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Management primer for high tech: An entrepreneur's view

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An Entrepreneur's View

A Management Primer for High Tech

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Andrew Mellon once said: "I'd rather have a market than a mill." A budding entrepreneur should stamp that on the first page of every business plan. For whether his new firm lives or fails is going to depend on identifying the customers' needs, not on that revolutionary product sequestered in his laboratory.

Now that's the keystone, but there is more, of course, to starting a successful business. More than 60 entrepreneurs have appeared before the MIT Enterprise Forum, where experienced businessmen offer advice in a public forum to firms with problems or to new businessmen just starting out.

One common denominator that describes these new entrepreneurs is a lack of focus. Some don't know what product areas they are in, or whether they're selling a product or a service. Others don't know where they're going, whether they're going to sell out down the road or try to become a *Fortune* 500 company. What makes the right management team confuses some. Still others are bewildered by the world of finance.

The Rules of the Game

The Management Team. One of the keys to good management is not to run a one-man band. I remember the questions to one entrepreneur: Who's the CEO? "I am." Who's the chief engineer? "I am." Who's the sales manager? "I am." And so on. And why are you here? "Well, things aren't so good." This CEO complained that his product showed a good user benefit, but he was grossing only \$50,000 a year—a disaster. Who's the sales manager? "I am." How much of your time do you spend on sales? "Ten percent." It figured.

The entrepreneur can't be all things to all people. To those who think they cannot afford a sales manager, the fact is that they cannot afford *not* to have one. Some entrepreneurs will hire a sales person who will put money into the company. The money will pay for the person, and he'll watch how it's spent. Or the entrepreneur will offer stock options as incentives and pay a smaller amount.

The point is that venture capitalists do not often invest in a one-man show. They look for a first-rate management team, and they're further pleased when the company has an active board of directors. These are concepts the streetwise businessman practices automatically, but they are just now being reflected in the business plans we see at the Enterprise Forum.

Business Planning. The entrepreneur has to figure out what he wants to be when his firm grows up. Will the company be a personal cash cow? Will he sell out in five years? Or go public? Or acquire other companies? Or license his product line in the U.S. or abroad? Or engage in joint ventures? The entrepreneur first must establish his overall objectives before he can create the strategy and tactics—his business plan—to reach those objectives.

Then we come to marketing research. No one wants a $10,000 solution to a $100 problem. Many questions must be faced: Is there a market, or does one have to be manufactured? If there is an existing market, what are the characteristics of the product and its price against that of the competition? What must the product look like—its packaging? What servicing is expected? What is the user benefit, the likely penetration, the cost of penetration, the expected life of the product?

The entrepreneur also has to decide if he is selling a product or a service. Let's say the entrepreneur begins furnishing air pollution control equipment, which seems like a product line. Then a large chemical company says it wants a special electrostatic precipitator to remove acid mist in a Florida plant. The entrepreneur and his chief engineer travel there for several days and make a preliminary presentation. That's $2,000. Then the chemical people say, "Great. We'd like a proposal, complete with drawings." Our friends do an engineering survey, an analysis, and a design. They spend a fortune and visit again with 50 drawings—and they discover that 10 other companies have done the same thing.

The problem is that the precontract engineering service is often more costly than the hardware being sold. Five proposals, for example, may produce only a single sale. Such people are in the business of selling a service, and they don't know it. If they did, they would say, "Fine. We need $100,000 to prepare that proposal." Now, they may not get it every time, but if one prospect in five believes in them, the business will be far more profitable.

The real question is whether or not the product is being manufactured for a legitimate inventory. Can it be put on a distributor's shelf and the same item sold to different customers? This gets back again to the strategic plan and what the company is going to be when it grows up.

Product Focus. The entrepreneur in love with technology often becomes fascinated with side developments and brings out one product, then another and another.... And they are all important to him on a personal level. I know of one entrepreneur who was grossing less than $500,000 a year; he had 27 products, and he liked every one. We asked him how much he sold of what appeared to be his major product. "Oh, that's 84 percent of sales," he said. So we told him to get rid of the other 26 "specials." He had to learn how to say no.

I have suggested a guideline for many (but not all) small businesses. If it is doing $1 million or less in sales, it shouldn't have more than one product. I have built and sold a number of businesses, and each had a single product or one line of products.

The company that Jack O'Donnell and I started four years ago, Advanced Energy Dynamics, has just one purpose, which is to remove impurities (ash and sulfur) from coal prior to combustion. We've just raised a considerable sum in a second financing, and we've stayed with this one product and objective. We use a novel electrostatic technique, and I get a call nearly every week, asking about other kinds of separation we might do, ranging from the recovery of gold from ore to oil-bearing shale from rock. I tell them we're not interested. At least for the next several years our focus is on coal. This is not always easy, but it's part of the learning process that turns a technologist into a successful entrepreneur.

User Benefit. How long will it take the purchaser of a product to save the price of what he has purchased? My guideline is that if it pays for itself in under a year, it's a mandatory purchase. If it takes one to two years, it's a probable purchase. If it's over three years, forget it. I know of one company which turned itself around when it started advertising the user benefit of its product instead of its marvelous innovative technology.

That's why the entrepreneur should not get hung up on his brilliant technological achievements. No one should knock himself out, for example, on technology that has a payback time for 10 years. That's why solar energy projects have never taken off.

Financial Management. Today's entrepreneur doesn't usually come out of engineering school with a knowledge of finance. One of the first things he has to learn is the importance of cash flow. A friend of mine who has learned this lesson the hard way now says, "Cash flow is more important than my mother."

I discovered this in the second business I ran. The first was so successful it didn't matter what the cash flow was; it was bought by a *Fortune* 100 within two-and-a-half years after we started it. But the second had the usual growing pains, and I learned why cash flow is more important than a P&L statement and a balance sheet. You can have all kinds of orders on the books, and yet go down the drain because you don't have the cash to support them.

Once a firm reaches a quarter of a million dollars in sales, if not before, it needs to have a qualified financial manager. It needs a treasurer/controller who can develop realistic projections, who can weigh past obligations against financial resources and cash availability. He will work on this with the outside accountant, as well as with the production manager and the sales manager.

Warning Signs

I know a company that started at the same time as Apple Computer. Now, Apple did not have a brilliant product, but it did have a brilliant management team and brilliant marketing. This other outfit had good technology and a viable product—a small computer it built itself, plus a printer and various software packages about the same as Apple's. They started at the same time, and Apple today is a *Fortune* 500 company. This other outfit is bankrupt.

What happened? Basically, management was not conscious of its competition. Its sales were actually decreasing after two years, while others in the industry were increasing sharply. It was not taking seriously the patterns of its total sales, its market penetration, its profitability.

The entrepreneur who sets an objective of "x" percent of growth a year must make sure it is realistic. If he goes from $1 million in sales one year to a half million the next and then to a quarter million, he needs more than Band-Aids. He had better look at his strategic plan and decide whether or not it should be updated—or whether he should continue the business, change it, or end it.

Poor Quality Control. We talked to one firm at the Enterprise Forum that was doing a respectable amount of business—about $2 million a year. But they were making no money at all. They were just at break-even and couldn't understand it. They were in silicon chips, and so we asked what percentage of their product they could ship. They said their reject rate was 65 percent. We all gasped. They shipped just 35 percent of production, we asked, compared with 80 to 90 percent at Texas Instruments?

Many companies are so enamoured of their technology that they've done lousy engineering, and they don't have good quality control. This sickness is not confined just to small companies; it afflicts the giant auto manufacturers and many other American industries. We told the silicon chip outfit to get some people who knew how to run the kind of machinery they used, and get those rejects down to 30 percent. If they could ship 70 percent of their products, we said, they would be looking for places to invest their profits.

Lack of Sales Planning. An entrepreneur needs to know whether he can afford to hire in-house salesmen, or whether he should be selling by mail order, by distributor, by manufacturer's representatives.

The appropriate sales channel often is dictated by the price of the product. Let's say a company is selling a $2,000 instrument. If we use a standard of 10 percent as the cost of sales in this field, we can afford to spend only $200 on one sale. If we make one sale for every five calls, that's just $40 for each sales call, which is less than one hour of a salesman's time, including travel. Clearly, one can't afford a salesman to hold the customer's hand for $40; it's necessary to use a rep who sells 10 other such items, or a distributor who will stock it on his shelves. Of course, if the product sells for $200, the entrepreneur can afford to spend only $4 on each sale. He can afford perhaps one letter, and preferably goes with mass distribution. On the other hand, if he is selling a half-million-dollar system, he can afford to live in the customer's lap.

It is not a bad rule of thumb to copy the channel of distribution that the best competitors in the field are using.

Lack of Market. Good judgment often comes from experience. I can tell a story on myself. Back in 1947, I developed an instrument that measured the modulus of elasticity for textile fibers. I did it because one textile client had requested it. Had I done even the most rudimentary marketing survey, I would have learned that no one else in this world wanted it at that time, but I thought it was great and fell in love with the product. (And the result of the textile fiber research made possible by the instrument is that there are better ladies' stockings today.) I sold only two instruments at $2,000 each in the ensuing two years and got rid of the business. It happened that in 1966 I noticed an article on the modulus measurement technique I had invented; and the fourth purchaser of the idea, a company in Massachusetts, was making quite a success of it. I was only 19 years before my time. The lesson I teach people is: do not pick up a soldering iron or a screwdriver until you know that your product will have a real and immediate market in terms of need, price, and benefit to the user.

In our coal-cleaning project we have groups of customers waiting for us to complete our scale-up schedule in the calendar year. We thoroughly researched the potential market and asked, in detail: What if you had such and such a coal-cleaning system? Would you be interested? How much would it save? In what time span?

Lessons for Tomorrow

Through the MIT Enterprise Forum, through preparing talks and articles, I am deeply committed to helping technologists succeed as businessmen, to leading them to a better understanding of user-benefit, risk/reward, cash flow, and the overall need for management. As the technologist becomes a knowledgeable businessman, he becomes, in turn, more attractive to the venture capitalist. This knowledge also has a growing appeal for the scientist/engineer.

In the past, such people might have remained in the universities and in the large companies. But today "entrepreneur" is an increasingly attractive word. The risks are less and the recognition is becoming universally positive. And small groups are forming so these technologists/entrepreneurs can also help each other. My involvement is a sign of this process, but more importantly it is a sign that the high-tech entrepreneur is coming into industrial maturity. The 85 percent who are succeeding in Massachusetts and California are soon going to be matched all across the nation. That is why I see high technology as one key to achieving our nation's growth and employment objectives in the 1980s.