

Marketing High Tech Products: Lessons in Customer Focus from the Marketplace

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EXECUTIVE SUMMARY

Nystrom (1990) described high tech markets as marketing dependent and technologically driven. Unfortunately, there is evidence that this linkage is not often recognized by organizations (Gupta, Ray and Wilemon 1985). High tech markets are characterized as complex. In addition, they exist under rapidly changing technological conditions which lead to shorter life cycles (Davidow 1986) and the need for rapid decisions (Bridges, Coughlan, and Kalish 1991). The importance of speed in high tech markets is driven by increasing competition and the continually evolving expectations of customers (Doyle and Saunders 1985). All of this is compounded by higher levels of risk for both the customer and the producer.

As a result of these dynamic market conditions high tech companies frequently rely on a product focus (Dugal and Schroeder 1995, Marcus and Segal 1989) driven by innovations in technology rather than by the needs of the customer. This failure to incorporate a customer focus is often compounded by an absence of attention to the critical role which the diffusion of innovation plays in successful product launch.

As illustrated by the three cases presented in this paper, the outcome of a product focus is often a product launch which does not live up to its technological promise. The launch of Philips' CD-I, Apple's Newton, and Sony's BetaMax, illustrate the critical role which the diffusion of innovation process plays in successful high tech product offerings. In each case, the companies rushed their products to market and failed to combine a customer focus with an understanding of the diffusion process.

These examples provide specific lessons for managers today that can be used to insure that managers achieve the right blend of market and technology. First, rethink the first to market mentality. Is it really imperative to be first in the market? If it is not, attention should be placed on perfecting the value package and taking this opportunity to develop a "complete product" for the consumer. While some innovators rush to try the first product on the market, your company can be improving the performance of the product and improving the marketing mix. When introduced, your product will fulfill the promises made during development. Second, though a common phenomenon, managers should not fall into the trap of assuming that customers are useless in the product development process and skip marketing research. Developing successful high tech products requires working closely with customer to identify their problems so that technologies can be identified which provide solutions. Third, target the market carefully by identifying an accurate profile of consumers most likely to purchase this product. Knowledge of the adopter categories can be useful in determining the most viable market segment. Fourth, take advantage of the role that innovators and early adopters in socialization of the product. Satisfying these two groups can greatly affect whether a product receives positive or negative

word of mouth. And finally, rethink the target market as the product progresses through adoption. Just as the product changes over the course of its life so too will the appropriate market. Readjust the description of the target market and pay close attention to the differences in the groups. For example, innovators and early adopters may be excited about a "new" product but early and late majority will want reassurances that risk is minimal and the product will do what is promised (Rogers 1962).

The marketing concept is intuitively appealing, and there is ample evidence of the critical role it can play in product acceptance. However, Philips' handling of CD-I, Apple's of the Newton, and Sony's experiences with BetaMax are reminders of the difficulties in implementing a customer focus when a firm has become technologically obsessed. While being technologically driven is essential, managers must remember whose perceptions of superiority ultimately lead to product success. It is imperative that the *customer* deems the product "superior".

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As a result of these dynamic market conditions high tech companies frequently rely on a product focus (Dugal and Schroeder 1995, Marcus and Segal 1989) which is driven by the innovations in technology rather than by the needs of the customer. This orientation often leads to abandonment of a customer focus; a must in today's globally competitive markets.

Customer focus, a core element of the marketing concept, is certainly a widely adopted buzzword today, one which is stressed in all introductory marketing texts. While the marketing concept applies to all industries, it is particularly important in technologically driven industries that have been among the first to introduce quality techniques, many of which begin with capturing the "voice of the customer". Consequently, one would expect a customer focus to be integrated into new product development and marketing in technologically driven firms. Unfortunately, reviews (e.g., Cahill, Thach and Warshawsky 1994; Webster 1988; McGee and Spiro 1988) have repeatedly concluded that the marketing concept often remains just that - a concept.

Perhaps there is something even more elementary which can explain the failure of high-tech companies to successfully adopt a customer focus. Presented in this paper are three case studies in customer focus, Philips' CD-I and Apple's Newton and Sony's BetaMax, to illustrate the critical role which the diffusion of innovation process plays in successful high tech product offerings. In each case, the effectiveness of the marketing strategy can be traced to how well the company combined a customer focus with an understanding of the diffusion process. To put these specific examples in the right context, however, the nature of high tech markets must first be explored.

HIGH TECH MARKETS

There are two issues relevant to the discussion of product launch in high tech markets. First, it is important to understand the difference between the customer's perspective and the manager's perspective that can exist in high tech markets. Second, there are specific features of high tech markets that are believed to distinguish them from other product categories. Examination of both of these sets of issues is necessary to understand the particular importance of the diffusion of innovation in the launch of high tech products.

"IF WE BUILD IT THEY WILL COME"

Many involved in product development claim that customers don't know what they want, are unable to articulate desires, or are not knowledgeable about products they seek. For example, when asked whether Apple did any consumer research in designing the iMac, Steve Jobs replied: "No...in the end, for something this complicated, it's really hard to design products by focus groups. A lot of times, people don't know what they want until you show it to them (*Newsweek*, pg. 52)." As a result, product developers tend to be driven by their technology in determining the marketing mix oftentimes ignoring their role as translators of customer needs.

In addition, several authors have suggested that high tech markets, unlike low-tech markets, must focus on both demand-side marketing and supply-side marketing (e.g. Shanklin and Ryans 1984). Based upon the belief that supply can create its

own demand, supply-side marketing is appealing to new product developers as it legitimizes a product orientation (e.g., Moore 1995). In practice, however, the supply-side can so dominate the demand-side that the needs of the consumers are ignored in strategy development. As a result product developers tend to be driven by their technology in determining the marketing mix.

The demise of several of Texas Instruments' product lines provides a glaring example of this phenomenon. For years, the firm has been known for its technical know-how. However, the fact that the linkage between technology and marketing was missing at Texas Instruments led to a failure to discern the need to change from a supply-side focus to a more market-driven orientation. This, in turn, led to the downfall of their watch and personal computer business (Shanklin and Ryans 1984).

The idea that the superior product will win out in the marketplace pervades much of the product development literature (e.g., Cooper 1987; Gruenwald 1985; Kleinschmidt and Cooper 1991). However, the history of technology is full of examples that contradict this notion (Loudon and Della Bitta 1994). Sony's BetaMax, considered by many to be a better machine (Perry 1988; Cusumano, Mylonadis, and Rosenbloom 1992), lost the market to the VHS format videocassette player largely due to not meeting the needs of consumers. Similarly, compact disk technology provides unparalleled sound reproduction capabilities, including increased dynamic range. Yet, for many consumers, louder highs and softer lows were a nuisance. Soon, compact disk players incorporated a 'CD-r' button, to provide for a reduction in dynamic range for certain listening environments such as automobiles. This ironic situation shows how product attribute superiority does not always lead to customer satisfaction.

The perspectives of managers involved in developing new products often seems to be at odds with the perspectives of customers (Table 1). When selecting products, consumers focus on features, what the consequences are from using those features and how the consumption experience fits into their values (Gutman 1982; Gardial, Clemons, Woodruff, Schumann, and Burns 1994). Product adoption is smoother when the product is easy to operate and does not require behavioral changes (Davidow 1986). To get people to adopt a new technology, it should possess unique qualities which current offerings cannot deliver (Porter 1980). Last, but not least, their goal is to fulfill unmet needs.

TABLE 1
Customer Focus versus Managerial Focus

Customer Focus	Managerial Focus
Features	Design
Consequences, values	Cost
Ease of operation	Ease of production
Unique qualities	Unique technologies
Consumption	Production

For the manager, however, there is ample evidence that the focus is on the product (Dugal and Schroeder 1995; Marcus and Segal 1989). Similarly, there are countless examples of functionally sound designs that are extremely consumer hostile. One of the most blatant examples of this being the controls in a refrigerator (Norman 1988). Due to cost considerations, the emphasis is on ease of production. Many product developers seek advantage through sophisticated technologies without concern for whether or not consumers desire or perceive the advantages inherent in the technologies (Perry 1988; Cosumano, Mylonadis, and Rosenbloom 1992). It is as if managers and customers are operating in different paradigms, not "speaking the same language" (Kuhn 1962).

The chasm between these two orientations is far wider in high tech markets for several reasons. First, how customers think about and categorize new products is critical (Howard 1989). Several studies provide evidence that customer expectations are probably more critical in high tech markets because product attributes change rapidly leading to dynamic expectations (Bridges, Yim and Briesch 1995; Weiss and John 1989). Second, combining a product orientation with a technologically driven organization reinforces the supply-side orientation of new product developers resulting in the development of

technologically sound products that nobody wants. What follows is a brief discussion of exactly how high tech markets differ from other product categories as these differences specifically affect product launch.

THE NATURE OF HIGH TECH MARKETS

There is ample evidence pointing to specific ways in which high tech markets are different from consumer package goods markets (Table 2). Because high tech companies exploit and create change rather than consolidate and defend existing conditions the interdependence between marketing and technology is of crucial importance. Companies regarded as low-tech may basically adjust their marketing strategies to reflect relatively unchanging technological conditions. High tech companies, however, must recognize that both technological and marketing conditions are rapidly changing (Nystrom 1990). This dynamic environment necessitates stronger consideration for the marriage of marketing and technology.

Research and practice indicate that high tech markets are characterized as dynamic and complex which results in a changing target market over the life cycle (Abell 1978, Davidow 1986, Beard and Easingwood 1996). The complexity of the product also impacts market acceptance in different ways in high tech markets (Davidow 1986). As high tech products are more complicated, they require greater customer education and more product information. This necessity results in greater effort on the part of marketing to adequately convey the necessary information as well as greater effort on the part of the consumer to digest the information.

TABLE 2
Prominent Issues in High Tech Markets
High tech markets:

- exploit and create change
- are complex
- need to be targeted carefully
- exhibit risk
- require deliberate timing
- are extremely fast-paced

The requirement of greater customer education is not meant to imply an uneducated consumer. Consumers of high tech offerings, particularly those first to adopt a technology, are extremely sophisticated and product/technology savvy. To some authors (e.g., Moore 1995) and product developers (Dugal and Schroeder 1995) this means that you can ignore getting to know your customers while focusing on product leadership. The level of sophistication prevalent in high tech markets, however, demands developing an intimate knowledge of the consumer in order to ensure that the offering is captures what the customer considers to be desirable.

Target marketing is another critical factor for firms introducing high tech products. Easingwood and Lunn (1992) found that clearly targeted products diffuse more rapidly than non-targeted products. Complicating this factor is evidence that the customer base changes for each stage of the product life cycle as different segments of the market become interested in the product at different times (Davidow 1986). Consequently, it is important to recognize the need to clearly identify and profile a target market as well as take into account that the profile of the target market will change over time.

Higher levels of risk for both supplier and customer also contribute to a belief that high tech markets are different (Moriarty and Kosnik 1986). As a result of this uncertainty, new products have only a brief opportunity to be introduced and become established in the marketplace (AMA 1988) leading to pressure for shorter development cycles. And once a market is established, high tech products mature rapidly (Davidow 1986). Thus, high tech markets are characterized as risky as they are fast-moving and expensive due to technological advances, intense competition and a fickle customer. This emphasis on timing results in many firms emphasizing a first-to-market mentality.

Clearly, time pressures pervade high tech markets. Perceptions of time pressures have led to steps in the development process, such as concept and market testing, being skipped entirely in an effort to beat the competition. But is this speed

really necessary? Freshman, Mahajan and Muller (1990) found that order of entry has no relevance to market share in the long run. Shorter development cycles, however, were found to increase sales, profitability and enhance a company's image as an innovation leader (Smith and Andrews 1995). Why the contradictory results? Perhaps the explanation lies in the fact that being first is not the critical factor in market success. Rather, being *among* the first is the necessary condition thus creating a need for shorter development cycles. Further, some studies provide evidence that it is the firms' resources and skills that matter most and not their ability to be a technological pioneer (Ali, Krapfel and LeBahn 1995). Others show that pioneering firms are different but not superior to late entrants (Robinson, Fornell and Sullivan 1992). For a specific firm the strategic window for entry "occurs when the best fit arises between a market's key success requirements and specific firm competencies" (Robinson, Fornell and Sullivan 1992; Cusumano, Mylonadis, and Rosenbloom 1992).

High tech markets may not be so different as to require different theories. However, there is ample evidence that their operating environments are more intense than consumer markets making attention to the nuances of product launch strategies particularly critical. Examination of the new product development process and the role of the diffusion of innovations followed by a review of several examples of recent high tech product launches will clarify why this is so.

PRODUCT LAUNCH PROCESSES

Inherent in the adoption process concept is the notion that different stages of adopters have different requirements. Combining these different requirements with the emphasis on shorter development cycles and shorter life cycles prevalent in high tech markets makes correctly targeting each adopter category critical.

THE NEW PRODUCT DEVELOPMENT PROCESS

Models of new product development prescribe critical stages that organizations should go through to have a successful product launch. Regardless of the model, critical phases include: product idea generation, idea screening, concept testing, business analysis, marketing mix development, test marketing and commercialization. In theory, going through these stages systematically helps organizations weed out the potential failures.

Customer focus is an integral component of the product development process that is often ignored. The need to incorporate the voice of the customer (adopt the marketing concept) at every phase is imbedded in these models of new product development, each phase contributing additional knowledge as to what customers want. Yet concept testing and test marketing are most often overlooked by new product development teams as they rush to get their product to market before the competition. Unfortunately, this can lead to fatal errors when customer expectations are extremely high - or when dealing with a sophisticated customer - as is the case for high tech products. One of the ways to understand how different types of customers respond to new product offerings is to examine Rogers' Diffusions of Innovation model (Rogers 1962).

DIFFUSION OF INNOVATIONS AND ITS ROLE IN HIGH TECH DIFFUSION

Rogers' Diffusion of Innovations model (1962) has repeatedly been demonstrated to explain how innovations enter a social system. Developing the belief that individuals differ in their readiness to adopt new products, Rogers describes five types of individuals innovators, early adopters, early majority, late majority and laggards (Table 3). These types differ in terms of their timing to adopt a new product and the sources of information they rely on to adopt new products.

Understanding the differences in the five adopter groups presents a way to successfully reach individuals at various stages of adoption as the "...main uses of research on characteristics of adopter categories is to provide a basis for audience segmentation strategies..." (Robinson, Fornell and Sullivan 1992). As the requirements for success change as the market evolves (Abell 1978), this widely accepted adopter classification system should cause the innovative firm to research the characteristics of the innovators and early adopters and direct introductory marketing strategies specifically at them. This

is particularly true in high tech markets where products more often present high-risk decisions (Davidow 1986). One important way to reduce risk is to gather information (Cox 1967). As gatekeepers, experts and opinion leaders, innovators and early adopters serve critical informational roles in the diffusion process.

TABLE 3
Adopter Categories
Category Characteristics Role in Diffusion

Innovators	willing to take risks impersonal and scientific information	"gatekeeper"
Early Adopters	accept new ideas early rely on multiple sources of information	opinion leaders
Early Majority	risk adverse; rely on company-generated promotional information and word-of-mouth	don't purchase until late growth stage
Late Majority and Laggards	require early categories to "test drive" the product	this is an advantage for companies who enter during maturity (Dell Computer, AMA 1988)

In addition, it is important to understand that there is not a general innovativeness personality trait (Kotler 1984). Individuals may be early adopters for one product class and laggards for another. Consequently, it is extremely important for producers of high tech products to gather the necessary demographics, psychographics and media characteristics for each product introduction in order to insure that they successfully reach the innovators and early adopters who are key to a particular product's success.

Understanding the relationship between the product development process and the product adoption process provides the means of incorporating the marketing concept into the development of new products. How an organization treats the two can impact the success or failure of a new product launch. As indicated in Table 4, the most common reason for product failure is not meeting customer expectations. An organization that has a product focus has basically relegated customer expectations to, at best, a secondary role. Several examples are presented in the next section to illustrate the importance of, and ways to incorporate, the voice of the customer when developing high tech products.

As high tech companies have only a brief window of opportunity, they must understand that certain factors can facilitate or inhibit the adoption process. Complexity tends to slow the process of adoption and requires greater attention to at least promotional strategy to ensure that the intricacies of the product are understood and appreciated. If the firm can communicate a distinct relative advantage, diffusion will be facilitated. Compatibility with existing attitudes and values also accelerates product adoption. Clearly, a firm engaging in high tech marketing cannot afford to ignore the impact of these factors on their marketing strategy.

EXAMPLES FROM PRACTICE

Examples of high tech products that failed to meet manufacturer and consumer expectations abound. A great deal can be learned from product failures such as Polaroid's instant movies or RCA's videodiscs. Why is it that these products did not capture the interest of consumers? Was it the technology, the marketing, or a combination of the two? The critical importance of adopting a customer focus emerges through an examination of Philips Consumer Electronics' Compact-Disc Interactive system, Apple Computer's experience with the Newton personal digital and Sony's ill-fated BetaMax.

TABLE 4
Factors Associated With Technological Product Failure

Customer expectations not met
No innovative advantage perceived
Information about product is scarce, unclear, or difficult
Need for product is not seen
Unique attributes not seen
Poor selection of target market
Poor communication of product benefits
Distribution channel selection
Pricing problems

Adopted from Hartley (1994), Loudon and Della Bitta (1994), Settle and Alreck (1989), and Engel Blackwell & Miniard (1995).

PHILIPS' CD-I

During a period of fierce competition in the home entertainment industry Philips Consumer Electronics (the U.S. subsidiary of Philips Electronics) launched the Compact Disk Interactive (CD-I) entertainment system. Billed as a major technological breakthrough for consumers, the CD-I system combined television and audio compact disc technology in an interactive system. Philips' management believed this format represented the family entertainment system of tomorrow and counted heavily on this system to carry Philips into the next century (Kidney 1994). Not only would Philips manufacture the hardware, but they also were partners in a joint venture with Polygram to produce the system's software. However, sales of the CD-I system were disappointing (Reilly 1992). Examination of the marketing strategy for the CD-I provides insight as to what Philips perceived of as an innovation was perceived otherwise by its customers.

Target Market and Timing of Introduction

Philips based the initial marketing strategy for the CD-I system on their profile of the targeted customer - married with school age children, technologically advanced and relatively affluent. With this profile in mind, the push was on at Philips to introduce this product for the holiday season of 1991 (Calabrese 1991). This meant introducing the product when software availability was limited and heavily concentrated in the "game" category. As the early purchasers were believed to be married with children, the emphasis on entertainment titles geared towards children was perceived to be a minor problem (Calabrese 1991).

To some degree Philips recognized the importance of co-opting the innovators and early adopters. There is evidence, however, that they did not truly understand what this meant. Franz Schmetz, Philips's vice president of audio marketing stated that the CD-I system was selling primarily to innovators, someone who wanted to be first on the block with the "latest gear" (Reilly 1992). To Philips this meant these innovators would "buy anything."

Product

There were several product related elements that were flawed when Philips launched the CD-I system. First, as mentioned above, not all the features meant to be included in the system were available in 1991 when the system was introduced. In Davidow's terms the product was incomplete (Davidow 1986). Second, the CD-I unit operates in conjunction with a TV and is similar in size to a VCR. At the time of product launch in 1991, most households already owned a VCR, hence the space directly above or below the TV was already occupied. Thus, in many of the households installation of the CD-I unit meant placing the system to the side of the TV. When playing the educational games, early users of the CD-I system noticed that they sat pointing the remote at the TV screen where the action unfolded. However, since the CD-I system was off to the side, some of their clicks of the remote buttons did not lead to a corresponding move on the screen. This minor

malfunction led to a perception that the equipment was not of top quality. Ironically, Philips produces a remote with an extremely wide reception band that would have eliminated this problem. However, this remote was not packaged with the CD-I system in the interest of keeping down costs (Calabrese 1991).

Distribution

Retail outlets for product introduction of the CD-I system included stores such as Sears and Circuit City. These are not stores associated with an image of high tech sophistication. These are, however, the stores that carry video games such as Nintendo. By selecting these outlets, Philips positioned themselves with the existing game technology and not necessarily leading edge products.

Promotion

The initial promotion strategy for the CD-I system was to: (1) advertise in national newspapers, magazines and newspapers in the larger metropolitan markets where CD-I would first be introduced; (2) produce special stand-alone kiosk displays for the CD-I system; and (3) utilize a specially hired sales staff for in-store demonstrations.

The CD-I was being pushed initially as the imagination machine. The copy for the ad used concurrently with product release depicted all the things an owner could "imagine" doing with the CD-I system (*Wall Street Journal* 1992). However, many things on this list were not yet available. The purchaser would indeed have to "imagine," for instance, viewing photos on their CD-I system an option that was not even available at the time of introduction though the ad included a description of this technology.

The kiosk displays set the system apart from all the other displays in the home entertainment sections of the selected retail outlets. This physical separation contributed to the attempt to differentiate the technology from current offerings.

Using a specifically trained sales force in the stores during the initial months of product introduction was also a good decision on Philips' part. Though early purchasers of the system proved to be more technologically sophisticated, the system did require someone to assist the consumer as they tried out the software. As the store's personnel in the retail outlets did not understand the system, these specially trained sales people proved very useful. Their services, however, were only retained for a three month period (Calabrese 1991).

Price

The original retail price of the system was \$899 - in line with a high end CD player - but higher than a Super Nintendo machine. Almost immediately after introduction, the price of the CD-I system dropped to \$699. Philips continued to lower the price since introduction (\$499 by 1994). Unfortunately, sales have still not taken off, creating a situation not likely to produce the results Philips sought.

Lessons Learned

The error in not focusing on the profiles of innovators and early adopters was compounded by confusing signals from the marketing mix decisions. In Philips' case the product was not a true innovation but rather a hybrid of existing technologies. Yet there is evidence that when sophisticated consumers invest time and money into a new system, they must perceive that the product is truly an innovation and not another Super Nintendo or audio CD offering (Olson, Orville and Ruekert 1995).

Early adopters are necessary in product adoption to develop word-of-mouth. The perceptions of the early purchasers of the CD-I system were not ringing endorsements of the system. The initial software titles available did nothing to enforce an image of an innovative product regardless of the characteristics of the purchaser. To the profile-consistent (i.e., married, with children) user the system did not appear to be different from the Super Nintendo. For single purchasers (who comprised 45% of the initial purchasers), the system offered little software that truly tapped into their perceptions of the interactive possibilities (Calabrese 1991). Even three years after introduction consumers still were not sure whether CD-I was a video game, a home computer or a game console - is it a toy or a tool? (DuBois 1994). This confusion stems in part from Philips misreading the characteristics of the target market (i.e., who would be purchasing the machine, what

their demographics and psychographics were) and underestimating the level of sophistication of innovators and early adopters.

In terms of product design, the issue of remote choice highlights how a seemingly insignificant product design decision can affect the perception of the quality of the product. Selecting the narrow band remote and saving money resulted in diminished perceptions of quality. If the manufacturer wants the product perceived as a leap in technology, the best available technology should be a part of the package and not one that costs ten cents less per unit to produce.

Some elements of Philips' promotion strategy did develop the perception of an advanced product. The media selected was appropriate as early adopters in particular get their information from mass publications. However, the imagination machine advertising copy did not match up with the functions of the system available in the initial units. Thus, consumers were disappointed and confused. And while the ad copy's discussion of the technologies merged together in the CD-I system might be effective with late adopters (i.e., those not willing to take on much risk in their purchases), such comparisons might denigrate from the image of a totally new technology worthy of adding to the high tech junkie's collection.

The initial retail stores selected by Philips did not project the image of technological sophistication that also contributed to the consumers' confusion. Sears and Circuit City might be where the late majority shops for new technologies but it is not where the early adopter categories expect to find the most technologically advanced products. Likewise, the initial pricing strategy of skimming might have provided a perception of a new technology but almost immediately management dropped the price. In the rush to get the product to market, Philips forced the consumer to "imagine" the possibilities that the system could not yet deliver. Clearly, the signals that Philips sent through their marketing strategy contributed to the confusion consumers experienced and which still persists today.

Both Philips and Apple have focused on being technological leaders. Having maintained a predominant product orientation, they demonstrate that neglect of the customer can be detrimental to the product launch. Apple's introduction of the Newton provides additional examples of strategies that did not match expectations of high tech consumer, in particular those of the innovators and early adopters.

APPLE'S NEWTON

In 1992 Apple Computer introduced the Newton, a hand-held message pad computer promoted as a "personal digital assistant" and capable of sending and receiving faxes and transmitting data electronically. The Newton sold strongly at first, mostly to adopters of early technology, who were not satisfied with the hardware or software. Sales fell short of expectations and the product was revamped and reintroduced in 1994. The new improved Newton, however, still did not meet the consumers' expectations of a cheap hand-held data device that can seamlessly communicate anywhere as promised by Apple. While sales after reintroduction were more promising, the initial launch of the Newton was not only dismal, but actually harmed the future of the product line. The Newton, says Microsoft Corp. Chairman Bill Gates, may have "set the category back a couple of years" (Hill and Carlton 1994).

Target Marketing and Mass Marketing

While Apple may have initially had a specific target in mind, their strategy decisions point to a mass marketing approach. It was only after reintroduction of the Newton that Apple clearly targeted areas with vertical market growth such as health care companies and brokerage houses (Carlton 1995). Product reviews indicate that this product, when complete, would appeal strongly to techno-philes (a common innovator of high tech products), as was the case with the early purchasers of the Philips' CD-I (Carlton 1993).

Product

Designed to compete with AT&T's Eo and the Zoomer, a product of Casio and sold by Tandy, Apple did not have a completed prototype in May 1992 when John Sculley, then Apple's CEO, introduced the Apple Newton. Compaq and Sony, however, were also at work on their own versions of the personal digital assistant which compelled Sculley to rush

the Newton to market (Burgess 1993). With a media splash consistent with previous product launches, Mr. Sculley introduced the Newton at a 1992 press conference by displaying an empty box describing the capabilities of the software (Yamada 1993).

The personal digital assistant was a new product category combining wireless electronic communication with file management, handwriting recognition capabilities and a pocket size. Although Apple claimed its Newton could recognize handwriting, send faxes, and receive wireless messages, at launch it could not send wireless messages or receive faxes and wasn't particularly adept at handwriting recognition (Goldman 1993). Again, in Davidow's terms, the Newton was not a "complete product" (Davidow 1986).

At the time of product launch the Newton could perform about "...75% of what Apple says it can do", maintained Andrew Seybold, publisher of the monthly newsletters Outlook on Mobile Computing and Outlook on Professional Computing, "which only contributes to a user's frustration". He described the Newton as "... an interesting combination of features and functions that won't sell well" (Yamada 1993).

Reviews of the Newton as well as the product category as a whole have not been glowing. A *Wall Street Journal* product review described the product's currently on the market as not having been designed to address a particular unmet need, technologically flawed and all of this has been combined with a very high price (Hill 1994). The product category has been described by others as "an information organizer on steroids" (Yamada 1993). Clearly, Apple's vision of a revolutionary product has not been shared by the customer.

Price

The pricing strategy for the Newton created a dilemma for the research team. Historically, Apple had used a skimming strategy for their products. However, this time, Mr. Sculley set a price point of \$500 and a set of product expectations which the research team could not fill at \$1,000 much less \$500 (Yamada 1993). Even with a sticker price of \$699, the reintroduced Newton was still perceived as too expensive to generate the market appeal it sought (Carlton 1995). Once again, the pricing strategy did not fit the product strategy.

Promotion

As is the case whenever Apple launches a new product, extreme attention was played to their promotional mix, from press conferences to advertising copy. In keeping with their strategy to provide sensational presentation, the Newton's introductory promotion was dramatic to the extreme. At the press conference a year before launch, John Sculley not only claimed the Newton was "the beginning of the biggest thing Apple has ever done" he went so far as to state, "This is tremendously exciting for the rest of the world" (Yamada 1993). However, unlike their famous Macintosh introduction of 1984, Sculley actually enumerated the features of the product as he envisioned them.

In its promotion strategy Apple Computers made many promises about the Newton, few of which it could fulfill. Making the same mistake as Philips, Apple advertised specific features prominently and then failed to deliver on its promises. Because of exaggeration of the capabilities of the product early users were disgruntled and, in fact, many returned the product (Goldman 1993). It seems the predictions of the *Wall Street Journal* were accurate.

Lessons Learned

The marketing mix for the Newton was long on promise and short on fulfillment. In terms of the product offering, it was neither a complete product nor a fully functional product. In the hurry to get to market, Apple had not fully developed the handwriting recognition software, one of the featured attributes. While innovators and early adopters are willing to take risks on new products, they do expect a minimal level of performance which Apple's Newton could not deliver.

The Newton was not a complete product because at the price point Sculley insisted upon, the research and development team could not deliver all the features Sculley promised. In fact, the research team had to strip some features, settle for compromises on others and offer the Newton in parts (Yamada 1993). The promotion strategy only served to compound all of the errors rendered by the inadequacies of the product.

One could argue that Apple attempted to develop a dramatically new technology to satisfy sophisticated high tech consumers as suggested by Olson, Walker, and Ruekert (1995). However, Sculley's overly ambitious, idealized product concept resulted in a less than successful product launch. "It will take two or three iterations before these things are any good", says Kimball Brown, the Chief Analyst for mobile computing for Dataquest, a research firm (Hill 1994).

Failure to successfully launch the Newton followed other unsuccessful launches such as the Mac portable computer. Apple was clearly not learning from its previous mistakes. Similar errors can be found in Sony's launch of the BetaMax.

SONY'S BETAMAX

The videotape player market emerged in 1971 but the standard for VCRs, the VHS format, did not appear on the market until 1976. Predecessors to VHS included InstaVideo by Ampex, an almost instant flop, the U-matic format by Sony which was soon relegated to the submarkets of educational and industrial training due to its heavy, cumbersome nature, and BetaMax also by Sony (Perry 1988). (Note: other failed formats are on display at the Ampex Museum of Magnetic Recording in Redwood City, California.) Of all the forerunners, BetaMax is certainly the best known as it still represents a point of controversy centering on its supposed superior technology.

Target Market and Research

It is not unreasonable to ask the question why Sony's BetaMax format, introduced in 1975, a full year before the VHS format, did not prosper. Videotaping and playing ability appeals to most owners of television sets. Furthermore, this market actually is large enough to allow several competing products to prosper (Cusumano, Mylonadis, and Rosenbloom 1992). In fact, in the early 1980s VCRs surpassed color televisions in sales and became Japan's top consumer electronics product in production value (Cusumano, Mylonadis, and Rosenbloom 1992).

One characteristic of Sony which might be a primary culprit in the failure of BetaMax was the total absence of market research. A former Sony executive, Yasuo Kuroki, once claimed, "We do not get involved in marketing studies to build products. No, we operate on the concept of increasing the number of people in our ranks who are working toward the same aims as us" (Hirai 1991). RCA, considering an alliance with Sony, conducted its own research and found that consumers required a minimum tape capacity of two hours before considering a purchase, far short of Beta's one hour capability. At the time, RCA decided to delay production of any VCR until it found a partner capable of a high level of production and a design capable of long time recording (Cusumano, Mylonadis, and Rosenbloom 1992).

Product

The evolution of the VCR market is perhaps a well-known story. Several earlier attempts began with questionable products that used tape cartridges, sharp angle turns for tape loading, heavy, bulky cases, and even tape players which did not record. Sony's first product in this category was the U-matic. Though targeted at the home consumer, it was too large, too heavy and too expensive. In an attempt to successfully attract the home consumer, Sony introduced the BetaMax in 1975 as the first compact, lightweight, inexpensive VCR with a recording capacity of one hour. Sony's goal was to set the standard for the VCR market (Cusumano, Mylonadis, and Rosenbloom 1992).

One of Beta's strengths was a broader carrier signal band width than VHS (Perry 1988). This difference is one of the bases upon which videophiles declared the BetaMax superior (Cohen 1989). Beta also had a higher signal to noise ratio. It is questionable, however, whether these differences were discernible to the viewer (Perry 1988). What consumers clearly preferred was the longer playing time of the VHS format (6 hours) to Beta's picture quality (Cohen 1989).

Price

Pricing at the time of product launch was somewhat confusing. In April 1975, Sony announced the launch of its new BetaMax line of video cassette recorders to be priced at \$788 (*Wall Street Journal* 4/17/75). The month before product launch, the BetaMax unit (including a 19" color TV) was advertised at \$2,295 even though a simplified model was currently selling in Japan for the equivalent of \$800 (probably the source of the earlier low price estimates, (*Wall Street*

Journal 10/30/75). The high end pricing strategy for bundled units led to the BetaMax only appealing to the luxury market, "wealthy people who want expensive toys" (*Wall Street Journal* 7/8/76).

While the price of Beta (\$899 in 1975) was not, itself, a barrier to adoption, the price of prerecorded movies was. Paramount Home Video and Sony formed a joint venture to sell Paramount's feature and educational films which were priced at \$79.95 to \$87.95. By 1987, Paramount Home Video was forced to drop the price of Beta movie cassettes from \$79.95 or \$89.95 to \$29.95 (Cohen 1989) to clear inventory. At the same time, VHS tapes were being sold profitably at \$29.95.

Place

Similar to other electronics manufacturers such as Matsushita, Sony relied heavily of alliances with other production or marketing firms. It originally intended to develop and produce VCRs with JVC. Sony also attempted to court Matsushita but this resulted in a Japanese trade paper article about the chairmen of Sony and Matsushita meeting late one night on a subway train (Perry 1988). According to the story, Matsushita had developed a two-hour playing time on a much smaller machine and refused to consider Sony's one hour capacity of Beta. Sony, on the other hand, refused to surrender its superior picture quality for the sake of size and playing time. This lack of an active partner to combat competing formats hurt Sony considerably when the competitors entered the market with extensive promotional and advertising budgets (Cohen 1989).

Promotion and Positioning

Sony encountered a number of opportunities to position BetaMax. Though first in the market, Sony did not position the Beta towards innovators and early adopters of this product category who were largely videophiles. Though Sony had retargeted their original offering in this market, the U-matic, toward industrial training and educational markets where its size and weight were not obstacles, the promotions for the Beta did not indicate that Sony had really learned what would appeal to innovators and early adopters in the consumer market.

Once competitors entered the market, though Sony had an affordable lightweight machine, RCA was able to exploit the long playing time (6 hours) of VHS in its promotions which disintegrated Beta's shrinking market share which went from 100% to 28% in 6 years (Cohen 1989). Whatever first mover advantage Beta had was wiped out and Sony was left unable to differentiate its product.

Having failed initially, Sony then failed to take advantage of the Beta's technical superiority and develop promotions to reposition the machine to appeal to the high tech videophiles, many of whom to this day still defend the BetaMax as a superior machine (Electronic Business Today).

Lessons Learned

BetaMax was the only VCR on the market for almost one year. Having first market entry advantage should have catapulted the BetaMax format to the top. Why then did BetaMax fail? While some technophiles still attest to the superior qualities of BetaMax (including greater horizontal resolution and signal-to-noise ratio) (Perry 1988), Beta was an incomplete product. This was due to a combination of a compromised design and total disregard for consumer preferences. This is ironic, as Sony's mistakes with Beta were similar to those it made with the U-matic, a machine superior to existing technology but without the features wanted by consumers (Cusumano, Mylonadis, and Rosenbloom 1992).

Though Sony ultimately tried to respond to consumers with the Extended Definition Beta, JVC introduced the Super VHS designed to counter Sony's clearer, sharper picture (Cohen 1989). This competition has resulted in a clear winner – the consumer. As quality improved, price dropped. But there was also a clear loser – Sony.

Unlike the case with Apple's Newton, the failures of InstaVideo, U-matic and BetaMax did not delay the adoption of the product category. For Sony, however, the experience of attempting to set the product standard with a machine which did not fill consumer's needs was a painful one. The defeat of the BetaMax was so crushing one Sony executive recalled, "At one point we even gave serious consideration to abandoning consumer products altogether" (Hirai 1991).

MANAGERIAL IMPLICATIONS

The academic literature provides ample evidence as to the importance of adopting a customer focus. In practice there are also many modern techniques such as Quality Function Deployment, which provide blueprints for making sure that the "voice of the customer" permeates every new product development effort. The examples presented in this paper provide additional insight for organizations seeking ways to properly insure that a customer focus is a part of their new product development strategies.

Specifically, the nature of high tech markets makes it all the more important to:

1. Rethink the first to market mentality. Is it imperative to establish the product as the first in the market? If it is not, work on perfecting the value package. Take this opportunity to develop a "complete product" for the consumer. While some innovators rush to try the first product on the market, improving the performance of the product and improving the marketing mix may be more important. When introduced, a complete product will more likely fulfill the promises made during development. If it is imperative to be the first product into the marketplace, target the market carefully. Identify those innovators and early adopters who will be trying the product immediately after introduction. Quick acceptance of the new product after introduction can mean the difference between survival and failure.
2. Rethink the value of market research. It is ironic that while engineering has embraced the notion that identifying the "voice of the customer" should be the bedrock of quality management processes (e.g., Quality Function Deployment), marketing practitioners like Steve Jobs still maintain that customer cannot participate in product development. This myopia, as illustrated by Sony, Philips and Apple, is a result of the product developer expecting the customers to provide their own solutions when customers should be probed for problems. This obviously requires becoming intimate with customers long before product launch. This should result in product offerings which fulfill unmet needs through superior technologies which consumers desire.
3. Target carefully. No matter when the product is introduced market segmentation and identification of the target market are critical. Carefully identify the consumers most likely to purchase this product. Knowledge of the adopter categories can be useful in determining the most viable market segment.
4. Exploit the innovators and early adopters. Take advantage of the role these two segments play in socialization of a product. Satisfying these two groups can greatly affect whether a product receives positive or negative word of mouth.
5. Rethink the target market as you progress. Just as the product changes over the course of its life so too will the appropriate market. Readjust the description of the target market and pay close attention to the differences in the groups. For example, innovators and early adopters may be excited about a "new" product but early and late majority will want reassurances that risk is minimal and the product will do what is promised (Rogers 1962).

With the benefit of hindsight the lessons learned from Philips, Apple and Sony are textbook examples of how not to incorporate the "voice of the customer". These marketing missteps provide a very clear message regarding the importance of not only a customer focus but also the role which the diffusion of innovation plays in developing an effective customer focus. The points outlined above provide specific ways for high tech organizations which are typically product focused to infuse the necessary dose of marketing dependence to their new product launch strategies.

CONCLUSION

Each of these examples provides ample evidence that failing to understand the nature of product adoption can lead to ineffective marketing strategies which led to negative results (Table 5). The CD-I has never taken off as Philips hoped. In the case of the Newton, Apple not only failed to make the splash they sought, they set the entire product category back. Sony's class product focus was one described as a "geocentric theory of management" (Hirai 1991). Its result, BetaMax, was an expensive and humiliating failed attempt at setting the industry standard with an incomplete product.

Of primary importance in each of these examples was the failure to recognize the evolving role that the adoption process plays in the launch of a new product. Understanding that the requirements of customers change as the product moves through the product life cycle dictates that consideration must be given to different marketing strategies for different stages. This is compounded in high tech markets where life cycles are typically short and the product introduction phase affords limited opportunities. Directly related to this, none of these companies recognized the critical gatekeeping role of the innovators. Failure to involve the innovator in the diffusion process led to less than successful product launches as predicted by Rogers (1962).

TABLE 5
MARKETING MISTAKES AND MISCONCEPTIONS IN PRODUCT LAUNCH

Marketing Mix Element	Philips	Apple	Sony
Product	Incomplete product <ul style="list-style-type: none"> shoddy remote was incompatible with brand image software not available to use all of machines unique features 	Incomplete product <ul style="list-style-type: none"> not all promised features will be available some promised features did not perform as advertised 	Product technology did not meet consumers' needs <ul style="list-style-type: none"> could only record for one hour Superior band width and resolution (opportunity for differentiation) but viewers couldn't perceive a difference
Price	Skimming strategy conflicts with mass market approach	Skimming strategy conflicts with mass market approach	Skimming strategy conflicts with mass market approach
Promotion	Poor job educating consumers about the nature of the product only used specially trained salespeople for 3 months	Couldn't fulfill promises made in promotion bad product reviews revealed shortcomings	Pitched the product to the mass market Did not promote product's superior features to back-up technophiles
Distribution	Distribution did not fit target market or brand image		Missed prerecorded tape distribution (very important to VCR owners) Refused license to Hitachi
Targeting	Ignored early adopter categories (innovators and early adopters)	No evidence that they attempted to address adopter categories	Did not target early adopter categories; focus was on the mass market
Timing of market entry	Product launched before software was available to produce promised product	Rush to beat competition to market resulted in product incapable of performing 25% of promised tasks	Commitments to production of U-Matic design delayed entry to home market for VCRs Refused to delay entry to establish relations with Matsushita

Many reasons for product launch failures exist: excluding expert consumers from product testing (Schoormans, Ortt, and de Bont 1995), poor customer "fit" (Shanklin and Ryans 1984), not understanding the implications of customer expectations (Teas 1994) and not correctly or accurately articulating the product's psychological benefits (Haley 1968). Philips, Apple and Sony were guilty of one or all of these errors. High tech managers need to recognize that being solely customer focused or solely product focused is suboptimal. Ideally, high tech companies must link the needs of the consumer with the drive for superior technology.

The marketing concept is intuitively appealing, and there is ample evidence of the critical role it can play in product acceptance. However, the launch of the CD-I, Newton, and BetaMax are reminders of the difficulties in implementing a customer focus when a firm has become technologically obsessed. While being technologically driven is essential, managers must remember whose perceptions of superiority ultimately lead to product success. It is imperative that the *customer* deems the product "superior".

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