

Key Success Strategies for Marketing of High Technology Products: A Review

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Abstract:

High technology product markets seem to exhibit unique characteristics that impact both the marketer and the customer. The products seem to pose unique marketing challenges and in there has been considerable academic work suggesting different approaches in marketing elements such as segmentation, targeting, positioning, the four Ps, customer relationship management, branding and other strategies. Faster product introductions, strategic alliances, bundle pricing and integrated marketing communications are some of the strategies deemed suitable for high tech products. In addition, a different approach altogether towards strategy making has also been suggested.

Key words: High – Technology Products, Role of Marketing Product Development, Pricing Options, Brand Building, Unique Approaches

Introduction

The market characteristics and buyer behaviour are thought to be different and unique for high technology products. Life cycles of these products tend to be shorter, giving rise to a high level of uncertainty

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among the marketers and consumers. There seems to be a consensus among researchers that the variables affecting the consumers of high tech products are different as compared to buyers of other types of products. The implications of this are significant on the marketing function of firms operating in these markets. The common belief is that marketing here is different than the traditional marketing approach. There is enough literature is available on the role of marketing and the marketing approach for success in high tech products. This paper is a review on the existing literature on high tech products and their marketing.

Meaning of Technology

Technology in simple words means scientific knowledge applied to useful purpose. There are three dimensions in this short definition. First, that technical knowledge is scientific, meaning that technology involves cause and effect phenomenon; second, that it is applied, meaning that it is of practical relevance and third, that it serves a useful purpose implying that technology helps mankind by manifesting itself in the things humans use and acts they do. Consistent with this understanding Kosnik and Moriarty (1989) have defined technology as "the practical knowledge, know-how, skills and artifacts that can be used to develop a new product or service and/or a new production/delivery system. Technology can be embodied in people, material, cognitive and physical processes, plant, equipment and tools".

Mohr et al (2005) have defined technology as the stock of relevant knowledge that allows new techniques to be derived. They have termed ideas embodied in the product and its constituent components as *product technology*, and ideas involved in the manufacture of a product as *process technology*. John et al (1999) caution that there are different meanings attached to the word technology and therefore an attempt to generate an inclusive definition will only add to confusion. Nevertheless, they provide an inclusive view of technology by relating it to scientific knowledge embodied in a product's functionality, manufacturing and sales knowledge.

High Technology Products

Most of the products that we see around us can be called technology products as their structure and functioning can be explained through scientific knowledge. For example, consider a simple device such as a pulley. It is used to lift water from a well with lesser effort due to a phenomenon called mechanical advantage (scientific knowledge). On the other hand modern automobiles use MPFI (multi point fuel injection) technology to increase the fuel efficiency of petrol engines. Hence technology products are conceived to be those products which incorporate technology that is "in-use" while being consumed. This distinction is necessary to separate technology products from nontechnology products. Steel with identical specifications can be manufactured using the traditional method or the latest state of the art facilities. To the consumer of this product, there is no difference between the two (maybe except the price). On the other hand, a mobile handset with bluetooth technology enables the use of a cordless ear plug as compared to an ordinary handset which does not provide this facility. The handset user here "experiences" bluetooth technology while using the product. Similarly, services and management actions incorporate technology make the that recipients (of the services/management actions) experience the technology. A customer might prefer one bank over the other because one bank provides ATM (technology) facility to withdraw cash (service) whereas the other bank may not be offering this facility.

Though not much difficulty is experienced in conceptualizing technology, problems emerge when it comes to understanding "high technology". First of all the term "high technology" has been prefixed to industries (*high tech industries*), markets (*high tech markets*) and products (*high tech products*). Secondly, there are several ways in which these have been defined. For instance, the US Bureau of Labor Statistics labels any industry having twice the number of technical employees and double the R&D outlays of the US average as high tech (Kosnik and Moriarty, 1989). As per the UK Department of Trade and Industry (DTI), a high tech industry is one where the ratio of R&D

intensity to gross output is 20% greater than the manufacturing industries' average (Oakley 1996).

Regis McKenna (as cited by Kosnik and Moriarty, 1987), asserts that high tech industries are characterized by complex products, large number of entrepreneurial competitors, customer confusion and rapid change. On the other hand John et al (1999) argue that speed of change and complexity are corollaries of technical intensity, and not foundational concepts. While citing the PC microprocessor industry as an example, Ofek and Sarvary (2003) have proposed successive introduction of next generation products as a characteristic of technology intensive markets. Shanklin and Ryans (1984) however, argue that businesses must primarily meet three broad criteria to be labeled high technology. First, the business should have a strong, scientific/technical basis; second, new technology should be replacing old technology rapidly and third, as new technologies come on stream, their applications should create or revolutionize demand.

A majority of the explanations cited above seem to identify high tech with industry characteristics (high R&D investment) and/or market characteristics (fast paced change, risk and uncertainty), which at best explain a high tech industry or a high tech market. However, the identity of an industry or a market is primarily determined by the product or service with which it carries out transactions. Therefore, it is necessary to understand high tech from the point of view of a product or a service because once this is accomplished; it would then be possible to conceive a high tech industry as an industry engaged in the manufacturing and supply of high tech products, and a high tech market as one which is made of sellers and buyers of high tech products.

As mentioned above, high tech products incorporate advanced knowhow based on the knowledge of science. Gardner et al (2000) explain that high tech products are those that use technologies considered to be the leading edge or state of the art in a particular field. It is that technology inherent in emerging from the laboratory into practical application. Hence high tech products or services are those devices, procedures, processes, techniques or sciences that are characterized by state of the art development and have typically short and volatile lives. These fast technological changes lie along dimensions that reflect changes in product benefits, technological capabilities and usage patterns. Based on this technology - user interaction, Gardner et al (2000) have developed a working definition that explains high technology products as "the results of turbulent technology requiring substantial shifts in behaviour of at least one member of the product usage channel."

As compared to other type of products, for a high tech product, the change in the behaviour of the usage channel would be primarily a function of the channel's experiencing of the product's technology. As for the end users, a product is ultimately made for their consumption and hence, technology built into a product or service directly impacts them. Hence it is this interaction (consumer – technology) that matters the most in shaping the nature of other entities in the market and industry. Kosnik and Moriarty (1987) have argued that most of the confusion in high tech markets arises because of wrong labeling and wrong units of analysis and suggest that the proper unit of analysis is the buyer seller exchange which is a set of activities and decisions involved in the buying-selling process.

High Technology Products as Technological Innovations

Given that high technology products represent novelty, complexity and require change in usage patterns, they have also been regarded as technological innovations. An innovation is basically defined as an idea, practice or material artifact perceived to be new by the unit of adoption. (Dewar and Dutton 1986, Rogers 1995). Depending mainly on the novelty, benefits offered and, the degree of change involved, two broad types of innovations have been identified.

1.*Incremental or continuous Innovation*: These are minor improvements or simple adjustments in current technology which occur through interaction of many organizations. They enhance and extend the underlying technology to reinforce an established technical order. (Dewar and Dutton 1986, Tushman and Anderson 1986)

2.*Radical or discontinuous Innovation*: These are new product classes that involve fundamental changes that represent revolutionary changes in technology and represent clear departures from existing practice. (Dewar and Dutton 1986, Tushman and Anderson 1986)

If continuous and discontinuous innovations are represented as two ends of the spectrum, then high technology products will lean more towards discontinuous innovations because they would require some change in the usage patterns. Tushman and Anderson (1986) have termed discontinuous innovations as "competence destroying" because they are fundamentally different from the incumbent dominant technologies. These come as a new product class or substitutes for an existing product and they require a shift in the skills and knowledge base required to operate them. Rogers (1995 p.12) has used the word "innovation" and " technology" as synonyms and even later researchers define technically innovative product as a product or service that the potential adopter perceives as new and the innovation represents a major change in the behavior necessary for adopters to use the new product (Lewin and Bello 1997).

Role of Marketing in High – Tech Products

Existing literature, on high technology products focuses on various topics such as basic strategy, market segmentation, customer relationship, product development, pricing, branding, advertising and sales promotions. (Ford & Ryan 1977, McKenna 1985, Bahrami & Evans, 1989, Crosby, Evans & Cowles 1990, Oakley 1996, Beard & Easingwood 1996, , Mahajan & Muller, 1998, John *et al* 1999, , Smith, Sinha, Lancioni & Forman 1999, Ward, Light & Goldstein 1999, Gardner *et al* 2000, Shih & Venkatesh 2004, Peppers and Rogers 2004). These studies have considered high technology products as a separate category having unique characteristics and then suggest suitable marketing actions under these conditions.

However, the opinion on technology intensive markets seems to be divided. Technology evangelists claim that these markets are very different and hence require a different marketing approach. On the other hand, skeptics contend that nothing is fundamentally different about such markets and existing insights on conventional marketing mix elements can be extrapolated usefully to technology intensive markets (John et al 1999). It appears to be a valid argument because marketing strategies for high tech products as suggested by most of the scholars seem to lie within the domain of conventional marketing insights. However, the same scholars have urged marketers to adopt innovative approaches within these familiar domains. Meldrum (1995), while discussing characteristics of high tech products, notes that these products do seem to present specific marketing challenges, but ones about which further research and understanding needs to be developed. Moreover, along with marketing, other functions have also been advised to approach their tasks in a different manner when it comes to high tech markets. For example, Kosnik and Moriarty (1989) hint that the role of human resource departments in high tech markets is not drastically different so as to move away from the traditional tasks, but at the same time suggest broadening and deepening the skill set of people by being more creative in conventional tasks such as recruiting, training and job assignments. In the same vein, it has been suggested that in high tech markets, R&D should go beyond its perceived role of technology development and cultivate marketing type relationships with stakeholders outside the firm (Tzokas et al 1997). The high tech characteristics have also seen to be impacting the organization structures resulting in complex matrix organizations, multi-functional teams, account management systems and new forms of business process that are replacing functional departments (Moller & Rajala, 1999).

Oakey (1991) found that marketing was consistently neglected in small high technology firms and urges firms to view marketing as a part of the total innovation process and not just as a function that is added as an afterthought. This view is supported by Dutta et al (1999) who claim that the role of marketing in high tech markets is rarely acknowledged and go on to caution that even if a firm has strong research and development abilities, it might fail to convert the same into a commercially viable product because of poor marketing capabilities. R&D may come up with innovations but it is the marketing capability 2 of the firm that influences the width of applicability which leads to widespread adoption of these innovations. A firm with a strong marketing capability will be able to achieve better targeting and positioning of its brands relative to competing brands. In addition, marketing effectiveness and expertise of these firms not only ensure successful product introductions but also long run success of these products (Gardner et al, 2000).

Given the unique characteristics of technology markets such as shorter PLC, competitive volatility, presence of network externalities³, market and technological uncertainties⁴, there should not be any doubt that marketing is an increasingly demanding function. In markets where change is a norm, marketing activities are to be focused on driving change by altering customer preferences and behaviours (Hills & Sarin 2003). Im & Workman (2004) contest that customers in such markets evaluate a firm's creativity not just in the product but in marketing programs as well, and a firm that closely monitors customer needs tends to improve creativity by producing novel products and marketing programs. But to say that the role of marketing in high tech markets has to do more with understanding customer needs does not make it any different as compared to other types of markets. However, as the types of uncertainties experienced by customers in high tech markets

² Marketing capability in this study by Dutta et al (1999) is measured in terms of technological base, advertising stock, marketing expenditure stock, investment in customer relationships and installed base.

³ Network Externality is the phenomenon by which the utility that the user derives from consumption of the good increases with the number of other agents consuming it (Katz & Shapiro 1985). In the context of high tech products the formation of the network may take such long time that users of the new product end up paying exorbitant incompatibility costs.

⁴ Kosnik & Moriaty(1989) define technological uncertainties as uncertainties faced by the customer of high tech products in terms of their timely delivery, availability of high quality services, possible side effects, capability to render existing systems obsolete and ability to perform as promised.

tend to be unique, it would be inappropriate for marketers to approach customers with assumptions based on broad generalizations. It is in this regard that the fundamental marketing concepts become more relevant in high tech markets, and the nature of these markets have made marketing tasks more knowledge intensive (Cahill & Washawsky 1993, Moller & Rajala, 1999).

Market Segments for High tech Products

Kosnik and Moriarty (1987) list five broad supplier activities as success factors in high tech markets. These activities are -

1. Increasing interaction between marketing and R&D

- 2. Accelerating product development process
- 3. Building relationships with channel partners and customers
- 4. Emphasizing on technical support and service

5. Relying on qualitative rather than quantitative approaches for market research.

Most of the existing literature on strategies for success in high tech markets seems to support the points mentioned above. However, Kosnik and Moriarty (1987) have said that a majority of these points are not quite unique to high tech markets, but are applicable in the contexts outside the high tech domain as well. According to them the confusion on whether high tech markets require a separate marketing approach or not, can be attributed to incorrect labeling (of what is high tech and what is not), inappropriate unit of analysis (customer, consumer or the marketer), inadequate comparison and limited approach to the problem. Hence, it is contended that before applying any of the above mentioned factors, it is important to first apply the marketing fundamentals which involves choosing the right customers to serve (market selection), identifying unmet needs and figuring out ways to satisfy them (marketing concept), finding how can target customers' needs be met better than competition (differentiation) and finally, making crucial decisions about the marketing mix (the four Ps). Rather than simply selling to all takers, focusing on carefully chosen customers helps marketers in cultivating the right image as the key elements of credibility building are specific to different customer segments. Instead of trying to identify the homogeneous demographic

groupings, high tech marketers should identify customer groups that use the product in similar ways and realize similar value from the product (McKenna Regis 1985, Mohr et al 2005).

Drawing from adopter categories in diffusion literature⁵, Easingwood and Koustelos (2000) indicate that high tech firms, along with existing customers, can target innovators, early adopters, late adopters and competitors' customers, but they do not tell us which segments among these are to be chosen. McKenna (1985) uses the same typology to compare early and late adopters with regard to their risk taking ability based on their motivation and confidence levels, and then goes on to suggest different selling strategies to these segments. Obviously, the decision to target any one particular segment over the other would depend on several market and competitive conditions. For instance, it is optimal for a firm to allocate more of its marketing efforts and resources to the innovators despite their small size, when the intensity of their influence on the majority does not decrease as more and more consumers adopt the product (Mahajan & Muller, 1998). Organizations experiencing higher levels of competitive and stakeholder pressures, and capable of sensing a technological opportunity are more likely to adopt radical technologies and marketers can target such organizations (Srinivasan et al 2002). In a study of home technologies, that included home computing systems and entertainment electronic goods, Shih and Venkatesh (2004) have segmented technology users on two dimensions - level of use (intense/limited) and type of use (specialized/nonspecialized) and suggest this could be of interest to marketers for segmentation. Two things emerge from the above discussion. First, for success in high tech markets it is important to choose the right markets (segment) and second, marketers need to look beyond the traditional segmentation variables.

⁵ Diffusion literature (Rogers, 1992) contends that an innovation is adopted first by a group of customers called innovators, and is then followed by early adopters, early majority, late majority and laggards.

High Tech Products and the Four Ps of Marketing

Strategies focusing on the four P's of Marketing have been suggested by several authors and some of them are contradictory. Dhebar (1996) expresses a genuine concern on the rapid product obsolescence customers face on account of shorter product life cycles of different high technology products that are used together (systems that require a set of complimentary products). He therefore, urges marketers to offer modular upgrades to avert obsolescence at the customer side and suggests appropriate phasing of product improvements to avoid dissonance among different groups of customers. On the contrary, Oakley (1996) argues for faster and faster new product developments with the rationale that such speed would take care of shorter product life cycles, open up opportunities for cost reductions, help in gaining price premium and result in better product quality. Often high tech products' technological sophistication is ahead of the technological sophistication of the people who are meant to use them. This leads to to discomfort and fear about using complex high technology products. In light of this, Higgins and Shanklin (1992) urge marketers to adopt user friendly product designs so that customers do not find it complicated to learn and use.

Sarin et al (2003) advocate the use of price and product bundling as incentives to consumers to overcome their hesitancy related to purchase of new high tech products. Bundling a new high tech product with complementary products would signal the availability of complimentary products, compatibility between products and conformance to a common technological standard thereby accelerating adoption rates. It has also been observed that successful high tech firms frequently offer scaled down versions of their new products in order to hold on to the low end of the market that they would have created not long ago (Tabrizi & Walleigh, 1997). John et al (1999) identify two types of design strategies; one called the *optimal design* which denotes systems composed of highly integrated and tightly coupled components and the other called the modular design which denotes systems composed of standardized components that do not change during an intended period. They propose that modular designs should be used when technological evolutions are very uncertain and when the

diversity of technology is high. Optimal design, on the other hand, should be favoured when it is difficult to transfer the know-how to relevant parties. In the B2B context, Heide and Weiss (1995) claim that the best strategy for a new supplier would be to develop products that are compatible with incumbent vendors so as to increase probability of switching. This is based on the premise that switching costs ⁶ associated with purchase of high technology products are an important consideration for the buyers,

Pricing, as such, is a complicated exercise and it becomes even more complicated for a high tech product given its unique characteristics. Ford and Ryan (1977), as early as in the late seventies, suggested that technology products present certain complexities in pricing. This is because of various reasons such as difficulties in establishing the perceived worth of technology by the users, the determination of true costs of developing a technology and the relationship of revenue from technology sales⁷ to sales of hardware. However, managers must face the uncertainties of the technology market to decide the optimal price because, ultimately pricing determines the overall success and viability of a product. But studies show that developing a long term pricing strategy in technology-driven markets is a difficult task (Smith et al, 1999). Mohr et al (2005) suggest that marketers must first understand how the customer will use their products, focus on the benefits customer will derive using their products and calculate customer's perceived and purchase costs to arrive at the right price. Termed as "Customer Oriented Pricing", the implications of this approach are that the price considerations are made before the product is developed and commercialized. Moreover, the value attached a product by different customers from different segments is understood by the marketers who

⁶Switching costs are the actual and psychological costs incurred by the buyer when he/she switches from one vendor to another. Among other reasons switching costs arise due to technological incompatibility among products that need to work together.

⁷ The authors include know – how that goes along with the physical product.

can subsequently track profitability of different customers to choose appropriate segments to serve.

Some authors have taken the traditional approach of suggesting a high price for a new product, known as skimming price (Gardner et al 2000, Higgins & Shanklin 1992). This, perhaps, would suit leaders who move on from one version of the product to the next improved version much faster than competitors and hence can command a price premium. On the other hand, skimming as a pricing strategy has been viewed as a myopic approach by scholars. (Easingwood & Koustelos 2000, Baltas & Freeman, 2001) have suggested low price strategy to marketers of high technology products. They identify late adopters as the largest segment and argue that these customers are not techies and buy products because of competitive pressures. They however may not buy if they cannot afford to buy and therefore, making the product attractive through some tangible incentive in the form of key customer discounts, special manufacturer trials and priority for delivery are often suggested as a strategy for success (Gatington & Robertson, 1989, Sengupta et al 1997).

Importance of the sales promotions and personal selling has also been highlighted in high tech marketing literature (Gardner et al 2000, Higgins & Shanklin 1992). It is only logical that any complex sale is carried out in person rather than depending on other indirect channels. Businesses to business sales transactions are typically complex, due to large size of the order, large number of decision makers and longer selling cycles and, if the product is high tech, it would only add to the complexity. Cespedes (1989) highlights the need to understand the buying process of the customers in depth while selling to key organizational customers, which is better achieved through personal selling. Moreover, the popular generalized variants of personal selling approaches such as Consultative selling (where the sales person acts more as a consultant), FAB selling (selling on the basis of physical features of the product that give performance advantage, leading to customer benefits) and SPIN selling (selling by understanding the customers current Situation, Problem and its Impact to highlight the Need for a solution) appear to be relevant in the context of high tech

products as well. Apart from the selling process adopted, sales person attributes such as similarity (with customer) and expertise are also determinants of success. Crosby et al (1990) consider appearance, lifestyle and status as constituents of similarity and product market knowledge as constituents of expertise to suggest that the ability to convert an opportunity into sales depends more on these conventional source (salesperson) characteristics. Especially in high tech markets, when the focus is on building long-term relationships with customers, it is important to have sales persons who are technically competent and train them to highlight the technological excellence of the firm in their dealings with customers (Datta et al ,1999).

Some of the factors associated with technological product failures are poor selection of target markets, channel and pricing problems, need for the product not seen, no perceived innovative advantage, unfulfilled customer expectations, and unique attributes not seen (Rosen at al 1999). As it can be seen, most of these factors appear to be the result of poor communication of product benefits to customers. The reason for this could be that technology products are often developed by engineers and launched with a focus on their technological newness. result. marketing communication messages As а highlight technological aspects of the product or service instead of end user benefits (Winter & Sundqvist, 2009). Several scholars have suggested tailoring advertisements according to the sub-segments targeted, using simple and lucid communication, word of mouth, educating the market, providing interest generating pre-launch information and choosing appropriate channels partners such as special distribution arrangements, to serve new markets (McKenna 1985, Easingwood & Koustelos 2000, Gardner et al 2000, Higgins & Shanklin 1992). Tailoring of communication strategy carefully to manage satisfaction of different segments has been suggested by Fournier and Mick (1999) in an investigation of satisfaction as revealed through consumers' ownership experiences with technological products, where it was observed that there are multiple models within the satisfaction process, and that these are moderated by product, person and situational factors. Other than advertisements, deliberately building links to buyers via special seminars and supplier visits are important means of achieving

early adoption of technologies (Gatington & Robertson,1989). The social contexts of communication and interactions (internal and external) are central to the technology diffusion process and in general, exposure to an external source of information, such as other users fosters a higher level of technology diffusion. Hence additional emphasis should be placed on targeting existing adopters and educating them about potential applications of technology that may not be readily apparent (Shih & Venkatesh, 2004)

Winter and Sundqvist (2009) suggest all marketing communication for high tech products to be integrated and believe that the key to successful new product introductions lies in Integrated Marketing Communication (IMC)⁸. In an exploratory study of high tech industry, they discovered that companies placed great importance on principles such as consistent product positioning, interactivity with customers and openness in communication. The same study also revealed that companies of different types (product or service, B2B or B2C) and backgrounds can achieve high levels of IMC, and company specific characteristics such as firm size, customer orientation and product type had an impact on IMC usage.

Brand Building for High tech Products

Though brand building is generally perceived to be more relevant in mass markets than high tech and business markets, some believe that it is equally, or even more important in high tech markets where products change rapidly. Established brands in such markets help customers to simplify their choices and provide a safe short cut in their decision making (Mohr et al 2005). Proponents of this approach claim that customers of high tech products do not buy only on the basis of price-

⁸ The premise of integrated marketing communication (IMC) is to create consistency and synergy by combining marketing communication elements so that they support and enhance each other, thus avoiding potential conflicts (Duncan & Everet, 1993). IMC has been recognized as a response to issues such as decreasing effectiveness of traditional mass media advertising, media and audience fragmentation, and increased consumer and marketer sophistication.

performance but look for a promise of distinctive value proposition by the seller (Ward et al 1999). While it is difficult to create and sustain brands due to the speed in such markets, good brand equity, reputation and credibility help to reduce the uncertainty and confusion among customers of high technology products. According Regis McKenna (1985), the key elements of building credibility in high tech markets are, using word of mouth, developing infrastructure, selling to the right customers, dealing properly with the press and forming strategic relationships. Research has shown that when a product is perceived to be high tech and has a high level of associated uncertainty, customers will need to develop a greater degree of trust than might otherwise be the case. An important ingredient for the creation of trust is credibility, which has two aspects; the credibility of the technology and the credibility of the selling organization. Establishing credibility for a technology will require the development of a belief by the customer that it will live up to the performance promised, whereas organization credibility seems to be a function of its size and overall reputation (Meldrum 1995). Consumers may rely on credible brands as a perceived risk⁹ reducing strategy for high tech products because many consumers either have incomplete information or may not fully understand the technology inherent in the products that they're buying. In such cases the presence of the brand name helps in reducing the perceived risk. The presence of a credible brand name is also important in alliances between two firms as it may signal to potential consumers that a credible firm is willing to stake its reputation on some other product. Consumers are likely to assume that marketers of a high quality brand will ally only with other high quality products in order to avoid damaging their brand's reputation (Sarin et al 2003).

When reputation, which is built through brand image or established supply chain relationship is part of the determinants of success of next generation high tech products, a market leader's chances of winning in

⁹ Perceived risk in the context of consumer behavior can be understood as the consumer's perception of uncertainty and associated adverse consequences of buying a product or a service (Dowling & Staelin 1994)

the future are higher than the followers. Ofek and Sarvary (2003) call this as '*reputation advantage*' and claim that it increases the probability of achieving future success independent of current R&D effort by the high tech firm. While developing a set of propositions on the competitive factors influencing technology diffusion, Robertson and Gatington (1986), propose that a high reputation supplier will generate a faster penetration rate when there are uncertainties about the new product's performance, as supplier credibility will mediate uncertainty felt by potential clients. Another advantage of cultivating a winner image is that other firms will recognize the leadership position and design supporting products and services around the market leader, which will thus become a more preferred choice (Easingwood & Koustelos, 2000)

Unique Marketing Strategies for High tech Products

Bahrami and Evans, (1989) postulate that firms operating in high technology markets need to combine their strategy formation and implementation activities so as to accommodate both deliberate intentions and emergent actions. They term this as an empiricist mode of strategy making a view which has found widespread support. For instance Beard and Easingwood (1996) argue that for high tech products, the marketing approach requires considerable flexibility and speed of response from both the technical and marketing functions of the firm. In the context of overseas product launches, Oakley (1996) shows that speed of action has been a significant contributor in successful launches of high tech products. The best performing firms were launching their products much faster in overseas markets (within one month after home launch) as compared to poor performing firms (more than eight months after the home launch). Similarly, Tabrizi and Walleigh (1997), found that successful firms were launching new or upgraded products frequently. This rapid fire approach to product releases forced these organizations to stay abreast of new technology and look at product development as a continual process.

Hills and Sarin (2003) propose what they call "market driving" as a new paradigm for marketing high technology products and

innovations. The authors, point towards three interrelated dimensions that underline the market driving construct. The first is value creation, which can come through process innovation, strategy limitation and development of competitive barriers to entry among others. The next is change, where market driving organizations act as change agents by altering the market conditions to their benefit even in situations where little radical innovation has taken place. The third is leadership achieved by compelling other industry participants to follow in a new direction that involves leading product-markets into uncharted territory as well. Though the measures of market driving construct are yet to be developed and validated, the authors claim that the range and scope of their conceptualization is broader than what is offered by other customer centric strategies such as *market orientation* (the process by which firms acquire, process and disseminate customer and competitor information throughout the organization and act upon this information in the market), customer leading (a process of uncovering the latent needs of customers, and directing their preferences and behaviors in new directions) and *pioneering* (being the first to introduce a new product to the market).

Another paradigm that seems to have secured the attention of high tech marketing researchers is *Relationship Management*, now broadly recognized as being integral to business success and a key source of competitive advantage. The importance of relationship marketing has already been pointed out for a host of markets, but its significance has been rarely recognized in high tech markets where the focal firm needs to signal the likelihood of it being a technology leader to influence customer expectations appropriately (Datta et al 1999). Though Kosnik and Moriarty (1987) point out that relationship building is important not only in high tech products but also in a variety of business to business settings, Mohr et al (2005) stress on the dynamic nature of high tech markets which makes it difficult for most firms to go alone and compels marketers to partner in some capacity to be effective. Moreover, they claim that the focus on customer relationship is consistent with the basic need to have a customer orientation. Relationship management would be particularly important for the

development of technology based innovations; typically involving complex supplier, partner, distributor, customer, financial, regulatory and other relationships that create unique challenges. Once developed, successful marketing of high tech products requires interactive learning among various players such as, the manufacturer of the new technology, lead-user customers, channel members and third party specialists (Woodside, 1996).

A stakeholder sequence model has been developed by Danov et al (2003) to help entrepreneurs, project managers and start up advisors to identify an efficient sequence in which different classes of key stakeholder relationships are developed. The model aims to improve the technology commercialization process by highlighting which stakeholder relationships need to be developed at what stage of the new product development. Customers can be involved early in the product development process which is not uncommon in business and high tech markets. In fact this could be vital because rapidly evolving customer needs in high tech markets leads to instability and in many areas of product development, speed of technology development results in instability of component requirements (Thomke & Reinertsen 1998). Hence it makes sense to involve customers in some way in the early stages so that product development process becomes flexible rather than being rigid. Firms developing internet products are known to adopt a concurrent (flexible) product development process as a result of which products evolve based on customers' feedback on their experience with the beta versions put up on the World Wide Web (Insiti & MacCormack 1997). There is ample literature supporting involvement of customers during the product development stage through R&D marketing interface in high tech markets. However, Danov et al (2003) indicate that building relationship with customers prior to establishing relationship with other stakeholders, may increase the risk due to potential loss of this relationship in case the investors back out from the project. On the other hand, such approaches may also increase the returns as investors' risk is reduced because of established customer relationships.

As it is not possible for every firm's R&D and product development department to establish communication directly with potential customers, the interaction needs to be facilitated through the marketing department. This is achieved by first establishing a proper R&D marketing linkage. Within the firm, establishing good relationships and sound communication systems among different departments especially Marketing and R&D, have been frequently cited as important success factors for high tech products. Shanklin and Ryans (1984) stress on the fact that high tech firms often have superior R&D capabilities but fail often as there is no proper link between R&D and marketing in such firms. It is suggested that product design, manufacturing, sales and marketing professionals need to improve their cross functional communications and understanding of customer needs if they are to design, make and market products that provide value (Kosnik & Moriarty, 1989). Basically, if they are to succeed, firms in technology markets need to excel in the ability to come up with innovations constantly and commercialize these innovations into the kinds of products that capture consumer needs and preferences. To this effect, the marketing and R&D interaction becomes the most important determinant of success (Datta et al 1999). In a study of new product development and management practices in the Korean high tech industry. Song and Noh (2006) found that cross functional integration enhances new product development performance. This suggests that a tight communication and co-operation between commercial and technical entities are helpful throughout the new product development process.

Apart from relationship management with customers and establishing suitable cross functional linkages, tactical alliances with other stakeholders have been suggested as an element of execution strategy (Easingwood & Koustelos, 2000) for high tech products. These are spontaneous developments with other (preferably smaller) firms who realize that a new product has the potential to become a standard and desire to become associated with that standard. Forming internal organizational alliances, setting common standards for an industry and issues of product compatibility have been generally observed in the networked organizational structures that bind high technology firms (Cooper 2000). For example, providing a complete computing system to the ultimate users requires a network of original equipment manufacturers, operating system vendors, independent hardware vendors, independent software vendors, systems integrators, distributors, trainers and service organizations. Success for each of these players depends on how closely they are aligned together. Alliance as a strategy for success in high tech markets is also supported by Kosnik and Moriarty (1989), who suggest effective use of inter firm alliances with a clear understanding of what each partner brings to the table in terms of resources, relationships, reputation, capabilities, chemistry and culture, to appropriately serve the chosen market.

Implications and Future Directions

Based on the above discussion on the available literature on marketing of high-technology products, it is observed that different perspectives exist on marketing elements such as segmentation variables, brand building, product, price, promotion and distribution. An attempt is made here to consolidate these elements into an integrated framework for the successful marketing of high technology products and the framework is given in Annexure -1. As per this framework, successful marketing of high technology products depends on choosing suitable marketing mix elements which in turn are derived from the target market selection and a strategic platform. Therefore, the framework also indicates the linkages between segmentation variables, broad strategies and the marketing mix elements.

It can be seen from the framework that most of the constructs are not new or unique to high technology products. The reason can probably be attributed to the fact that a majority of the suggested strategies and tactics have been borrowed from the literature outside the high technology product domain and are thought to be suitable for high technology products as well. Hence, there is a need for empirically testing the relationships between these "actionables" and their suitability in ensuring success in the chosen markets. For example, the relative importance of direct selling and strategic alliances in distribution of high technology products could be an interesting area for further research. Similarly, research on the impact of cross functional teams on flexibility in product development could shed some light on organization structures for high technology product companies. We have also seen that establishing credibility among customers has two dimensions; the credibility of the technology and the credibility of the selling organization. It would be interesting to explore the impact of these two types of credibility on adopter categories. The influence of these two types of credibility could be different for innovators and late adopters given their varying ability to evaluate a new technology and risk taking propensity.

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ANNEXURE - 1 AN INTEGRATED FRAMEWORK FOR MARKETING **OF HIGH TECHNOLOGY PRODUCTS**

Product

Modular or Optimal Designs, Scaled Down Versions. User Friendly Designs, Product Bundling, Compatible with other products.

Price

Short Term Pricing Skimming for Leaders Low Price for Late Adopters **Customer Oriented Pricing** Price Bundling **Discounts & Special Offers**

Distribution

Direct Selling Strategic Alliances

Promotion

Integrated Marketing Communication Simple & Lucid Messages Market/Customer Education Seminars & Supplier Visits Interest Generating Pre Launch Information

Brand Building

Technology Credibility Organization Credibility Word of Mouth Media management Alignment with Strong Brands

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