4	13.0	6.7	5.1	13.0	15.6	9.1
Manufacturing Extension Service	5.3	2.4	3.7	6.7	3.8	2.9	0	9.1
Small Buss. Dev. Ctr. (SBDC)	12.2	7.9	20.4	3.3	12.8	8.7	4.4	18.2
SBA Prog. (Other Than SBDC)	6.3	4.7	3.7	10.0	6.4	5.8	4.4	0
State Technology Program	15.9	12.6	16.7	10.0	20.5	15.9	8.9	9.1
University or Community College	28.0	26.8	24.1	33.3	28.2	26.1	26.7	36.4
Other	29.1	21.3	24.1	26.7	33.3	20.3	22.2	18.2
Attorney	5.3	1.6	3.7	0	6.4	1.4	2.2	0
Govt. Sponsored Confs., etc.	3.2	2.4	1.9	3.3	5.1	2.9	2.2	0
Partner With Other Firms	9.0	5.5	9.3	6.7	9.0	5.8	4.4	9.1
Subcontract to Prof./Tech. Firms	7.4	9.4	5.6	13.3	7.7	7.2	13.3	9.1

*“Sales” represent responses to the survey question “have you sold products, processes, or services as a result of the SBIR Phase II award?” “Amount of Sales” represents responses to the question “if yes, how much was sold?” “Likelihood of Sales” represents responses to the question “if no, how likely is it that the products, processes, or services that are the subject of the SBIR Phase II award will be sold?”

Note: N equals the number of firms. Firms could have multiple responses.

Table 24
Perceived Impact of Assistance on Firms' Ability
to Commercialize SBIR Results
by SBIR-Related Sales*
(Percent of Respondent Firms That Received Assistance)

Response**	Total		Phase II Award Completed		Phase II Award Not Completed	
	Made Sales (N=190)	Did Not Make Sales (N=137)	Made Sales (N=161)	Did Not Make Sales (N=64)	Made Sales (N=29)	Did Not Make Sales (N=73)
Assistance helped	92.6	81.0	91.9	78.1	96.6	83.6
Assistance did not help	7.4	19.0	8.1	21.8	3.4	16.4

*“Sales” represent responses to the survey question “have you sold products, processes or services as a result of the SBIR Phase II award?”

**Data represent responses to the question "if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed?" Firms were given the choices of “yes” and “no”; “assistance helped” represents “yes” answers, “assistance did not help” represents “no” answers.

Note: N equals the number of firms. Percentages may not add to 100 percent because of rounding.

Table 25

**Importance of Assistance in Commercializing SBIR Results*
by Type of Assistance
(Mean Percent of Resp. Firms That Received Asst.)**

Type of Assistance	Importance of Assistance*		
	Very Important	Somewhat Important	Not Important
Accounting & Bookkeeping (N=88)	58.0	40.9	1.1
Business Planning (N=94)	58.5	40.4	1.1
Commercialization Planning (N=108)	60.7	38.4	0.9
Exporting (N=28)	60.7	32.1	7.1
Facilities & Location Assistance (N=26)	57.7	34.6	7.7
Human Resources (N=24)	50.0	41.7	8.3
Legal (N=108)	57.4	41.7	0.9
Management (N=29)	55.2	44.8	0
Marketing (N=99)	66.7	30.3	3.0
Market Assessments (N=109)	60.6	36.7	2.8
Meeting Government, International, & Regulatory Standards (N=49)	51.0	44.9	4.1
Partnering with Other Firms (N=123)	69.9	26.0	4.1
Patenting & Licensing (N=143)	72.7	27.3	0
Technical (R&D-Related) (N=118)	68.6	30.5	0.8

*“Importance of Assistance” represents responses to the question “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/service or shorten the time needed; if yes, how important was this assistance in helping you produce and sell your SBIR-related product/process/service or move you toward that goal?” Firms were given the response choices of “very important,” “somewhat important,” and “not important.”

Note: N equals the number of firms. Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 26
Importance of Assistance in
Commercializing SBIR Results:
Summary of Firms Responding “Very Important”*
by Type of Assistance and Agency Sponsor
(Mean Percent of Resp. Firms That Received Asst.)

Type of Assistance	Total	Agency										
		DOAG	DOC	DOD	DOED	DOE	DOT	EPA	HHS	NASA	NRC	NSF
Accounting & Bookkeeping (N=51)	58.0	50.0	50.0	42.9	100.0	87.5	0	100.0	67.6	50.0	0	62.5
Business Planning (N=55)	58.5	50.0	60.0	51.1	100.0	27.8	0	20.0	57.7	45.5	100.0	53.8
Commercialization Planning (N=68)	60.7	71.4	57.1	52.7	75.0	61.9	50.0	66.7	55.6	56.3	100.0	56.3
Exporting (N=17)	60.0	50.0	0	60.0	0	100.0	0	0	71.4	80.0	0	50.0
Facilities & Location Assistance (N=15)	57.7	50.0	0	44.4	100.0	100.0	0	50.0	87.5	0	0	50.0
Human Resources (N=12)	50.0	50.0	0	38.5	0	50.0	0	0	80.0	66.7	0	0
Legal (N=62)	57.4	20.0	83.3	45.5	100.0	63.6	0	66.7	71.8	73.3	0	76.9
Management (N=16)	55.2	0	0	53.8	100.0	50.0	0	0	72.7	100.0	0	0
Marketing (N=66)	66.7	50.0	60.0	51.0	75.0	50.0	0	80.0	83.3	50.0	100.0	50.0
Market Assessments (N=66)	60.6	50.0	50.0	54.7	50.0	50.0	33.3	75.0	56.7	66.7	100.0	47.1
Meeting Government & International Regulatory Standards (N=25)	51.0	0	0	23.5	75.0	25.0	0	0	73.9	33.3	0	33.3
Partnering with Other Firms (N=86)	69.9	28.6	85.7	74.2	100.0	71.4	100.0	100.0	74.3	69.6	100.0	84.2
Patenting & Licensing (N=104)	72.7	50.0	71.4	72.3	100.0	77.8	100.0	75.0	79.2	72.4	100.0	76.5
Technical (R&D-Related) (N=81)	68.6	62.5	0	65.1	100.0	53.3	100.0	50.0	68.3	71.4	100.0	68.8

*Firms were asked “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed; if yes, how important was the assistance in helping you produce and sell your SBIR- related product/process/service or help you move toward that goal?” Firms were given the choices of “very important,” “somewhat important,” and “not important.”

Note: Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 27

**Importance of Assistance in Commercializing SBIR Results*
Summary of Firms Responding “Very Important”*
by Type of Assistance and SBIR Technology Area
(Mean Percent of Resp. Firms That Received Asst.)**

Type of Assistance	SBIR Technology Area								
	Total	Comp./ Info. Process.	Electronics	Materials	Mech. Perf.	Energy Convr. / Use	Envir. & Nat. Sciences	Life Sciences	Other
Accounting & Bookkeeping	58.0	44.4	47.1	64.3	75.0	33.3	66.7	68.8	75.0
Business Planning	58.5	71.4	43.8	53.3	60.0	40.0	81.8	64.3	25.0
Commercialization Planning	60.7	47.4	50.0	56.3	100.0	50.0	92.9	46.7	60.0
Exporting	60.7	100.0	44.4	100.0	100.0	0	75.0	75.0	0
Facilities & Location Assistance	57.7	80.0	66.7	40.0	0	0	33.3	71.4	0
Human Resources	50.0	33.3	100.0	20.0	100.0	0	75.0	75.0	0
Legal	57.4	52.0	60.9	57.1	50.0	71.4	42.9	65.0	25.0
Management	55.2	50.0	50.0	40.0	100.0	33.3	66.7	66.7	0
Marketing	66.7	70.6	62.5	61.5	60.0	44.4	72.7	93.8	33.3
Market Assessments	60.6	33.3	65.0	80.0	83.3	28.6	70.0	57.9	66.7
Meeting Government & International Regulatory Standards	51.0	66.7	20.0	50.0	33.3	0	75.0	78.6	0
Partnering with Other Firms	69.9	81.8	72.0	68.2	60.0	75.0	61.5	68.4	50.0
Patenting & Licensing	72.7	69.6	81.8	57.1	100.0	20.0	76.5	88.5	100.0
Technical (R&D-Related)	68.6	86.7	63.6	62.5	50.0	91.7	50.0	72.0	50.0

*Firms were asked “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed; if yes, how important was the assistance in helping you produce and sell you SBIR-related product/process/service or help you move toward that goal?” Firms were given the choices of “very important,” “somewhat important,” and “not important.”

Note: Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” add 100 percent (may vary slightly because of rounding).

Table 28

**Importance of Assistance in Commercializing SBIR Results:
Summary of Firms Responding “Very Important”*
by Type of Assistance and Number of Employees
(Mean Percent of Resp. Firms That Received Asst.)**

Type of Assistance	Total	Number of Employees			
		1-5	6-15	16-50	51+
Accounting & Bookkeeping	58.0	69.0	52.9	22.2	66.7
Business Planning	58.5	61.8	64.3	50.0	50.0
Commercialization Planning	60.7	65.9	66.7	44.0	60.0
Exporting	60.7	63.6	40.0	100.0	100.0
Facilities & Location Assistance	57.7	75.0	42.9	33.3	100.0
Human Resources	50.0	80.0	42.9	25.0	100.0
Legal	57.4	67.4	47.5	50.0	80.0
Management	55.2	66.7	50.0	25.0	100.0
Marketing	66.7	82.4	60.6	58.3	66.7
Market Assessments	60.6	60.6	67.6	48.0	61.5
Meeting Government, International, & Regulatory Standards	51.0	62.5	45.0	44.4	50.0
Partnering with Other Firms	69.9	77.8	67.4	64.5	66.7
Patenting & Licensing	72.7	74.5	78.0	64.5	64.3
Technical (R&D-Related)	68.6	77.1	71.9	36.8	76.5

*Firms were asked “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed; if yes, how important was the assistance in helping you produce and sell your SBIR-related product/process/service or help you move toward the goal?” Firms were given the choices of “very important,” “somewhat important,” and “not important.”

Note: Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 29

**Importance of Assistance
in Commercializing SBIR Results:
Summary of Firms Responding “Very Important”*
by Type of Assistance and Minority Status
(Mean Percent of Resp. Firms That Received Asst.)**

Type of Assistance	Total	Minority Status		
		Woman-Owned Firm	Minority-Owned Firm	Other Firms**
Accounting & Bookkeeping (N=51)	58.0	66.7	62.5	54.8
Business Planning (N=55)	58.5	50.0	57.1	59.0
Commercialization Planning (N=68)	60.7	62.5	46.7	60.5
Exporting (N=17)	60.7	50.0	60.0	61.9
Facilities & Location Assistance (N=15)	57.7	50.0	100.0	56.5
Human Resources (N=12)	50.0	33.3	0	55.0
Legal (N=62)	57.4	61.5	63.6	56.8
Management (N=16)	55.2	100.0	0	50.0
Marketing (N=66)	66.7	42.9	80.0	68.4
Market Assessments (N=66)	60.6	58.3	81.3	56.5
Meeting Government, International and/or Regulatory Standards (N=25)	51.0	50.0	50.0	48.8
Partnering with Other Firms (N=86)	69.9	73.3	78.6	68.4
Patenting & Licensing (N=104)	72.7	66.7	80.0	72.7
Technical (R&D-Related) (N=81)	68.6	76.9	42.9	71.3

*Firms were asked “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed; if yes, how important was the assistance in helping you produce and sell your SBIR-related product/process/service or help you move toward that goal?” Firms were given the choices “very important,” “somewhat important,” and “not important.”

**“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 30

**Importance of Assistance Not Received
in Commercializing SBIR Results*
by Type of Assistance
(Mean Percent of Resp. Firms That Received Asst.)**

Type of Assistance	Importance of Assistance		
	Very Important	Somewhat Important	Not Important
Accounting & Bookkeeping (N=60)	28.3	31.7	40.0
Business Planning (N=92)	56.5	33.7	9.8
Commercialization Planning (N=108)	71.3	25.9	2.8
Exporting (N=67)	25.4	41.8	32.8
Facilities & Location (N=58)	19.0	27.6	53.4
Human Resources (N=61)	24.6	31.1	44.3
Legal (N=70)	37.1	30.0	32.9
Management (N=63)	30.2	42.9	27.0
Marketing (N=104)	79.9	17.3	4.8
Market Assessments (N=109)	77.1	19.3	3.7
Meeting Government & International Reg. Standards (N=61)	36.1	32.8	31.1
Partnering with Other Firms (N=108)	66.7	24.1	9.3
Patenting & Licensing (N=77)	55.8	26.0	18.2

*Firms were asked “if you have received assistance, do you believe that receiving this assistance has helped/will help you produce and sell your SBIR-related products/processes/services or shorten the time needed; if yes, how important was the assistance in helping you produce and sell your SBIR-related product/process/service or help you move toward that goal?” Firms were given the choices “very important,” “somewhat important,” and “not important.”

Note: N equals number of firms. Firms could have multiple responses. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 31
Result of Effort to Obtain Financing for SBIR
Development and Commercialization
by SBIR Sales*
(Percent of Respondent Firms)

Result	Total (N=583)	Made Sales as a Result of SBIR Awards(s)	
		Yes (N=320)	No (N=258)
Successfully obtained all capital sought	20.2	25.9	12.8
Did not need additional capital	21.6	26.3	15.9
Tried, but did not succeed in obtaining all capital sought	24.4	29.1	19.0
Did not try because it is premature **	26.1	13.4	41.5
Did not try because of other reason **	10.1	7.2	14.0

*“Sales” represent responses to the survey question “have you sold products, processes, or services as a result of the SBIR Phase II award?”

□**Firms could respond to more than one category.

Note: N equals the number of firms.

Table 32

**Result of Effort to Obtain Financing for
SBIR Development and Commercialization
by Fiscal Year
(Percent of Respondent Firms)**

Result	Total (N=583)	Fiscal Year			
		1994 (N=152)	1995 (N=194)	1996 (N=231)	1997 (N=307)
Successfully obtained all capital sought	20.2	19.7	25.8	25.1	21.8
Did not need additional capital	21.6	21.7	19.6	24.2	20.5
Tried, but did not succeed in obtaining all capital sought	24.4	32.2	25.8	23.8	20.5
Did not try because it is premature*	26.1	20.4	19.6	21.6	30.0
Did not try because of other reason*	10.1	8.6	10.8	7.4	8.8

*Firms could respond to more than one category.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category.

Table 33

**Result of Effort to Obtain Financing for
SBIR Development and Commercialization
by Number of Employees
(Percent of Respondent Firms)**

Result	Total (N=583)	Number of Employees			
		1-5 (N=197)	6-15 (N=167)	16-50 (N=123)	51 + (N=86)
Successfully obtained all capital sought	20.2	11.2	25.1	17.1	36.0
Did not need additional capital	21.6	15.2	22.8	25.2	27.9
Tried, but did not succeed in obtaining all capital sought	24.4	27.4	27.5	26.0	10.5
Did not try because it is premature*	26.1	36.0	21.6	18.7	22.1
Did not try because of other reason*	10.1	12.7	5.4	15.4	5.8

*Firms could respond to more than one category.

Note: N equals the number of firms.

Table 34
Result of Effort to Obtain Financing
for SBIR Development and Commercialization
by Minority Status
(Percent of Respondent Firms)

Result	Total (N=583)	Minority Status		
		Woman- Owned Firms (N=74)	Minority- Owned Firms (N=56)	Other Firms* (N=465)
Successfully obtained all capital sought	20.2	17.6	19.6	20.4
Did not need additional capital	21.6	18.9	8.9	23.2
Tried, but did not succeed in obtaining all capital sought	24.4	18.9	28.6	24.9
Did not try because it is premature**	26.1	31.1	35.7	24.3
Did not try because of other reason**	10.1	14.9	7.1	9.9

*“Other Firms” are those firms that did not report being minority- or woman-owned.

**Firms could respond to more than one category.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category.

Table 35
Source of Financing
for SBIR Development and Commercialization
by Agency Sponsor
(Percent of Resp. Firms That Received Financing)

Source	Agency Sponsor											
	Total (N=264)	DOAG (N=20)	DOC (N=7)	DOD (N=132)	DOED (N=5)	DOE (N=40)	DOT (N=3)	EPA (N=8)	HHS (N=63)	NASA (N=52)	NRC (N=1)	NSF (N=30)
Banks and Other Financial Institutions	26.5	30.0	14.3	26.5	40.0	30.0	33.3	50.0	20.6	34.6	100.0	16.7
Family and Friends	9.8	0	14.3	6.8	40.0	7.5	0	12.5	15.9	7.7	0	6.7
Government Programs	22.3	20.0	42.9	20.5	60.0	27.5	66.7	25.0	12.7	30.8	0	26.7
Other Firms/Corporate Partners/Strategic Alliances	13.3	5.0	42.9	18.9	40.0	20.0	33.3	12.5	11.1	21.2	0	30.0
Owner(s) of Firm	41.7	30.0	100.0	40.2	40.0	35.0	66.7	71.4	44.4	34.6	100.0	30.0
Venture Capital Firms and Angels	20.1	10.0	0	21.2	0	27.5	0	0	20.6	28.8	0	30.0

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. Firms could have multiple responses.

Table 36
Source of Financing
for SBIR Development and Commercialization
by Fiscal Year
(Percent of Resp. Firms That Received Financing)

Source	Total (N=264)	Fiscal Year			
		1994 (N=77)	1995 (N=95)	1996 (N=110)	1997 (N=137)
Banks and Other Financial Institutions	26.5	24.7	31.6	28.2	24.1
Family and Friends	9.8	6.5	8.4	10.0	8.0
Government Programs	22.3	23.4	20.0	20.9	19.0
Other Firms/Corporate Partners/ Strategic Alliances	13.3	16.9	21.1	18.2	16.8
Owner(s) of Firm	41.7	39.0	37.9	40.9	40.1
Venture Capital Firms and Angels	20.1	16.9	20.0	20.0	25.5

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category. Firms could have multiple responses. The fiscal year is determined by the federal agency sponsor.

Table 37
Source of Financing
for SBIR Development and Commercialization
by Number of Employees
(Percent of Resp. Firms That Received Financing)

Source	Total (N=264)	Number of Employees			
		1-5 (N=77)	6-15 (N=88)	16-50 (N=52)	51 + (N=44)
Banks and Other Financial Institutions	26.5	19.5	29.5	28.8	31.8
Family and Friends	9.8	11.7	13.6	7.7	2.3
Government Programs	22.3	28.6	15.9	19.2	25.0
Other Firms/Corporate Partners/Strategic Alliances	13.3	15.6	10.2	15.4	13.6
Owner(s) of Firm	41.7	53.2	48.9	32.7	18.2
Venture Capital Firms and Angels	20.1	9.1	17.0	34.6	27.3

Note: N equals the number of firms. Firms could have multiple responses.

Table 38
Source of Financing
for SBIR Development and Commercialization
by Minority Status
(Percent of Resp. Firms That Received Financing)

Source	Total (N=264)	Minority Status		
		Woman- Owned Firms (N=33)	Minority- Owned Firms (N=30)	Other Firms* (N=207)
Banks and Other Financial Institutions	26.5	21.2	33.3	26.1
Family and Friends	9.8	6.1	13.3	9.7
Government Programs	22.3	18.2	16.7	23.2
Other Firms/Corporate Partners/Strategic Alliances	13.3	18.2	10.0	13.0
Owner(s) of Firm	41.7	45.5	50.0	40.6
Venture Capital Firms and Angels	20.1	15.2	10.0	25.1

*“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Firms could have multiple responses.

Table 39

**Assistance with Obtaining Financing
for SBIR Development and Commercialization*
by SBIR-Related Sales and Likelihood of Sales**
(Percent of Respondent Firms)**

Assistance	Total (N=566)	SBIR-Related Sales		Likelihood of Sales		
		Made Sales (N=315)	Have Not Made Sales (N=245)	Highly Likely (N=113)	Likely (N=96)	Not Likely (N=33)
Received Assistance	28.8	31.1	26.1	31.9	22.9	15.2
Did Not Receive Assistance	71.2	68.9	73.9	68.1	77.1	84.8

*Data represent responses to the question “did you receive assistance from anyone outside your firm to help you identify financial sources or help you to obtain financing?” Firms were given the choices of “yes” and “no”; “received assistance” represents “yes” responses and “did not receive assistance” represents “no” responses.

**“Sales” represent responses to the question “have you sold products, processes, or services as a result of the SBIR Phase II award?” “Likelihood of Sales” represents responses to “if no, how likely is it that the products, processes, or services that are the subject of the SBIR Phase II award will be sold?” Firms were given the choices of “high likely,” “likely,” and “not likely.”

Note: N equals the number of firms. Percentages may not add to 100 percent because of rounding.

Table 40

**Assistance with Obtaining Financing
for SBIR Development and Commercialization*
by Number of Employees
(Percent of Respondent Firms)**

Assistance	Total (N=566)	Number Of Employees			
		1-5 (N=187)	6-15 (N=162)	16-50 (N=122)	51+ (N=85)
Received Assistance	28.8	28.3	32.7	33.6	17.6
Did Not Receive Assistance	71.2	71.7	67.3	66.4	82.4

*Data represent responses to the question “did you receive assistance from anyone outside your firm to help you identify financial sources or help you to obtain financing?” Firms were given the choices of “yes” and “no”; “received assistance” represents “yes” responses and “did not receive assistance” represents “no” responses.

Note: N equals the number of firms. Percentages may not add to 100 percent because of rounding.

Table 41
Source of Assistance
Used to Obtain Financing
for SBIR Development and Commercialization
by Fiscal Year
(Percent of Resp. Firms That Received Assistance)

Source of Assistance	Total (N=158)	Fiscal Year			
		1994 (N=46)	1995 (N=47)	1996 (N=77)	1997 (N=90)
Consultants	51.3	56.5	57.4	53.2	54.4
Family, Friends, Professional Contacts	12.0	8.7	5.9	9.1	9.8
Federal Government	17.1	13.0	19.1	20.8	18.9
Incubators and Res. Parks	9.5	8.7	4.3	5.2	6.7
State Technology Programs	26.6	21.7	27.7	26.0	27.8

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards in multiple years are represented in more than one category. Firms could have multiple responses. The fiscal year is determined by the federal agency sponsor.

Table 42

**Source of Assistance
Used to Obtain Financing
for SBIR Development and Commercialization
by Number of Employees
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Total (N=158)	Number of Employees			
		1 - 5 (N=53)	6 - 15 (N=52)	16 - 50 (N=40)	51 + (N=12)
Consultants	51.3	43.4	46.2	67.5	50.0
Family, Friends, and Professional Contacts	12.0	22.6	13.5	0	0
Federal Government	17.1	18.9	17.3	15.0	16.7
Incubators and Res. Parks	9.5	18.9	5.8	5.0	0
State Technology Programs	26.6	37.7	25.0	17.5	16.7

Note: N equals the number of firms. Firms could have multiple responses.

Table 43
Source of Assistance
Used to Obtain Financing
for SBIR Development and Commercialization
by Minority Status
(Percent of Resp. Firms That Received Asst.)

Source of Assistance	Total (N=158)	Minority Status		
		Woman- Owned Firm (N=18)	Minority- Owned Firm (N=19)	Other Firms* (N=127)
Consultants	51.3	44.4	47.4	52.8
Family, Friends, Professional Contacts	12.0	16.7	5.3	11.8
Federal Government	17.1	11.1	10.5	18.1
Incubators and Res. Parks	9.5	11.1	5.3	9.4
State Technology Programs	26.6	22.2	21.1	28.3

*“Other Firms” are those firms that did not report being minority- or woman-owned.

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because some firms are represented in more than one category. Firms could have multiple responses.

Table 44

**Source of Assistance Used to Obtain Financing
for SBIR Development and Commercialization
by Importance of Assistance*
(Percent of Resp. Firms That Received Asst.)**

Source of Assistance	Importance of Assistance*		
	Very Important	Somewhat Important	Not Important
Consultants (N=86)	42.3	39.4	18.3
Family, Friends, & Professional Contacts (N=8)	50.0	50.0	0
Federal Government (N=44)	45.8	37.5	16.7
Incubators & Res. Parks (N=32)	18.2	27.3	54.5
State Technology Programs (N=55)	34.3	48.6	17.1

*Data represent responses to the questions “did you receive assistance from anyone outside your firm to help you identify financial sources or help you obtain financing”; if yes, “what sources”; and if yes, “how important were these sources in helping you obtain financing?” Firms were given the choices “very important,” “somewhat important,” and “not important.”

Note: N equals the number of firms. “Very important,” “somewhat important,” and “not important” equal 100 percent (may vary slightly because of rounding).

Table 45
Number of Employees
by Agency Sponsor
(Percent of Respondent Firms)

No. of Employees	Agency Sponsor											
	Total (N=603)	DOAG (N=39)	DOC (N=21)	DOD (N=271)	DOED (N=13)	DOE (N=75)	DOT (N=8)	EPA (N=16)	HHS (N=167)	NASA (N=102)	NRC (N=5)	NSF (N=61)
1-5	33.5	35.9	19.0	23.2	61.5	22.7	12.5	37.5	35.9	22.5	60.0	34.4
6-15	29.0	38.5	33.3	31.0	30.8	17.3	25.0	31.3	24.6	25.5	0	14.8
16-25	13.1	7.7	9.5	15.5	7.7	18.7	12.5	0	10.8	19.6	0	16.4
26-50	9.0	5.1	14.3	10.3	0	13.3	12.5	25.0	80.4	9.8	0	13.1
51-100	6.5	2.6	19.0	7.7	0	9.3	12.5	6.3	8.4	8.8	0	13.1
101 +	9.0	10.3	4.8	12.2	0	18.7	25.0	0	12.0	13.7	40.0	8.2
Mean	33.9	30.3	60.0	42.4	5.7	55.1	56.6	18.3	40.6	53.2	72.4	30.4
Std. Dev.	72.6	64.1	160.1	81.5	4.7	83.4	61.0	19.6	80.6	113.7	95.3	64.1

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that Received awards from multiple agencies are represented in more than one category. Percentages may not add to 100 percent because of rounding.

Table 46

**Division of Effort Between
R&D, Production, and Services*
by Agency Sponsor
(Mean Percent of Respondent Firms)**

Type of Effort	Total (N=602)	Agency Sponsor										
		DOAG (N=39)	DOC (N=19)	DOD (N=269)	DOED (N=13)	DOE (N=77)	DOT (N=8)	EPA (N=16)	HHS (N=166)	NASA (N=104)	NRC (N=5)	NSF (N=60)
R&D	52.9	51.4	46.0	52.5	67.3	57.4	36.3	56.8	58.0	51.8	33.0	59.0
Production (Products and Processes)	29.1	29.9	43.4	28.8	13.1	33.4	25.0	30.0	28.0	32.3	8.0	29.5
Services	18.0	18.7	10.6	19.0	19.6	9.1	38.8	13.2	13.9	15.9	59.0	11.4

*Data represent responses to the question “approximately what portion of your firm’s efforts (time and expense) are devoted to R&D, what portion to producing products and processes, and what portion to services?”

Note: N equals the number of firms. The total number of firms is less than the sum of firms by individual category because firms that received awards from multiple agencies are represented in more than one category. R&D, production, and services equal 100 percent (may vary slightly because of rounding).

Table 47
Division of Effort Between
R&D, Production, and Services*
by SBIR Technology Area
(Mean Percent of Respondent Firms)

Type of Effort	SBIR Technology Area								
	Total (N=602)	Comp/ Info. Process. (N=106)	Electronics (N=104)	Materials (N=81)	Mech. Perf. (N=43)	Energy Conv. / Use (N=45)	Envir. & Nat. Sciences (N=54)	Life Sciences (N=101)	Other (N=38)
R & D	52.9	51.7	53.2	52.8	51.3	67.0	45.0	57.6	32.7
Production (Products & Processes)	29.1	28.6	32.2	30.9	23.3	21.1	33.7	27.8	38.5
Services	18.0	19.7	14.6	16.3	25.3	11.9	21.3	14.6	28.8

*Data represent responses to the question “approximately what portion of your firm’s efforts (time and expense) are devoted to R&D, what portion to producing products and processes, and what portion to services?”

Note: N equals the number of firms. R&D, production, and services equal 100 percent (may vary slightly because of rounding).

Table 48

**Division of Effort Between
R&D, Production, and Services
by Number of Employees
(Mean Percent of Respondent Firms)**

Type of Effort	Total (N=602)	Number of Employees			
		1 - 5 (N=199)	6 - 15 (N=173)	16 - 50 (N=130)	51 + (N=91)
R&D	52.9	66.4	53.7	42.0	38.5
Production (Products & Processes)	29.1	19.3	29.1	33.8	42.4
Services	18.0	14.2	17.2	24.2	19.1

*Data represent responses to the question “approximately what portion of your firm’s efforts (time and expense) are devoted to R&D, what portion to producing products and processes, and what portion to services?”

Note: N equals the number of firms. R&D, production, and services equal 100 percent (may vary slightly because of rounding).

Table 49

**Number of Employees
by SBIR-Related Sales*
(Percent of Respondent Firms)**

Number of Employees	Total		Phase II Award Completed		Phase II Award Not Completed	
	Made Sales	Did Not Make Sales	Made Sales	Did Not Make Sales	Made Sales	Did Not Make Sales
Total (N=597)	55.4	44.6	68.1	31.9	25.1	74.9
1-5 (N=201)	40.8	59.2	54.4	45.6	17.6	82.4
6-15 (N=173)	65.3	34.7	77.9	22.1	35.3	64.7
16-25 (N=78)	60.3	39.7	70.5	29.5	23.5	76.5
26-50 (N=54)	70.4	29.6	73.3	26.7	55.6	44.4
51-100 (N=38)	57.9	42.1	69.0	31.0	22.2	77.8
101+ (N=53)	54.7	45.3	75.0	25.0	11.8	88.2

*“Sales” represent responses to the survey question “have you sold products, processes, or services as a result of the SBIR Phase II award?”

Note: N equals number of firms. Percentages may not add to 100 percent because of rounding.

Table 50
Number of Employees
by Likelihood of SBIR-Related Sales*
(Percent of Resp. Firms That Did Not Make Sales)

Number of Employees	Likelihood of Sales*		
	Highly Likely	Likely	Not Likely
Total (N=262)	45.3	40.5	14.2
1-5 (N=117)	46.2	39.3	14.6
6-15 (N=59)	55.9	32.2	11.9
16-50 (N=47)	31.9	53.2	14.9
51+ (N=39)	41.0	46.2	12.8

*“Likelihood of Sales” represents responses to the survey question “have you sold products, processes, or services, as a result of the SBIR Phase II award; if no, how likely is it that products, processes, or services that are the subject of the SBIR phase II award will be sold?” Firms were given the choices of “highly likely,” “likely,” and “not likely.”

Note: N equals number of firms. “Highly likely,” “likely,” and “not likely” equal 100 percent (may vary slightly because of rounding).