

Section 3

THE WORKBOOK

Strategic Planning
Customers/End Users
Market
Competitors

Prelude

The ATP program is designed to promote U.S. competitiveness by supporting high-risk research and development in technology areas where there is substantial potential for enhancing U.S. economic growth. The program has been highly successful in getting small, innovative firms to participate. Companies that receive ATP awards face many immediate challenges, due to the innovative nature of the technology being funded as well as the increased publicity the firms face after receiving an award. These challenges include:

- ▶ Having to deal with many suitors for "hot" technologies
- ▶ Having to develop more complex commercialization strategies
- ▶ Learning to focus in the context of a rich technology platform
- ▶ Having to develop more sophisticated planning
- ▶ Having to adapt to a more rapid learning curve

The focus of the basic concepts section was to provide information to enhance a more rapid learning curve and better decision making by small firms. Information, however, is never enough—it is only the starting point for action.

To facilitate action, the last section of this book contains a collection of activities to be addressed by the technology entrepreneur, either alone or with the assistance of an experienced, motivating mentor. As we have said earlier, such assistance could come from members of the company's board of directors, advisors, state service providers, or consultants. The role of the advisor is to help a company maintain a delicate balance between keeping these award-generated activities in the forefront while not distracting its management team from the company's core business.

Organization of Workbook

The activities included in the workbook relate to four content areas. Each has a direct bearing on the commercialization strategies you choose. These content areas include:

- ▶ strategic planning
- ▶ customers/end users
- ▶ market
- ▶ competitors

Of the 311 single applicant awards made since 1990, 212 have been made to small businesses.

Many of these issues will have been addressed by ATP awardees to some degree. One's understanding of the business environment and the best response to it, however, is dynamic and on-going.

Commercialization Toolkit™

- ▶ **Strategic plan**
- ▶ **Licensing Package™**
- ▶ **Business plan**
- ▶ **Presentation**

Do activities and then package.

Commercialization Toolkit™ is discussed in Chapter 1.

**FIGURE III-1:
ADVANCED ORGANIZER**

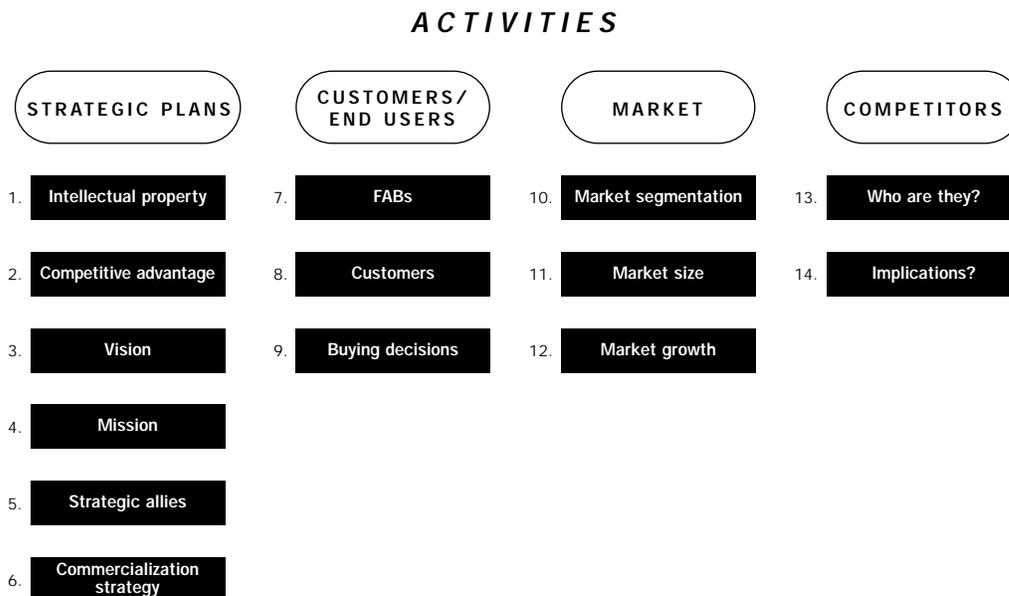
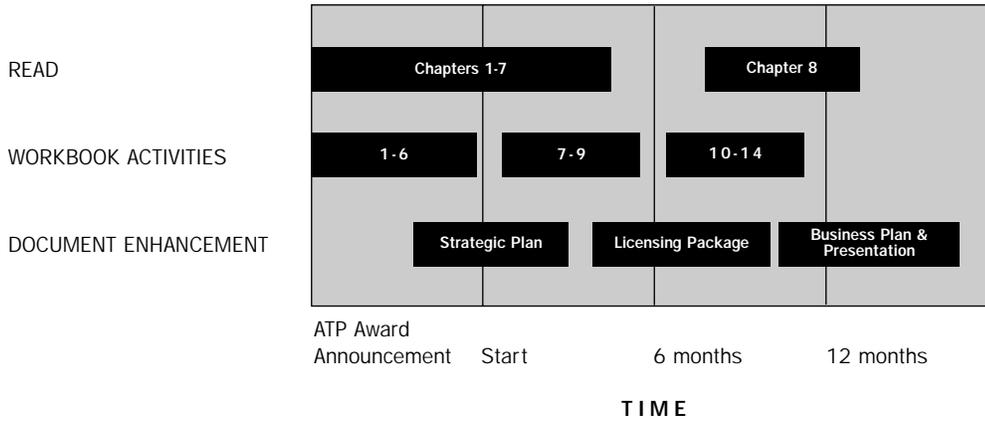


Figure III-1 is an advanced organizer representing the topics covered in this chapter. There are fourteen activities in all, relating to strategic planning, customers, markets, and competitors. It is highly recommended that the reader complete all pertinent activities prior to developing the various documents in the Commercialization Toolkit™. The activities contained in the Guide will assist in the development or revision of a strategic plan, licensing package, business plan, or presentation materials. An additional resource to consult for activities related to the development of operational plans is *Business Planning for Scientists and Engineers* (Servo, 1999).

When confronted with today's financial imperatives, planning is easily pushed aside. In order to increase the likelihood that good intentions result in successful action, start by setting up a schedule for completing the selected tasks. To obtain an objective assessment of your strengths and weaknesses, it is recommended that you start this process by consulting with a respected advisor. Then, complete only those activities that are relevant for you.

A strawman schedule for completion of various commercialization activities is listed below. This schedule will not meet all company needs.

**FIGURE III-2:
SCHEDULE FOR DEVELOPING COMMERCIALIZATION TOOLKIT™**



Related Activities:

Activity 1:

Intellectual Property

Activity 2:

Sustainable Competitive Advantage

Activity 3:

Vision

Activity 4:

Mission

Activity 5:

Strategic Allies

Activity 6:

Commercialization Strategy

The activities in this area of the Workbook (Activities 1 - 6) are intended to help management thoroughly consider fundamental issues related to strategic planning. The greatest headway with these tasks is often made in an off-site session, where interruptions can be minimized. If you intend to involve your board of directors in the planning process, an off-site meeting could be held in combination with a board of directors meeting.

To help synthesize the information resulting from these activities, we recommend that you begin work on a strategic plan for complex technology platforms (Chapter 4) following your planning sessions. Completion of this plan will require research on customers, markets, and industry trends.

A recommended low-cost resource for technology entrepreneurs is a very readable magazine entitled The Law Works:

*The Law Works
1935 S. Plum Grove Rd.,
Suite 158
Palatine, Illinois, 60067
(708) 705-7195*

The subscription cost is approximately \$45 per year. Call and ask them to send a sample so that you can assess its potential value.

A recommended book on intellectual property is Patent It Yourself, by David Pressman, Esq. This extremely readable book contrasts copyrights, trade secrets, and patents. It focuses on helping the reader understand the process of conducting a patent search, as well as filing and prosecuting patent applications.

Intellectual Property

One of the most significant changes during the past four years is the **provisional patent application process**. According to "Important Notice for Inventors," issued by the Patent and Trademark Office:

“As of June 8, 1995, inventors will be able to file a provisional application that will allow them to obtain an early filing date with few formalities and at a lower cost than filing a non-provisional application. This new application differs from a non-provisional application because the patent term does not start from this filing date, the application is not examined, and it cannot issue as a patent. The provisional patent application is retained in confidence and is automatically abandoned 12 months after filing. Before the provisional patent application expires, the applicant must file a non-provisional application to obtain a patent.

To file for a provisional patent application inventors should include:

- ▶ a clearly written description of the invention
- ▶ any drawings needed to understand the invention
- ▶ the filing fee of \$150 (\$75 for small entities), and
- ▶ a cover sheet identifying the inventor(s) name(s), residence(s), invention title, name and registration of correspondence address, and any U.S. Government agency that has a property interest in the application.

The inventors now have up to 12 months to file a non-provisional patent application under 35 US Section 111 (a) and claim the benefit of the provisional application filing date.”

For specific details about changes in U.S. patent law, please call the **Patent and Trademark Office (PTO) at (703) 305-9300**. For questions concerning any changes in the rules of practice before the Patent and Trademark Office, call (703) 305-9282.

At first blush, the provisional patent application may seem to bear similarities to the disclosure document program. However, the two are significantly different. The disclosure is used as evidence, whereas a provisional patent application is indeed an application. The 20-year clock does not start ticking until the formal application is filed. The major benefit to an inventor is that he can file a provisional patent application with a \$75 fee and receive a patent pending status. This enhances the inventor’s ability to interact with potential allies. One must then file the formal patent application within 12 months; otherwise the patent application will be abandoned. Consult the PTO with any questions.

Activities

Make a list of the intellectual property your firm has protected, noting the dates when patents, copyrights and trademarks have been filed or issued. If you find yourself indicating that your technology is “patentable” but have done nothing toward that end, start giving serious consideration to how you will protect your intellectual property.

WORKSHEET: ACTIVITY 1: INTELLECTUAL PROPERTY

DATE _____/_____/_____

INSTRUCTIONS: Use this area to generate a list of your current and pending intellectual property. With pending intellectual property, be sure to take action. You don’t want to revisit this page in six months and find that nothing has changed.

	Title	Date	Responsible party
Issued Patent			
Pending Patent			
Unfiled Patent Application			
Copyright			
Trademark			

Sustainable Competitive Advantage

Sustainable competitive advantage is the collection of characteristics which provide your firm and your technology/product with clear advantages in terms of cost, speed, exclusivity, and effectiveness in meeting genuine customer needs.

Competitive advantage is required for the long-term health of any company.

The types of things that provide a company with a sustainable competitive advantage include:

- ▶ intellectual property, e.g., patents, trade secrets, copyrights, trademarks
- ▶ the uniqueness of the technology and the limited number of people who have expertise in this area (hopefully many of them are employed by your company)
- ▶ cost of entry
- ▶ other advantages that enable you to be quicker and less expensive
- ▶ your record with respect to selecting successful new products or technologies, as well as your ability to keep to development timelines
- ▶ other organizational strengths such as your marketing and sales capabilities, access to distribution networks, and the quality of your work
- ▶ your strategic alliances and champions

Have I answered this question adequately?

Result: Your goal is to develop a list of those characteristics that comprise your “sustainable competitive advantage” and then to condense this list into a succinct statement of fewer than 50 words.

WORKSHEET: ACTIVITY 2: SUSTAINABLE COMPETITIVE ADVANTAGE

DATE _____/_____/_____

INSTRUCTIONS: Use this area to generate a list of those items that contribute to your sustainable competitive advantage. Then, generate a succinct statement that clearly expresses the competitive advantages of your company.

INTELLECTUAL PROPERTY: (This is the activity you just completed ((Activity 1)). Be sure to reference the information in your succinct statement.)

PERSONNEL:

COST OF ENTRY:

TRACK RECORD:

STRATEGIC ALLIES:

OTHER:

50-word statement of sustainable competitive advantage

What is Your Vision?

Management can't begin to map out financial, marketing, research and development, and manufacturing strategies until it decides upon a direction for the company's future. Many companies approach their growth strictly in an opportunistic fashion. Although a company should always remain open to opportunities, without a vision for the future, a company will not be able to propel itself forward in a purposeful way.

Activities and background:

The management team should spend time sharing visions for the future around each of the items listed below. This requires at least four hours of uninterrupted time. An off-site meeting may be the best way to make sufficient headway with this activity.

(1) PRODUCTS AND SERVICES

- ▶ What products and services will your company be providing?
- ▶ What type of work will you be doing: research, development, marketing, manufacturing, distribution?

(2) FINANCIAL GOALS

- ▶ What are your financial goals for five years from now?
- ▶ What will your company's (SBUs) revenue stream look like?
- ▶ What will your profit margin be?

(3) MARKET GOALS

- ▶ Who will your customers be?
- ▶ What geographic location will you serve?
- ▶ What percentage of market share will you possess?
- ▶ How big a player will your firm be in its defined market niche?

(4) IMAGE

- ▶ How will your organization be viewed by others?
- ▶ What will differentiate your firm from other companies?

(5) WHAT WILL YOU LOOK LIKE IN THE FUTURE?

- ▶ How large do you want to become?
- ▶ Where will your business be located?

Have I answered this question adequately?

Result: Your goal is to produce a thoughtful, two-to-three-page document. It doesn't need to be eloquent, but it does need to capture your vision for the future. Put the materials in a three-ring notebook and/or in a computer file. When you develop a commercialization strategy or sales and marketing objectives, check to see whether or

not it coincides with your vision. Let your vision propel you forward, rather than tie you to the present situation.

The most important elements of the vision are items 1-3. Items 4 and 5 are secondary items to consider when mapping a path for the future.

WORKSHEET: ACTIVITY 3: VISION

DATE _____/_____/_____

INSTRUCTIONS: Your vision for the future is a key element of what propels a company forward. Use the list of prompts on the previous page as discussion points for an off-site or after hours planning session. Your vision for the future must be one you have the energy and drive to pursue. For planning purposes, select a five-year horizon and summarize your conclusions below. Add additional pages as needed.

(1) PRODUCTS AND SERVICES:

(2) FINANCIAL GOALS:

(3) MARKET GOALS:

(4) IMAGE:

Mission Statement

Being able to describe your business in a very succinct fashion is a selling tool. Any manager should be able to clearly and simply express the essence of the business in one sentence. In addition to serving as a selling tool, a clear recognition of your company's mission helps define the commercialization strategies best suited for your firm.

Activities and background:

A good mission statement should answer the following questions:

- ▶ What business are you in? This question is answered by indicating the types of business functions your company performs, i.e., research and development, engineering, manufacturing, marketing, custom design, distribution.
- ▶ What products and technologies are involved?
- ▶ What markets do you serve?
- ▶ What is unique about your company? What differentiates it from others?

Have I answered this question adequately?

Process: Start by addressing the preceding questions. Be thorough and don't be concerned about length or style. Once you have addressed all of these issues, try expressing your mission in a 50-word statement. It will probably sound extremely dense. However, adding the word "limit" afterwards forces you to single out the critical elements. The resulting mission statement must pass "The Elevator Test;" i.e., you should be able to tell someone what your company does as the elevator moves between floors.

Results: Your goal is a pithy statement describing your company's mission. The following is a good example:

"Voltec Inc. designs, manufactures, and markets the only U/L-approved, high efficiency, computer-controlled power combustion gas fired boilers and heaters to the Real Estate, Education, Health Care and Service sections of the HVAC market in the commercial and industrial segments."

Although this statement is very dense, it contains all the required elements. One instantly knows what business functions the company performs—it designs, manufactures, and markets. One knows what products the company produces—gas fired-boilers and heaters. The listener knows what gives the company a sustainable competitive advantage—it has the only U/L-approved, high efficiency computer controlled device—and what markets it serves—the heating, ventilation and air conditioning market as it pertains to real estate, education, and health care. It would pass the elevator test.

WORKSHEET: ACTIVITY 4: MISSION

DATE _____/_____/_____

INSTRUCTIONS: Listed below are the four key elements of a good mission statement. Carefully consider each of these and then create a succinct statement. Begin by writing a sentence for each of the following prompts, and then combine them.

Business Functions:

Products/Technologies:

Markets:

Differentiators:

Succinct Mission Statement

Cooper, Robert. *Winning with New Products*. Reading, MA: Addison-Wesley, 1993

Strategic Allies

If the strategic ally or licensee to whom you entrust the future of your technology/product is not selected with care, your product could fail. Building on the recommendations of Robert Cooper, look for licensees or other strategic allies with whom there is market and/or technology synergy.

Background

In order to locate a potential strategic ally, **it is vital to know and address the ally's needs. This is your responsibility, not the ally's**, since you are doing the courting. In other words, when approaching potential strategic allies, your objective is to determine how you can enhance their business, NOT how they can enhance yours. By having your priorities in this order, both businesses will prosper. Suppliers of technology must be able to reduce their allies' (customers') costs or expand their revenues and earnings. Customers (allies) must help suppliers control the costs of selling and serving them. Making the customers a part of the process and sharing more information with them does this. One work that is particularly useful in setting the stage for such collaboration is entitled *Growth Partnering: How to Build Your Company's Profits by Building Customer Profits*, by Mack Hanan (1992).

The fundamental premise of Hanan's work is that successful partnerships are those in which you as a supplier can clearly demonstrate how you can help build your customer's profits. As a result of this focus and careful attention to laying the ground rules for successful collaboration, your firm will also profit. Hanan's book is filled with examples of how Boeing, Xerox, Toyota, and many other large companies have adopted this approach for mutual benefit. In order for such a relationship to work, there must be mutual objectives, mutual rewards, and mutual sharing of risk.

What this means is that you need to gather **detailed** information regarding potential allies, and determine whether there is the basis for a partnership. Do you have something to offer a particular customer that results in **significant cost reductions** or **significant revenue enhancement**? Of course you can't address this issue unless you know your potential allies well.

Hanan identifies many potential benefits from a large company can accrue from teaming with a small firm. These include:

- ▶ obtaining a source of new technology and products to supplement core technologies
- ▶ developing the ability to extend or round off current lines to markets
- ▶ gaining access to specialized market niches
- ▶ gaining new insights about the industry/business
- ▶ discovering a new training ground for entrepreneurial managers
- ▶ adding specialized application skills
- ▶ obtaining a high return on investment

In all cases, to sell these potential benefits, you need to know the large company's business and look at yours in a different way.

Activities

In order to find a good ally:

- (1) define the appropriate domain of potential allies and/or licensees based on the following:
 - ▶ needs addressed
 - ▶ technology synergy
 - ▶ market synergy
- (2) request copies of annual reports and SEC documents if publicly traded
- (3) obtain lists of patents and see if they are working in this area
- (4) find articles which show what they are doing relative to divestiture, acquisition, new product introductions, change in management, downsizing, and bankruptcy
- (5) obtain product catalogues and pricing information.

Have I answered this question adequately?

Process: Start by developing good intelligence files on potential strategic allies, reviewing the materials, and completing a partnerability analysis.

Result: The purpose of this exercise is to help clarify to whom your product/service can be of greatest advantage. Your goal is to prepare a partnerability analysis using the materials gathered. Develop a matrix—with potential allies listed down the ordinate and with three columns using the following headings: (1) contribution to cost reduction/ revenue enhancement, (2) time frame, and (3) partnering strategy. Complete this matrix to summarize the relative contribution that you could make to the strategic allies you are considering.

WORKSHEET: ACTIVITY 5: STRATEGIC ALLIES

DATE _____/_____/_____

INSTRUCTIONS: Begin this activity once you have developed good intelligence files on potential strategic allies. Then use the space below to clarify the nature of the synergy between your technology and their needs, technology, and/or marketing and sales capabilities. Add additional pages for each potential ally.

POTENTIAL ALLY NAME

Evidence of strategic fit:

Evidence of technology synergy:

Evidence of synergy with marketing/sales capability:

Evidence of corporate stability:

Commercialization Strategy

The commercialization strategy depends upon the vision and mission of your company. It includes an acknowledgment of the business functions that your company will perform and the financing strategies that you will use to realize your goals. For example, if the business function your company performs is limited to research and development, you might choose to bring the product to market through a licensing strategy. Possible financing strategies that you entertain could include:

- ▶ Development funds and licensing
- ▶ Small commitment of development funds and first right of refusal on licensing option

In other words, you would be looking to finance the latter stages of development and product introduction by finding a potential licensee who would be willing to fund and execute the following stages. Please note that those who entertain a licensing strategy must pay keen attention to all issues related to intellectual property protection.

By contrast, if your mission also includes manufacturing, then it would be reasonable to entertain one or more of the following.

- ▶ Debt financing
- ▶ Equity investment in parent company
- ▶ Equity investment in spin-off
- ▶ Joint ventures
- ▶ IPO (Initial Public Offering)
- ▶ Strategic alliances-marketing and distribution

Activities and background:

A commercialization strategy is an expression of the important milestones involved with moving a product from concept to product launch, accompanied by a proposed financing method for each. In preparing this statement, you might find it useful to think about the list of steps presented by Cooper (1993). Next to each activity, indicate how you would fund it. For example:

- | | |
|-----------------------------------|---|
| (1) Initial Screening | (1) Bid and Proposal line of General and Administrative (G and A) funds |
| (2) Preliminary market assessment | (2) Sweat equity |

- | | |
|--|---|
| (3) Preliminary technical assessment | (3) Phase I Small Business Innovation Research grant (SBIR) |
| (4) Detailed market assessment | (4) Retained earnings |
| (5) Predevelopment business/financial analysis | (5) Retained earnings |
| (6) Technology/product development | (6) ATP funding |
| (7) In-house product tests | (7) Corporate partner |
| (8) Customer product tests | (8) Beta test at prime partner site |
| (9) Trial sell | (9) License to distribution partner |
| (10) Trial production | (10) Equity financing from angels |
| (11) Pre-commercialization business analysis | (11) Corporate partner |
| (12) Production start-up | (12) Obtain equity capital |
| (13) Market launch | (13) Equity financing |

Please note that the milestones listed in the left-hand column come from Robert Cooper's work. This list is illustrative. Different steps will be appropriate for you depending upon the nature of your opportunity. For example, opportunities related to the pharmaceutical industry are likely to include such milestones as human trials and FDA approval.

WORKSHEET: ACTIVITY 6: COMMERCIALIZATION STRATEGY

DATE _____/_____/_____

INSTRUCTIONS: This is a summary sheet on which to map out factors that affect your strategy, as well as the preferred financing steps to utilize to fund each of the activities associated with bringing your product to market.

MISSION STATEMENT:

Business functions:

Target market(s):

Sustainable competitive advantage:

VISION: Select the descriptor that best fits your vision.

BUSINESS PHILOSOPHY:**PRODUCT OR TECHNOLOGY DESCRIPTION:****STAGE OF DEVELOPMENT:**

Customers/End Users

2

Related Activities:

Activity 7:

**Features, Advances, Benefits
(FABs)**

Activity 8:

Contacting Potential Customers

Activity 9:

Buying Decisions

It is important to have direct interaction with potential customers and end-users throughout the product development process. Such interaction helps verify where potential interest lies, which in turn affects the strategic decisions you make and lays the foundation for conducting a market assessment. The activities in this area of the Workbook (Activities 7 - 9) are intended to help management identify potential customers and end-users and distinguish between them, as well as to identify customer needs and benefits.

Rather than assigning this task to consultants or junior members of your staff, reserve interaction with potential customers for yourself. It is important that you not only hear what potential customers and end-users say, but also that you gauge their degree of enthusiasm and concern.

Customer feedback should also be used to shape your analysis of potential licensees and/or partners. This information will be important in completing your strategic planning process.

Background

Nothing replaces talking with potential end-users and customers. This is vital to successful commercialization and critical to determining a customer's genuine level of interest in what you have to offer. Early contact also helps you determine if your potential customers have the means to purchase your product. If a company thinks that your product is the greatest thing since sliced bread but doesn't have the funds to purchase it, the company's interest in your product is of little value. The activities in this section are all aimed at helping technologists prepare to talk with potential customers, end-users, and industry experts. Samples are included throughout.

Customers and end-users are often mentioned in the same breath, often leading entrepreneurs to the faulty conclusion that these are synonymous. They are not. An end-user is the entity that utilizes the item produced. A customer is the party which purchases it. The major difference then between customers and end-users is purchasing power. **Customers make the purchasing decision, but end-users may not.** If you reflect upon this for a moment, it soon becomes apparent that there is often a chain of customers between you and the ultimate end-user. It is also true that on occasion a customer may also be an end-user.

End-user needs are important because they influence purchase decisions.

Example 1: MRI Components

Assume that your firm manufactures a component for a magnetic resonance imaging machine (MRI) and that you are contemplating who is your customer and who is the end-user. It becomes apparent that hospital technicians who use the MRI are the end-users. How easy or difficult it is for the technicians to use the MRI is important, and affects the quality of the images produced. However, technicians do not make the decision to purchase the MRI. A board of hospital administrators and/or doctors most likely makes the decision. The hospital administrators are customers, but not your customers. Indeed, if you are the manufacturer of an MRI component, your customer is the system integrator who makes the decision to purchase your component. You need to understand your immediate potential customers, i.e., the frequency with which they purchase these components, what issues are important to them, price sensitivities, and the features, advantages, and benefits they seek. The ultimate customers in the chain (hospital administrators) are also important in understanding market size and the derived demand for this component. Problems the technicians have in using the MRI affect the decision makers at the hospital level. It quickly becomes apparent that understanding the needs and concerns of the entire customer chain is important.

Example 2: Software for Disabled Children

Assume that you design software for disabled children. The end-users are clearly the children. However, those with purchasing power are parents, teachers, and librarians. It is unlikely that children will directly purchase the software. Nevertheless, the children certainly influence the decision makers. If your commercialization strategy is to license to a software publisher, then your immediate customer is the publisher, not the parent, who likely will purchase the software from a re-seller. In order to understand the size of the market opportunity, you must examine the chain of customers and end-users that exist between you and the end of the chain. Understanding the needs and limitations of the end-users affects software design; understanding the purchasing behavior of the ultimate customer effects your understanding of market size and growth; and understanding the needs of your immediate customer allows you to position what you have relative to his needs.

Both customers and end-users are important. As you will discover in the next section, if no qualified customers exist, then you have no market, no matter how great the need. **A qualified customer is one with money, access, and desire.** The acronym MAD is sometimes used as shorthand to describe qualified customers. Your goal is to find customers who have Money, Access, and Desire. This customer is determined by need and the ability of what you offer to address that need. Access is determined by the channels that you use for sales and distribution.

MAD

- ▶ *Money*
- ▶ *Access*
- ▶ *Desire*

Money must exist in order for the interested party to qualify as a customer of interest to you. This point cannot be underestimated. Often entrepreneurs are blinded by the issue of need and confuse need with purchasing power—but these are two separate issues. You must first qualify potential customers on the basis of need and money, and then design your marketing and sales plan to maximize access.

Example 3: Exporting Rice

Let's assume that you grow rice and are looking to export to an overseas market. You know that thousands of individuals die each year from famine. Clearly there is a need for your agricultural product. However, the starving masses have no purchasing power. They are end-users, but, lacking the money to purchase what you have, they are not customers. If no relief organization steps forward to purchase the food on their behalf, no customers exist. Without qualified customers, no market exists, even though there is a need. However, if CARE or another relief organization steps forward to purchase the rice, a market is born. An absurd example? Not really.

Technologists frequently confound the need of end-users with market potential. A classic example involves the cleanup of U.S. nuclear sites. Economists study the problem and conclude that it will cost somewhere between \$200 billion and \$1 trillion to clean up these sites. As with the previous example (rice), there is clearly a need. However, if the federal government does not provide the funds to clean up the sites, there is no market in the same fashion that there was no market for selling rice to famine-ridden countries without qualified customers. End-users AND potential customers are important, but **qualified customers** that are MAD are vital!

Objectives, Method, and Questions

Many technology-driven companies fail to talk to potential customers early in the technology/product development process. The tendency is to assume that many customers will want the technology and that the technology or product addresses a real need. The ultimate survival of your business depends upon the purchases made by customers, and **it is vital to ask the customer what he wants early in the development process**. For the technology-driven company, the customer must quickly shift from being a hypothetical construct to a tangible entity. The earlier you begin discussions with potential customers, the quicker you can begin to articulate customer specifications and save development time and dollars.

There are many methods you can use to collect information from potential customers, end-users, and industry experts. You should ultimately use a method that fits with your planned activities and style. For example, if you plan to attend a trade show, you could develop a survey form and ask people to complete it. If you are traveling, you might collect anecdotal, in-depth information through person to person interviews. Other alternatives include phone interviews and mailed surveys. Whichever method you use to gather information, you must always begin by clarifying your objectives.

Objectives

Prepare for talking with potential customers and end-users by clarifying your objectives. For example, if your objective is to determine features that affect a purchase decision, you might ask:

- ▶ When buying a solution to Problem Y, what features do you look for?
- ▶ When comparing similar products, what do you compare?
- ▶ What are the key criteria you consider when deciding to purchase a solution for problem Y?
- ▶ How frequently do you purchase X?
- ▶ What is the average price range of solutions that you entertain?
- ▶ Who is involved in the decision to purchase X?

Method

The next decisions are how to gather the information needed and how large a sample is needed. As was mentioned earlier, face-to-face interviews can be conducted at trade shows, conferences, and meetings scheduled for the purpose of exploring these issues. Telephone interviews can be initiated by a letter advising that you will call to discuss XYZ or with a “cold” call. In-depth interviews allow you to branch and explore a range of issues based on the information that surfaces during the interview process. Once you have determined your objectives, generate questions that are intended to surface answers addressing your objectives, and then select a sample to contact.

Listed below are some questions that we generated before contacting industry experts. Our objective was to gather some useful data points that we could use in sizing the market for a power cogeneration device. We decided to interview industry experts instead of customers and end-users because it was most time efficient. You might also consider this as a strategy for gathering information.

Questions

Objective: To determine how many potential end-users there are in the U.S. for a cogeneration device in rural residences and remote works-sites.

- (1) How many rural residences are there in the U.S. which have inadequate electricity (inadequate = can't get it there or too expensive to do so)?
 - (a) What subset of these are in areas which have plenty of biomass (wood or agricultural waste)?
 - (b) How much electricity do they need?
 - (c) What is their reaction to the utility of co-generation from biomass and the generator output they would require?
 - (d) Do they keep data on recreational cabins and hunters' lodges in the outback? (Ask the same questions a through c)
- (2) Paper Industry—How do they define a remote work site?
 - (a) How many remote work-sites are there?
 - (b) Would they have use for the cogeneration device?
 - (c) How much energy would be required to drive X, Y, and Z?
 - (d) Are there tax or regulatory-driven incentives for getting rid of the waste that would fuel this cogeneration device?
- (3) Forestry—How many outposts are there? How many cabins in parks?
 - (a) What subset of these are in areas which have plenty of biomass (wood and agricultural waste)?
 - (b) How much electricity do they need?
 - (c) What is their reaction to utility of co-generation from biomass and the generator output they would require?

Finding Industry Experts

Generating a list of industry experts can be accomplished in a two-to-three-hour period, using a handful of reference materials available in any public library; for example:

- ▶ Encyclopedia of Associations
- ▶ Gales Directory of Publications and Broadcast Media
- ▶ U.S. Industrial Outlook

Sample Interviews

Once you have developed your objectives, questions, and contact list, the next task is to conduct the interviews. In all cases you should view the interviews as data-gathering. This is not a sales call, although the contacts may prove to be very useful in a wide variety of ways. Data gathering is something that all scientists and engineers do; the only difference in this situation is that you are collecting information from other people.

It is useful during the interviews to take good notes. Be sure to reference interviews with industry experts in your business plan and other documents that you generate regarding commercial potential. Listed below are samples of data collected in a few interviews with industry experts. The purpose for including this interview is merely to demonstrate the amount of information that can be obtained from well-structured phone interviews. The information gathered provided useful data points that could then be used in sizing a potential market.

Interview #1: Association

1. Logging in the industry is becoming more decentralized, with small contract logging firms filling the predominant role over the paper companies. There are far fewer company-owned centralized logging camps in harvesting sites that are without electric power.
2. While the lumber and paper industries (primarily paper) are incredibly energy intensive, using 12% of all industrial energy, amounting to 2.5-3 quads, or 3% of total U.S. energy consumption, the harvesting site uses little electricity.

Interview #2: Association

1. There are few remote facilities. Larger independent contract harvesters predominate over smaller players, and they tend to centralize their facilities in locations with access to power.
2. You might have an application involving powering very small sawmills, 1- to 2-man operations, which cut a customer's trees to build his log cabin.
3. As a result of environmental efforts, there is a lot more emphasis on leaving the waste in place. Downed logs provide homes for bugs and a habitat for small animals, which are food for raptors.
4. An exception may be large areas of dead wood, from beetle kill, for example. It is possible that small trail crews and ranger districts in these areas may have use for small-scale remote generated electric power. Mr. ABC, the new head of the Forest Service, is from Eastern Idaho, where there has been a lot of beetle kill. Discussed biomass utilization at the last industry round-table.

Interview #3: Association

1. Most remote work sites don't have a need for electricity.
2. You could use your device to turn chipping and debarking devices that require high torque.
3. There is no need for lighting at the remote sites.
4. I suggest you put together a focus group of loggers and put the issue to them. What you offer is radical and different from present thinking. It might have strong potential, but requires use in ways that are different and not readily apparent.
5. You might have an application in a small portable sawmill, but you might be too small in power.

Interview #4: Editor of a trade journal

1. Our readership is 31,000.
2. I think XYZ technology is a heck of an interesting idea. We put on tech conferences around the world, including Europe.
3. I see applications for the technology in Europe and developing nations.
4. There are a tremendous number of emergency loads that require just a fraction of the power of a household, such as for telecommunications equipment.
5. It is important to realize that there are entire sections of the U.S. where wood burning is an anathema. Creosote from wood stoves is a highly carcinogenic. Many ski areas in Colorado and Vermont restrict wood burning, with or without a catalyzer. This air pollution can be a problem any place, particularly in valleys with a lot of wood fires. In many of these areas, there are quite a few times a year when burning of biomass is restricted.
6. This is not a problem outside the U.S. I see thousands of site applications for your device in the Western Hemisphere.
7. Canada is more spread out; you can do anything you want there. Canada also allows government bodies to subsidize emergency power. This can work to keep people in areas or open up new areas for settlement.
8. It might be worthwhile to explore U.S. Government funding for the application of your device for disaster avoidance and recovery. I don't know where the funds are, but they're there.

Features /Advantages/Benefits

Customers use different criteria in making their purchasing decisions. Sometimes the decision is based on price and at other times on the features, advantages, and benefits of the product. It is, therefore, important to know how your technology/product compares with competing products and services that are available.

- ▶ A **Feature** is an element or property of the product or technology.
- ▶ An **Advantage** answers the question “So what?” and indicates the value of this feature. The advantage is frequently described in technical terms and tends to describe the competitive advantage from the company’s perspective.
- ▶ A **Benefit** describes the value to the end-user as he or she would perceive it.

Have I answered this question adequately?

Result: The goal is a completed Feature/Advantage/Benefit (FAB) matrix for your company, listing at least five features for each technology/product. There should be a corresponding advantage and benefit for each feature.

“The relationship between the man and the customer, their mutual trust, the importance of reputation, the idea of putting the customer first—always. All of these things, if carried out with real conviction by the company, can make a great deal of difference in its destiny.”

Thomas Watson, Jr.,
Chairman, IBM Corporation
The 1962 McKinsey
Lectures, Graduate School of
Business, Columbia
University

Contacting Potential Customers

Activities and background

For each market you are targeting, interview at least five potential customers or industry experts to determine their needs relative to your technology/product.

Process:

1. Decide upon your objectives for this outreach initiative and generate questions that will enable you to gather relevant information.
2. Carefully select the potential customers or industry experts you will approach by:
 - ▶ Determining which companies to approach
 - ▶ Developing a contact list within those organizations by looking for names in trade journals, trade associations, conference proceedings, Standard and Poor’s register, local newspaper articles, and/or from conversations with the public relations department of the organization in question
3. Before making the initial contact, decide what information about your company and research you are at liberty to discuss, given the degree of intellectual property protection you want to maintain for your technology. Keep in mind this is a data-gathering activity, so the focus is not on your technology—but rather on the need addressed. However, the opportunity might arise to share some information regarding your technology/product and you need to determine in advance how much non-confidential information you will share.

Have I answered this question adequately?

Result: Your goal is a complete set of written notes from the interviews. The number of people to be interviewed depends upon the financial decisions to be made based upon these data. Interaction with potential customers is iterative. The numbers of people included in initial interviews may be quite limited (five to ten people). However, subsequently larger samples will be required.

WORKSHEET: ACTIVITY 8: CONTACTING ENDUSERS, CUSTOMERS, AND INDUSTRY EXPERTS

DATE _____/_____/_____

INSTRUCTIONS: Use this section to clarify the process that you will use to gather information.

(1) OBJECTIVES:

(2) GROUP TO APPROACH:

Customers End-users Industry Experts Other (name)

Rationale for selection of group:

Sample size with rationale:

How to locate:

Who will collect information?

METHOD FOR GATHERING INFORMATION:

Paper and pencil tasks: mailed survey survey distributed at trade show/conference

Interviews telephone interviews interviews at trade shows/conferences/others

QUESTIONS TO BE ASKED: (Be sure that the questions relate to the objectives.)

Information that you ARE willing to share about your company/technology/product?

Information that should NOT be discussed.

Courtesy to be extended to interviewees: After conducting an interview, it is appropriate to send a thank-you note. If you are collecting information at a conference, you might hand out a token item of appreciation such as a pen, small calculator, etc.

Buying Decisions

Your company's cash flow depends upon your potential customers' buying behavior. There may be times during the year when customers are more likely to make purchase decisions than others. This will affect your models for predicting revenue. It is very common for new organizations to give inappropriate consideration to the sell cycle of potential customers and to how the customers' buying decisions are made. However, one quickly learns that adequate cash flow is what keeps a company going.

Activities and background

Previously, you identified the potential customers for the various applications under consideration. For each application, list the customers and what you know about their buying behavior.

Have I answered this question adequately?

Process: Do you have good solid data about each potential customer? The following is an example of one customer's process. Company X makes decisions by committee. However, the process begins with a meeting with Mr. John Doe, who acts as the first level screen. Mr. Doe is very hard to reach by phone or in person. It takes about a month to set up an initial meeting. The committee meets every two weeks, but it takes about two months for new items to appear on the docket. Once the decision is made to buy, processing the paper work takes approximately another two months. The decision to buy is very much affected by referrals, the state of the art, and your prestige. After you begin working for Company X, the payments are made within 90 to 120 days, even though terms are indicated as 30 days. This information was gathered through a conversation with another vendor who has worked with this company for over five years.

Results: The goal is a list of the customers (at least at the company level), who makes the decisions, how long the sell cycle takes, and what types of considerations affect the decision to buy. Indicate your data source for each customer.

WORKSHEET: ACTIVITY 9: BUYER BEHAVIOR

DATE _____/_____/_____

INSTRUCTIONS: Use this activity as a prompt, to determine if you truly understand the buying behavior of your targeted customers. Often, this type of information is gathered in the execution of the previous activity. Add additional pages as required.

Customer type _____

Decision-maker:

Sell cycle:

Basis for purchase decision:

Other considerations/observations:

How information gathered:

Customer type _____

Decision-maker:

Sell cycle:

Basis for purchase decision:

Other considerations/observations:

How information gathered:

Customer type _____

Decision-maker:

Sell cycle:

Basis for purchase decision:

Other considerations/observations:

How information gathered:

Customer type _____

Decision-maker:

Sell cycle:

Basis for purchase decision:

Other considerations/observations:

How information gathered:

Related Activities:

Activity 10:
Market Segmentation

Activity 11:
Market Size

Activity 12:
Market Growth

The activities in this area of the Workbook (Activities 10 - 12) are designed to lend greater specificity to your understanding of the markets pursued. You are encouraged to turn to other sources to help gather the information needed to build a hypothetical construct of market size. Once this information has been gathered, include it in items such as your business plan or licensing package.

Background

In this section, we move to a discussion of markets and present a way of aggregating information about customers. Various dimensions of the market either contribute heavily to or detract from the commercial potential of the opportunity at hand.

During the past 30 years there has been a steady migration away from the concept of mass market and toward the concept of **niche markets** (Webster, 1994). With mass markets, the premise was that one should produce product in large quantities to achieve economies of scale and to provide the mass-produced product to the greatest number of customers. Most customers received a little of what they wanted, and few were totally satisfied. By comparison, the concept of “niche market” focuses on customization and meeting very specific needs of customers.

The shift, then, is away from generic products and toward customer-defined products. The task every company faces is to determine which market niche(s) it will serve. Companies grow their business by focusing on customers and then stepping from one niche to another. Furthermore, “Customer choice shapes the business, which is why customer choice is such a critical strategic decision” (Webster, 1994, p. 96).

Earlier, we spoke about a chain of customers, starting with the entity which purchases directly from you and ending with the customer which makes the ultimate purchase decision. The first question to address is which level of customer do we focus on when sizing the market?

To shed some light on this question, let's begin by differentiating between consumer and industrial markets (Sandhusen, 1987). Industrial markets consist of all individuals and organizations that acquire good and services used in the production of other products and services supplied to the ultimate customer.

Industrial markets share a number of characteristics.

- (1) **There are fewer buyers than in the consumer market.** For example, if you make a component that can be used in automobiles, there are but a handful of potential direct customers among major automobile manufacturers or automotive assembly manufacturers.
- (2) **The buyers are larger.** The quantity of items that a customer such as Boeing or Motorola might buy could be sizable, i.e., hundreds of thousands of units, versus dozens.
- (3) **There is a geographical concentration of industrial buyers,** with 50% in 10 states.
- (4) **Demand is derived from the purchasing behavior of other customers in the chain.** This is an important point in sizing markets, as you need to size the market from which your immediate customer's need is derived.
- (5) **Demand is inelastic,** which means that short-term price changes don't produce disproportionate demand changes.
- (6) **The demand is more volatile.** This means that small changes in consumer demand can result in large changes in industrial demand.
- (7) **There are professionals involved with purchasing function.**

With respect to industrial customer buying behavior, there are three major types of buying situations: **(1) a straight rebuy, (2) a modified rebuy, and (3) new tasks.** The latter is the arena in which most new technology firms will find their opportunities. A number of decision-makers are involved in such purchase decisions; therefore, it is important to interact with the variety of people that influence such purchase decisions. These include the users of the technology/product, the influencers (such as design engineers, regulators, and the like) and the decision-makers. Factors which are known to affect the ultimate buying decision include product specifications, price, terms and delivery times, service terms, order quantities, payment terms, and whether the suppliers are approved.

If you have a component you wish to license, sell, or distribute to an industrial customer, it is important to understand not only who is involved in the decision-making process, but also what issues are of importance to them. As their demand for what you have will be derived from other customers and end-users in the chain, you will need to **size the market as it pertains to the ultimate customer at the end of the chain.** In other words, let's assume that you are looking to sell an MRI component to a company in the manufacturing sector, and you are trying to assess the size of the market opportunity for you. In this case, you will size the market based on the ultimate customer in the chain (the hospital administrators). Likewise, if you sell a software tool that can be used to interface more effectively with the internet, you would size the market opportunity based on the ultimate customer in the chain, i.e., the individuals who make the decision to purchase the software for themselves or their organization. If you sell a device that can be used in clean up of nuclear sites, you size the market based on the ultimate

customer in the chain that makes the decision to purchase the technology to be used in the clean up.

Sizing Emerging Markets

Commercial potential increases if one is dealing with emerging or imperfect markets. An **emerging market** is one which is ready to go through rapid growth in terms of market size; whereas an **imperfect market** is a pocket of unmet need (niche) within a mature market. Most of you are dealing with emerging markets. One of the dilemmas you will face is estimating your market's size. Since the market is about to grow, but has not yet grown, how can you size the opportunity? Most technologists, not understanding how to proceed, merely use the most easily defined market and most readily available industry figures and say, "This is the market size." This is NOT the approach to take, and immediately betrays to a potential investor or ally that you don't understand what you are doing. Approaching the issue of market size in this fashion often leads to failure because it does not help you understand either the size or the composition of the market niche with sufficient clarity to be able to develop good operational plans for success.

In this section, we will develop an example showing you how to size an emerging market using a market build-up method. Before beginning, though, let's define a related set of concepts: market, potential market, available market, served available market, penetrated market, and total market demand.

A **market** is a set of actual and potential buyers. Information about the potential buyer is vital to sizing an emerging market and using the market build-up method.

A **potential market** is a set of actual and potential buyers who have money and desire to purchase a product with a specific set of price and performance characteristics. Note the relationship between this and the definition of qualified customer.

The concept of **available market** adds one more descriptor to this definition—access. Access is determined by your marketing communication plan. If there are plenty of fish in pond X, but you fish in dead Pond Y, your catch will be nonexistent, not because there are no fish, but because you have limited access. An available market is a set of actual and potential buyers that have *money, desire, and access*. It is the set of actual and potential MAD customers.

As indicated by Reis and Trout (1986), "The essence of positioning is sacrifice. You must be willing to give up something in order to establish that unique position." One of the most difficult things for companies with a rich technology base to do is focus. Technologists tend to be overwhelmed by and sometimes enamored with the possibilities of their technology, and they feel that, by focusing, something will be missed. However, it is important to keep in mind that a niche marketing approach is a sequential process, not a permanently exclusionary one.

The focusing approach leads to better use of resources and greater success. “Just because there are a lot of targets and you’ve got a lot of shot, doesn’t mean that you don’t have to take aim” (Linneman and Stanton, 1991, p. 7).

The concept of **penetrated market** is different in kind and relates to the extent that you and others have addressed the opportunity.

Total market demand is an expression of the volume that could be purchased by a specified group of real and hypothetical customers within a defined period of time under certain conditions.

If the relationship between these markets is visually represented, you will see the size of the market niche is winnowed down to a more tightly defined and smaller niche. It is represented in dollars or units, on an annualized or total basis. However, annualized figures need to be based on verified data or known trends in that market, rather than as a straight average of the total market demand.

In summary, commercial potential increases with a niche marketing approach if the total market size is above a certain threshold (\$100 million or more is a common minimum). You should be cautioned that statements such as “The market is multibillion” make it apparent that you are not using a niche marketing approach. Furthermore, to say that the market is “unknown” betrays that you have not tried to assess the market potential. By contrast, if you have rigorously examined the market potential and it appears that the total market demand is less than a \$10 million opportunity, it will be of little interest to most investors and should lead you to re-evaluate the market you are addressing, as well as serve as a catalyst to re-examine the product definition.

Market Segmentation

The process of deciding which market niche(s) to pursue begins with **market segmentation**. This is a highly dynamic process in which both the features of the product as presently conceptualized and the characteristics of the ultimate buyers are used. The goal is to conceptually define homogeneous groups based on the parameter(s) that you select. The result should be a niche which is substantial in size and can effectively be reached with a designated marketing communications plan.

Segmenting the market appropriately is an art and takes considerable time and effort. Common ways of segmenting market include the following:

- ▶ Benefits sought
- ▶ Buyer readiness stage
- ▶ Customer size
- ▶ Geography
- ▶ Usage rate
- ▶ Price
- ▶ Type of customer

Based on the earlier interaction with potential customers, one begins to segment the market in ways that reflect key features of the interaction; i.e., was price important to the potential customers, and is there a high-end, low-end, and medium group for which various products might be appropriate? Are the more interested customers early adopters and does it make sense to segment one stage of buyer readiness? One segments the markets in various ways, examining homogeneity within the segment, the ability to cost-effectively reach members of that segment, and relative size.

When you segment a market, each segment should be distinct enough that it requires its own marketing communications plan. If you find that one marketing plan would work well with multiple segments, it would be wise to combine them into one segment.

Segmenting the market appropriately is an art, and takes considerable time and effort. Taylor (1986) provides three questions for helping you decide if you have segmented the market appropriately.

(1) Is the segment definable in some operational way?

In other words, can you accurately quantify how many customers are in the segment? For example, if you define a market segment by using the following demographic variables (children under five feet tall with freckles), you will probably have difficulty quantifying potential customers in this niche. It is unlikely that you would find any organization sorting data in this fashion, thus making it difficult for me to quantify the size of this market. As a result, this would NOT be a useful segmentation criterion.

(2) Can you reach this segment effectively through affordable advertising?

Each segment should be distinct enough that it requires a distinct marketing communications plan. If you find that one marketing plan would work well with multiple segments, it would be wise to combine them into one segment. Keep in mind that affordable advertising can include things such as face to face meetings, conferences, and phone calls. Do not assume that advertising means only print copy.

(3) Is it small enough for you to dominate and large enough to provide good profits?

The most common error that companies make is to define their market too broadly. You should aim at specificity and understanding of the market segment you define. Once you have the segment defined appropriately, develop a strategy for becoming a significant player in that niche. Remember that your ability to obtain significant market share begins with your aspirations and operational plans.

Have I answered this question adequately?

Process: Start the segmentation process by looking for commonalities among potential customers. What do they share? Are they all research and development firms? Are they all interested in a specific price range? Are they interested in a specific product characteristic? Are they located in a specific geographic region? Try to be as specific as possible regarding their interests, as expressed to you by these potential customers. Then determine if you can define the market segment in an operational fashion and reach it with cost-effective advertising.

A Market Build-Up Approach: An Example

There are many methods which can be used to derive the size of emerging markets. The method preferred by Dawnbreaker is referred to as a **market build-up method**. This method yields a hypothetical construct which defines the size of an available market. The data and assumptions used in building the model are clearly articulated, so that anyone can see the method used to derive market size. One starts with commonly available data points and then collects more difficult information to refine the model. In the example which follows, information from the 1994 *Statistical Abstract of the United States* was used as the starting point and combined with other information gathered from industry experts by phone and from potential end-users (who were also potential customers) in a mall intercept.

One begins the market build-up method with a product concept. In the example which follows, the product is a “warm suit for stranded motorists,” a light-weight piece of outerwear that could be tightly rolled and conveniently stored under one’s car seat in a vacuum sealed bag. The concept is that in a cold weather emergency situation, the driver could pull this out, put it on, and remain warm for an extended period of time. The need addressed was protection from the cold in remote areas. It is assumed that the selling price is \$25.95.

The obvious potential market for this product consists of car owners who live in snowy regions. However, after brainstorming regarding other potential end-users, other market segments were suggested, including sports enthusiasts, military, and workers on oil rigs. In most of these cases, the product definition would need to be refined to serve these markets. In our example, the warm suit was designed for one-time use, due to the need to reduce the volume to fit it back into a small, vacuum-sealed bag. The concept would therefore have to be refined to be applicable to other markets.

The decision was made to size the market for automobile use first. The challenge was to define the available market based on money, access, and desire—the criteria mentioned earlier for qualifying potential customers.

STEP 1:

Determine the size of the market, obtain data from the *Statistical Abstract of the United States* regarding automobile registration, and tally the number of automobiles registered to people in those states that have considerable snowfall.

Result: 67,611,000 motor vehicle registrations.

STEP 2:

Determine what percentage of this group would have a desire for this product. It would be wrong to conclude that by virtue of owning a car and living in a cold climate that one would have a desire for a warm suit. The premise adopted was that those individuals who carry some sort of emergency gear in their car have demonstrated an interest in protection from the cold, and would therefore be potential customers. Various approaches were used to try to get a handle on the size of this subset, including contacting AAA, various other associations, and editors of journals and catalogs that specialize in emergency situations. Ultimately, the decision was to conduct a mall intercept in a number of cities. In the mall intercept, a table was set up at an exhibit and men and women of driving age were asked if they kept cold weather emergency gear in their car. Ten percent of the sample did. Using this data point, we reduced the size of the potential market from 67,611,000 (the registered vehicles in cold climates) to 10% of that, or 6,761,100.

Result: 6,761,000 were inferred to have a desire for product.

STEP 3:

Determine what percentage of this group had the money to spend on this product. The *Statistical Abstract of the United States* includes information on car registration, broken down by age, income, and gender. Given the initial conceptualization of the product—retail price of \$25.95—it was assumed that the product would be of greatest interest to those who had an income above \$35,000, i.e., others would just use a blanket. Forty-five percent of the sample fit into this category.

The figure obtained previously (6,761,000) was further reduced to reflect income. $6,761,000 \times 45\% = 3,042,450$

Result: 3,042,450 were inferred to have the disposable income to spend. Thus, the potential market size for this niche was 3,042,450 units over the life of the product.

STEP 4:

Determine the size of the available market by taking into account access as determined by the marketing communication strategy selected by the company.

The firm decided to market this product strictly through catalogs. After talking with industry experts, it was determined that 40% of the relevant income group make purchases from catalogs. The market size was further reduced to take into account the distribution channel selected. $3,042,450 \times 40\% = 1,216,980$ units.

Result: 1,216,980 people were inferred to have access to this product based on their widespread use of catalogs. Thus, the available market size was 1,216,980 units.

Translating this number of units into a dollar value was accomplished by multiplying the total number of potential purchasers by the selling price of \$25.95 = \$31,580,631. Realize that the marketer of this product would then need to determine what might be the annual market for the warm suit and any current or potential competing products. The actual market demand in any given year would be substantially less than \$31.5 million, because that figure would exhaust all current, potential buyers in the current U.S. market.

Conclusion

The market build-up method uses a combination of reasonable and clearly articulated data and assumptions to determine the size of a market niche. As you can see, the conclusion is as good as the assumptions made, the product definition, pricing, and the marketing communication plan. A different configuration would yield a different result. In all cases, the conclusion drawn needs to be reasonable, defensible, and clear.

A common mistake that would be made by most entrepreneurs—namely, in sizing the market for warm suits, would be to begin and end with finding the number of people that have cars in areas with heavy snow (67,611,000) and falsely conclude that the market size was $\$25.95 \times 67,611,000 = \$1,754,505,450$. The market build-up method requires that the user examine the issues of desire, money, and access, and size the market in light of those factors.

Common Errors

When sizing markets, a number of common mistakes are made. The most common is to take a dollar value ascribed to an industry and to use that figure to represent the size of your market.

Example 1: A company that manufactures a sensor quotes the dollar value of the entire instrumentation market as the size of its market. If you manufacture a component that can only be used in one family of instruments, you must conceptually limit your market to the dollar value associated with the use of that component.

Example 2: If you have a device which can be used to remove heavy metals from a waste stream, the size of your market is that subset of actual and hypothetical customers which have the specific problem that you can address. Do not cite the dollar value for the entire environmental remediation market as your market.

Example 3: If you produce a software package on topic X, your market size is limited by the content scope of the software and the customer it targets. Do not cite the dollar value spent in the U.S. on all software as the size of your market.

Example 4: If you have a combustor that can be used with generators of a certain size, your market is limited to generators of a specific size. Do not indicate that the size of your market is equal to the entire power grid of the U.S. times a certain price per kilowatt.

Market Segmentation

The process of segmenting your market provides focus for your marketing communications strategies and also serves as a means of obtaining a clearer understanding of your market. An excellent resource to examine in this regard is *Competitive Marketing Strategies*, by James W. Taylor (1986).

Activities and background:

Using the form on the next page, indicate which descriptor(s) you will use to segment this market, as well as the rationale for segmenting in that fashion.

Have I answered this question adequately?

Results: Your goal is to produce a description of the market segment you will pursue. Indicate the approach that you will follow to determine the size of that segment and to locate potential customers. Then, clarify the types of communication vehicles that can be used to reach this segment cost-effectively.

WORKSHEET: ACTIVITY 10: MARKET SEGMENTATION

DATE _____/_____/_____

INSTRUCTIONS: Use this section to help you think through the best way to segment your market.

1. Segmentation criteria: Based on your interaction with potential customers, end-users, and industry experts, indicate the criteria that you will use in segmenting the market, as well as the rationale for segmenting in this fashion.

2. Availability of data in this format? In order for segmentation to be useful, data must be available to support your segments.

3. Does the method of segmentation appear to result in a market segment that you can dominate within five years? At this point, you may not have formally addressed the issue of market size. However, you should have an impression as to whether or not the market is segmented in such a way that you could become familiar enough with the players and the dynamics to become a dominant player. Justify your answer in the space provided below.

Market Size

Market size refers to the potential of a market in dollars, units, or in a specific time frame. This concept is applied to the segment(s) for which your product is appropriate. The appropriate segment was determined from analyzing the feedback you obtained from talking to potential customers. **Keep in mind that market size is not synonymous with sales projections. Market size represents all possible sales that could be made by all suppliers that can address the need of potential and actual customers.**

When sizing the market, it is important to differentiate the difference between the total potential market and the **served available market**. The served available market defines the market segment or niche in which your company will be operating in more precise terms. This precision enables your company to isolate the market area in which it can aim at becoming a dominant player. By contrast, the total potential market is the larger, related market in which your company is operating. For example, if a company produces heaters, the total market would be the heater market, defined in heater units and accompanying dollar value. However, if the company produces a heater with specific product characteristics, i.e., a small heater that produces 300 BTUs, those product characteristics come to define the served available market. In other words, this product competes within a subset of the total potential market. The company's product does not compete with all heaters in the market. The subset defines the served, available market and is the market niche of interest (small heaters producing 300 BTUs).

Activities and background

It is often difficult to obtain exact numbers on the size of the market. This problem is amplified if the product is new. The first place to start in trying to determine market size is to contact various sources to see if someone else has already compiled these statistics. Assuming that they have not, proceed with using a market build-up method. However, you may initially find it useful to contact some of the following sources:

Associations: *The Encyclopedia of Associations* is an extremely valuable resource, found in most libraries. This three-volume set is produced annually and contains an index and two accompanying volumes. There are associations for almost every item imaginable. Every entry provides the name of the association, its services, membership, and a contact person. The association will indicate if it collects statistics. If it does collect statistics, call the contact person and inquire if they cut the data in the manner of interest to you (your segmentation technique).

Regional Technology Transfer Centers (RTTC): Many of the NASA RTTCs will conduct on-line searches for you at reduced rates. Searches are done with key words, using Boolean logic. You could request a search on “market size” of a specific item. Ask for a price and time of delivery quote.

Journalists and Futurists: Another way to obtain information is to contact journalists and futurists that have written articles on the industry in question. When you find a valuable article, contact the editor and ask him to provide you with the phone number of the author. Contact the author and see if he has come across any information on the “market size.”

Findex—The Directory of Market Research Reports, Studies, and Surveys: This resource is found in most large libraries and lists published market research reports. For the most part, the reports are quite expensive. However, if you find the name of a research report of interest, you can contact specialty libraries in your area and see if they have a copy that they will let you see. Corporate libraries are the most likely to have such reports. (Bob Berkman, the author of *Find It Fast* ((1990)), has various tips for talking with experts and for gaining access to specialty libraries. These are described in his book.)

Have I answered this question adequately?

Process: Consult the data sources above to try and obtain published estimates on the size of the market. If these data are not available, you will have to infer the size of the market from data you collect on potential customers; for example, information regarding their buying habits and price point. Markets are ideally expressed as annual figures indicating the number of units that might be purchased by the customer base from all sources and the associated dollar value.

Result: The goal is to size the market. Have you defined the following?

- (1) The total potential market
- (2) The served available market

WORKSHEET: ACTIVITY 11: MARKET SIZE

DATE _____/_____/_____

INSTRUCTIONS: The following is a series of prompts to use in defining the size of a market utilizing a market build-up method.

(1) Based on the interaction you had with potential customers, define the type of individual or organization that should have a need for your technology, product, or service. Assure that your definition contains within it an implicit way of gathering information regarding the number of entities with said characteristic.

(2) What data can you find which indicates the number of entities with that characteristic? Add pages and provide supporting data.

(3) In addition to the data collected, what assumptions have you made which are not supported by data, but are necessary to develop your hypothetical construct?

(4) What is the selling price of your product, technology, or service? On what do you base the assumption that this selling price will be acceptable?

Market Growth

Conditions that affect the rate of growth in a market change. Such conditions include changes in demographics, technology, regulations, and other economic conditions. In predicting the rate of growth in your company's business, it is important to consider the various trends affecting the rate of market growth.

Activities and background

Industry journals and associations continue to be among the most valuable resources used to detect market trends in advanced technology. *The Encyclopedia of Associations*, a reference found in most libraries, is commonly used to find the names of many contacts and sources of data.

In seeking market information, one piece of information that will prove useful is the pertinent Standard Industrial Classification (SIC) codes. In 1997, this system was replaced by the North American Industrial Classification System (NAICS). However, as SIC codes are ubiquitous, the Department of Commerce maintains SIC-NAICS conversion tables on its website. SIC/NAICS codes function as keys unlocking vast stores of information housed in databases. This numbering system is referenced widely and provides a fairly easy way to cut through vast amounts of data. Given that you are working with fairly new technologies, you may not be able to find a SIC/NAICS code that exactly fits your specialty. You may have to move up to a broader class. For example, if your product is a warm suit, you would not expect to find a SIC/NAICS for this one-of-a-kind product. However, a warm suit is an example of protective clothing, emergency gear, or outerwear. You could start by looking for a SIC/NAICS code to cover this broader category.

North American Industry Classification System, United States Department of Commerce, 1997.

WORKSHEET: ACTIVITY 12: MARKET GROWTH

DATE _____/_____/_____

INSTRUCTIONS: Use the space below to compile information related to the rate of market growth. Add additional sheets as required.

(1) What is the appropriate SIC/NAICS Code? Verify your selection by comparing it with that used by known competitors.

(2) Contact industry experts associated with the Department of Commerce and/or with appropriate Associations to determine if they collect information by that SIC. Ask if they have collected information on future market projections for the SIC in question.

(3) Find another company that is approximately five years older than yours within the same industry. As a sensitivity check, benchmark rate of ramp up for them.

Competitors

Related Activities:

Activity 13a and 13b:
Who are Your Competitors?

Activity 14:
**Implications of
Competitor Information**

The activities in this area of the Workbook (Activities 13 - 14) are to help you compile information about your competitors and consider the implications of this information for your commercialization strategy and business plan.

Who are the competitors in this market?

Every company has competitors that are already operating within the market segment of interest. Your resources and skills relative to the other players will affect how profitable your business will be.

Activities and background

Various resources can be consulted to determine who your competitors are. The most common include the following:

1. Industry journals, local newspapers, customers, suppliers, and trade associations.
2. The *Thomas Register of American Manufacturers* is a large comprehensive set owned by most major libraries. It is updated annually, and lists manufacturers' names, addresses, and phone numbers. Information is organized alphabetically by product. This is an excellent starting place.
3. *Ward's Business Directory of US Private and Public Companies* provides a listing of the public companies with largest sales sorted by SIC/NAICS code.
4. *Dialog*: When looking for more obscure information and/or information on a global basis, Dialog is extremely useful. This searching process can be expensive.
5. *High-Tech Directory*: This resource lists over 800 publicly-traded companies specializing in innovative technology. To obtain a list, contact:

Barrington Research Associates
P.O. Box 860
Barrington, IL 60010
(708) 382-7788

Have I answered this question adequately?

Process: Examine the preceding references for information on competitors and begin to develop competitive files on each.

Results: The goal is a list of major competitors, including company name, address, and phone number. Group these by SIC/NAICS codes.

WORKSHEET: ACTIVITY 13A: COMPETITORS

DATE _____/_____/_____

INSTRUCTIONS: Use the summary sheet below to compile information on competitors. Add additional pages as needed.

SIC	Competitor's Name	Address	Phone Number

What are the current characteristics of these competitors?

This activity relates to expanding your customer files. In Activity 13a, you were asked to pinpoint who your competitors are. This activity helps you determine what types of information you should collect about your competitors. Analyzing your competitors' strengths and weaknesses helps you to take a more realistic look at your own organization and develop sound strategies for success.

Activities and background

The information you can obtain on competitors depends to a large extent on whether they are privately owned or publicly traded. Considerably more information is available on publicly traded companies. Leonard Fuld's book *Monitoring the Competition* (1988) provides many helpful hints on how to build up good data files on your competitors.

If the company is publicly owned, you can request an annual report, 10-K, 8-K, and 10-Q, from the Securities Exchange Commission. If the company is privately owned, the task is more difficult. However, you can develop good data from news articles, product literature and catalogs, price lists, and market studies, all of which may be available on the Web.

All of this information should be compiled in competitor files.

Have I answered this question adequately?

Process: Obtain more complete data on your competitors, in accordance with the suggestions listed above. In subsequent chapters you will be instructed to analyze the data you are now beginning to collect.

Results: The goal is a list of the competitor files that you have and what data your files contain: 10-K, 8-K, 10-Q, prospectus, annual reports, news articles, product literature, catalogs, price lists, and market studies.

WORKSHEET: ACTIVITY 13B: COMPETITORS

DATE _____/_____/_____

INSTRUCTIONS: : Use the summary sheet below to act as both a prompt and a place to compile information regarding competitors. Much more information is available for publicly traded companies. Add additional pages as needed.

Competitor Name _____ **Public?** _____ **Private?** _____

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Prospectus | <input type="checkbox"/> Annual Report | <input type="checkbox"/> Articles |
| <input type="checkbox"/> 10K | <input type="checkbox"/> Price Lists | <input type="checkbox"/> Catalog |
| <input type="checkbox"/> 10Q | <input type="checkbox"/> Market studies | <input type="checkbox"/> Internet info |
| <input type="checkbox"/> 8K | <input type="checkbox"/> Newspaper clippings | <input type="checkbox"/> Patents |

Competitor Name _____ **Public?** _____ **Private?** _____

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Prospectus | <input type="checkbox"/> Annual Report | <input type="checkbox"/> Articles |
| <input type="checkbox"/> 10K | <input type="checkbox"/> Price Lists | <input type="checkbox"/> Catalog |
| <input type="checkbox"/> 10Q | <input type="checkbox"/> Market studies | <input type="checkbox"/> Internet info |
| <input type="checkbox"/> 8K | <input type="checkbox"/> Newspaper clippings | <input type="checkbox"/> Patents |

Competitor Name _____ **Public?** _____ **Private?** _____

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Prospectus | <input type="checkbox"/> Annual Report | <input type="checkbox"/> Articles |
| <input type="checkbox"/> 10K | <input type="checkbox"/> Price Lists | <input type="checkbox"/> Catalog |
| <input type="checkbox"/> 10Q | <input type="checkbox"/> Market studies | <input type="checkbox"/> Internet info |
| <input type="checkbox"/> 8K | <input type="checkbox"/> Newspaper clippings | <input type="checkbox"/> Patents |

Competitor Name _____ **Public?** _____ **Private?** _____

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Prospectus | <input type="checkbox"/> Annual Report | <input type="checkbox"/> Articles |
| <input type="checkbox"/> 10K | <input type="checkbox"/> Price Lists | <input type="checkbox"/> Catalog |
| <input type="checkbox"/> 10Q | <input type="checkbox"/> Market studies | <input type="checkbox"/> Internet info |
| <input type="checkbox"/> 8K | <input type="checkbox"/> Newspaper clippings | <input type="checkbox"/> Patents |

Competitor Name _____ **Public?** _____ **Private?** _____

- | | | |
|-------------------------------------|--|--|
| <input type="checkbox"/> Prospectus | <input type="checkbox"/> Annual Report | <input type="checkbox"/> Articles |
| <input type="checkbox"/> 10K | <input type="checkbox"/> Price Lists | <input type="checkbox"/> Catalog |
| <input type="checkbox"/> 10Q | <input type="checkbox"/> Market studies | <input type="checkbox"/> Internet info |
| <input type="checkbox"/> 8K | <input type="checkbox"/> Newspaper clippings | <input type="checkbox"/> Patents |

Implications of Competitor Files

The purpose of developing good competitor files is to anticipate what your competitors are likely to do when you enter the marketplace with a new product that eats away at their market share. At the point of market entry, chess or war analogies are often used. It is important to keep in mind that the purpose of making a product entry is to gain market share and create value. This is always done at another company's expense. Some company will lose market share as you gain. Even in those instances where you come to market first and are developing a market, your presence in the marketplace first often makes it more difficult for other companies to replace you.

Once you have gathered competitor files, review the information looking specifically at issues such as the following:

- ▶ how financially stable your competitors are
- ▶ what their pricing policies have historically been
- ▶ their research and development plan
- ▶ strategic alliances formed
- ▶ distributors used

Then ask yourself what your competitors are likely to do when you enter the marketplace—drop their price, increase advertising, enhance customer service, buy a competitor to gain greater access to the marketplace, etc. Use this information when developing your marketing and sales plans, and your contingencies—all of which are part of your business plan.

WORKSHEET: ACTIVITY 14: IMPLICATIONS OF COMPETITOR FILES

DATE _____/_____/_____

INSTRUCTIONS: This worksheet contains a list of prompts for you to use when reviewing competitor files. We have seen so many companies just collect information and never do anything with it. Set aside time for your management team to review competitor files and discuss the implications for your evolving strategies and business plan. Add additional pages as needed.

Competitor _____

Financial stability of competitor:

Pricing policy:

Research and development plan:

Strategic alliances formed:

Distributors used:

Other:

Conclusion

The purpose of the *Advanced Technology Program's Commercialization and Business Planning Guide for the Post-Award Period* is to provide assistance to new ATP awardees and their advisors. The book is divided into three sections. Section 1 presents basic concepts concerning financing options, with detailed information on licensing, corporate partnering, and equity investment. Section 2 is an annotated sample presentation to investors. Section 3 is a workbook to be used by the technology entrepreneur on his own or with the guidance of an experienced advisor. For maximum benefit, it is recommended that you seek the involvement of an experienced and motivating mentor. The results of the various activities completed should be synthesized and incorporated into a variety of documents that become part of your Commercialization Toolkit™. Suggested outlines for the various documents that you are likely to need in the commercialization of your technology are included at the end of various chapters in Section 1 and throughout Section 2. These include:

- ▶ Strategic plan
- ▶ Licensing package
- ▶ Business plan
- ▶ Presentation

Scientists and engineers who are founders of their own companies can develop the necessary skills to successfully guide the growth of their firms. This requires dedication, however, since time for planning must be added to an already busy schedule. The information and the activities included in this workbook will assist in this endeavor.