Seagate - Quantum: Encroachment Strategies

Case Study

Glen M. Schmidt
The McDonough School of Business
Georgetown University
Washington, DC 20057
schmidtg@msb.edu

Jan A. Van Mieghem
Kellogg School of Management
Northwestern University
2001 Sheridan Road
Evanston, Illinois 60208-2009, USA
VanMieghem@Kellogg.Northwestern.edu

Andrea Forward[1], engineering manager at Seagate Technologies, was adamant in her support of a new development program for a 5.25 inch disk drive. "Look, I know this thing is going to be an expensive product to develop, and I know there just doesn't seem to be much of a market for 5.25 inch drives at the present time. But I've been talking to one of my engineer friends who now works for this young and upcoming computer startup, Apple. They think they can grow a market for personal desktop computers using such a drive, and a relatively lower-capacity, 5.25-inch drive would be perfect for such a computer."

"Hold on just a minute," countered Kwon Suzuki, VP of Marketing. "I just got back from the big Computer Expo, where I talked with all the leading computer companies such as DEC. They were raving about the 8-inch drive from Quantum and how well it was performing as a replacement for the old 14-inch drive. These customers said nothing about wanting a smaller drive. What they wanted was even *more* capacity in that 8 inch drive. If we want to compete against Quantum and encroach on their market, we should develop a higher-capacity 8-inch model. As I said, all that these big users could talk about was capacity, capacity, and more capacity. You engineering types are always looking to do something technically driven, but if it won't sell, what good is it?

"Tell you what, Andrea. There's this new methodology I've been hearing about called conjoint analysis. We survey potential customers, find out what the key attributes are that these customers are looking for in a product, and then find out just how much value each customer places on each attribute. Why don't we try out this new technique, and let the customers tell us what to do?"

Several weeks later, Andrea and Kwon got together to review the conjoint results. "Well, I'm not quite sure just exactly where all this is going to take us but I've got a ton of good information," started Kwon. "We talked to all the primary users of disk drives in today's market.

[1] This case study is historical fiction in that the characters and exact numbers are fictional, but the case is intended to offer a sense of what was transpiring in the disk drive industry in the late 1970s and early 1980s.

First, we contacted mainframe users, and had them go through the necessary exercise as prescribed by the conjoint method. And second, we surveyed companies such as DEC who make the high-volume units that I am going to call mid-range computers, to distinguish them from the personal desktop computers you mentioned earlier. You know, between the mainframe users and the mid-range users, that pretty much covers all of Quantum's current customers. And it's just like I told you earlier. They want more capacity in that 8-inch drive and show relatively little desire for a 5.25-inch form factor. No wonder Quantum is focusing much of its effort on providing more capacity.

"More about that later. But more importantly, you got me thinking beyond these existing customers. It's risky, but yes, maybe we should also consider that third possible group of customers you mentioned: those who might buy that new Apple desktop personal computer. And then, just to satisfy our curiosity, we peered even further out into the future on this. We came up with a possible fourth group of users that might want disk drives for a *portable* type of computer. Some people are envisioning a computer that an engineer might want to take to a work site so that she can collect and analyze her data and write her report on-sight, for example; something like a very powerful portable calculator. And after some heavy brainstorming we decided there might even be some specialty uses for other little devices that you could carry around and store data in. Maybe something like a little pocket-sized "personal assistant" that holds your daily calendar. Or maybe something that a forklift driver could carry around, to keep track of inventory levels in a warehouse.

"Anyway, as you can see, this analysis left us with the following five possible customer groups: 1) Mainframe users, 2) Mid-range users, 3) Desktop users, 4) Portable computer users, and 5) Specialty users. Now, here's where it gets interesting. Among all these potential users, we found two key things that these customers were all concerned about, to one degree or another. First, they wanted to know, just how much data will the disk drive store? And secondly, they wanted to know, physically, just how big is the disk drive?

"Regarding these two parameters (storage capacity and physical size), we were able to glean the following information. We found that, other things being equal, all of these potential customers prefer more capacity. Not a surprise, is it? However, not everybody is willing to pay the same amount for a given level of capacity. If you think about mainframe users, they clearly value capacity the most. Mid-range users value capacity only slightly less highly. The potential desktop users are more accepting of a drive with limited capacity, and futuristic users of those portable computers are even more willing to give up storage capacity. Finally, for those specialty devices that we could envision, we had to sort of guess but we felt big capacity levels would be of very little value, at least relative to the way a mainframe user values capacity.

"In fact, we found that if we plot the value (or part-worth) that each customer places on a disk drive of a given capacity, starting with the mainframe user who values this capacity most highly, we get something like the graph shown in Figure 1. What this graph is showing is that there are 1.275 million potential customers in this total market, broken down within the five groups I mentioned earlier. But even within any one of these groups, some customers value capacity more than others. In fact, the mainframe customer who values capacity the least is similar to the mid-range user who values capacity the most. So we can conveniently approximate the relationship with the straight line shown in Figure 1. In other words, the first customer, who is the customer valuing capacity the most, would effectively pay $2,415 for 60 megabytes (MB) of

capacity in a disk drive. We call this her *part-worth* for capacity, as this is only part of what the disk drive is worth to her. She will also pay some additional amount depending how compact the drive is, as we will see later. Other customers aren't willing to fork over that much money for the 60 MB drive: Willingness to pay for capacity decreases linearly with each customer until we get to the last customer (namely, the 1.275 millionth customer), who would pay nothing. Effectively, this last customer needs only a miniscule level of capacity, with no use for higher levels of capacity.

"Now, not so surprisingly when you think about it, we found the reverse relationship for physical size. In other words, mainframe users don't really care much about physical size. At least they don't care as much as the mid-range users, who in turn don't value compactness as much as desktop users, who don't value compactness as much as the portable computers users, who don't value compactness as much as specialty users. In fact, if we plot the value (or part-worth) these same 1.275 million customers place on compactness, we find a graph something like that shown in Figure 2. At one extreme, a mainframe user has a part-worth of $1,085 regardless of size, while at the other extreme a specialty user has a wide disparity.

"Now, perhaps we can use this type of analysis to figure out what each customer will pay for any given disk drive. We can call this amount the customer's *reservation price*, and calculate it as simply the sum of the two part-worths for capacity and physical size. This framework gives us a way of thinking about what it takes to actually make a sale to a customer. We have to price our disk drive at a level below that customer's reservation price, and, if there is a competitor, our disk drive has to provide that customer with more value than the competitor's disk drive. Or else she will buy the competitor's product."

"I'm think I'm beginning to get it," replied Andrea. "That's why Quantum's 8 inch drive is doing so well right now. Look, Quantum recently upped the capacity of its 8 inch drives, but the mainframe users still want more, more, more. The mid-range customers also love it, as they still primarily favor more capacity over smaller physical size! So to keep its customers happy, that's what Quantum is focusing on: more and more capacity. I understand Quantum is extremely profitable with their 8-inch drive and can produce it at a cost of $2,800. What if we assume, for simplicity, that they basically have a monopoly on the market? I've heard they sell about 150,000 units. Would your data support that number?

"At the same time, I have a hunch that your data suggests we can encroach on Quantum's market in a seemingly non-threatening sort of way. What if we do indeed pursue the 5.25-inch form factor? I mean, let's get specific. From an engineering perspective, I think we can develop a 5.25-inch drive with 10 MB of capacity. At the time of introduction, production cost would be $2,100, but it will go down as we grow our volume. Also, I think we can increase capacity of the drive at a rate of about 50% per year. And I think customers will then increase their willingness to pay for our drive, because as capacity increases it comes closer to meeting their appetite for capacity.

"I suspect Quantum will continue to increase the 8" drive capacity as well, and while Quantum's customers will expect continually increasing capacity in an 8" drive over time I'm not sure they will actually be willing to pay more as capacity goes up, given how much capacity those drives already have. For simplicity, let's assume willingness-to-pay for the 8" drive remains constant as its capacity goes up from here. With regard to Quantum's production cost, they will be able

to reduce cost per MB but I don't think they can reduce per-unit cost like we can because they are already further down the learning curve.

"To be specific, what if we assume the disk drive characteristics and customer willingness-to-pay change over time as shown in Tables 1 and 2? Which customer segments do you think would buy our drive, how much market share would we get over time, and how much profit would we make? Will our drive encroach on Quantum's 8-inch product? How will it impact their profitability? I think we need to answer at least some of these questions before making a decision."

Table 1. Expected changes in characteristics related to the 8-inch drive.

	Years since introduction					
	0	**1**	**2**	**4**	**6**	**7**
Capacity of 8" drive, MB	60	90	135	300	680	1025
Maximum willingness-to-pay for 8" drive*	$3,500	$3,500	$3,500	$3,500	$3,500	$3,500
Minimum willingness-to-pay for 8" drive*	$525	$525	$525	$525	$525	$525
Production cost of 8" drive*	$2,800	$2,800	$2,800	$2,800	$2,800	$2,800

* These values apply to a drive of the MB level as given in the first row of the table.

Table 2. Expected changes in characteristics related to the 5.25-inch drive.

	Years since introduction					
	0	**1**	**2**	**4**	**6**	**7**
Capacity of 5.25" drive, MB	10	15	22	50	115	170
Maximum willingness-to-pay for a 5.25" drive*	$2,275	$2,300	$2,375	$2,500	$2,700	$3,000
Minimum willingness-to-pay for 5.25" drive*	$1,085	$1,110	$1,185	$1,310	$1,510	$1,810
Production cost of 5.25" drive*	$2,100	$2,050	$2,011	$1,950	$1,900	$1,880

* These values apply to a drive of the MB level as given in the first row of the table.

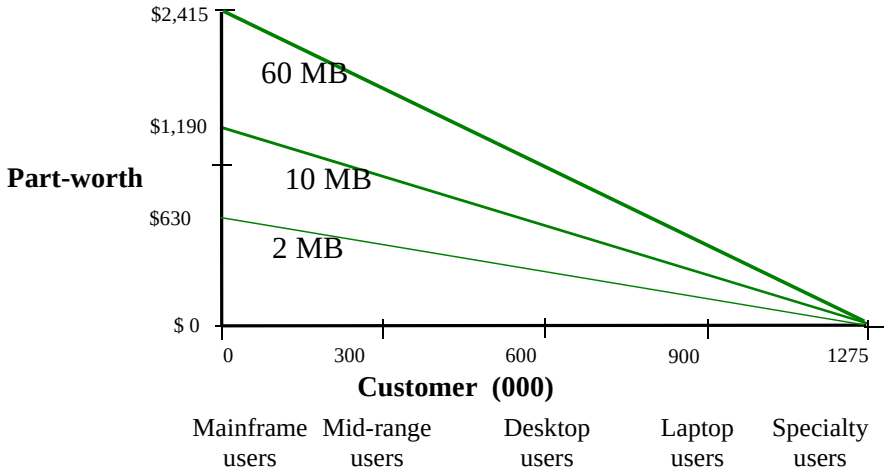

Figure 1. The value (part-worth) that each potential customer places on storage capacity.

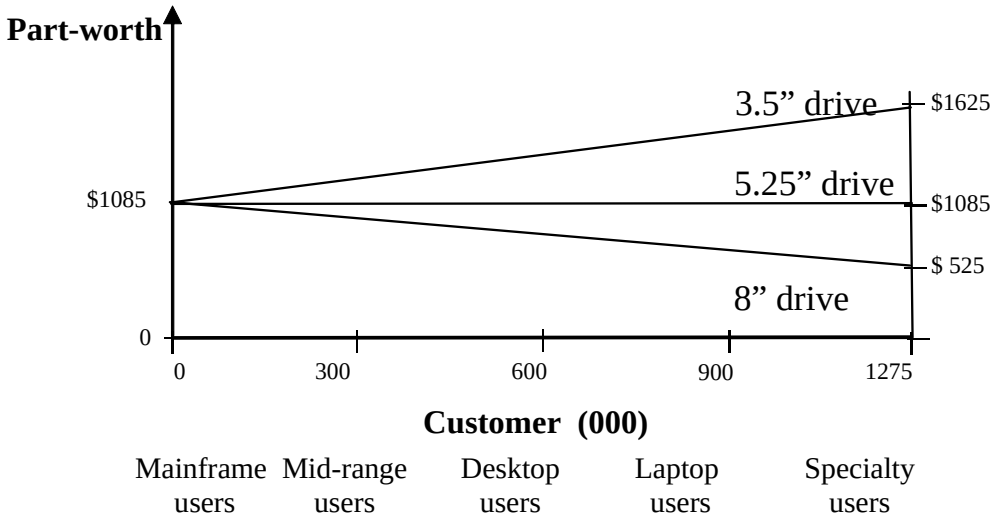

Figure 2. The value (part-worth) that each potential customer places on physical size.

Assignment Questions

1 If you were Seagate, would you introduce a 5.25 inch drive? Estimate pricing, market share, and profitability at introduction, and also at one year, two years, four years, six years, and seven years after introduction.

2 If you were Quantum, how would you react to Seagate's new product introduction strategy?

3 One "view of the world" seems to be that new products diffuse through the market because of communication. Some personality types buy because of communication external to the social system (these customers are sometimes called "innovators") while others require communication internal to the social system (these are "imitators"). At first, only "innovator-types" buy the product. Then "early adopters" become convinced, followed by the "early majority." The "late majority" types are risk-averse and are exceeded in their reluctance to convert only by the "laggards." How does the reservation price perspective compare with this marketing view?

4 What are the possible scenarios under which the electric car might make inroads into the automotive market? Describe both a low-end encroachment scenario and a high-end encroachment strategy. In your discussion, identify who are the first customers, from what segments does the market grow, etc. In what time frame do you envision the electric car, or some other alternate fueled vehicle? Which of these strategies would you choose if you were a manufacturer?