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ARTICLE INFO

Gabriela Gliga and Natasha Evers (2010). Marketing challenges for high-tech SMEs. *Innovative Marketing* , 6(3)

RELEASED ON

Thursday, 14 October 2010

JOURNAL

"Innovative Marketing "

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

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Marketing challenges for high-tech SMEs

Abstract

The development of successful strategic marketing programs for the commercialisation of new technology represents a challenge for small and medium sized technology-based firms. The mechanics of developing successful marketing strategies for technological innovations is a complex process from design to implementation. High-tech SMEs play an important role in facilitating the 'knowledge-based' or 'smart' economies. However, technological superiority is not a guarantee for a high-tech SMEs' success. Instead, the odds of success are maximized by a combination of technology superiority and marketing capability. Drawing on key published studies in the marketing literature, this paper proposes a research framework to capture the strategic marketing issues in high-tech SMEs, managing both incremental and breakthrough innovations. From our analysis, we identify some key strategic marketing challenges facing high-tech SMEs and conclude with avenues for future research.

Keywords: marketing strategy, high-tech SMEs, technology innovation, marketing capability.

Introduction

Representing 99% of all enterprises in the EU and employing two thirds of the workforce (67.4%) (Eurostat, 2005), micro, small and medium-sized enterprises (SMEs) are an important driver of economic growth and development in the EU. In recent years, high-tech SMEs in particular have scored high on EU policy agenda due to their key role in facilitating the 'knowledge-based' or 'smart' economies (European Commission, 2006).

However, technological superiority is not a guarantee for high-tech SMEs' success. In fact companies find it more and more difficult to gain competitive advantage on the basis of state-of-the-art technology alone. Instead, the odds of success are maximized by a combination of technology superiority and marketing capability (Berry, 1996; Dutta et al., 1999; Kakati, 2003; Mohr et al., 2010). High-tech SMEs will not subsist solely on the basis of outstanding R&D activities (precommercialization stage); these need to be complemented with marketing strategies and activities that successfully bring the innovation into the market place (the commercialization stage). Consequently the marketing activity of high-tech firms has witnessed an impressive growth in the last thirty years (Davidow, 1986; Davies and Brush, 1997; Davis et al., 2001). Nevertheless marketing deficiencies and difficulties are often quoted as responsible for failures and lack of success in the high-tech sector (Beard and Easingwood, 1996; Christensen, 1997; Costa et al., 2004). The key argument of this paper is that attributes of high-tech SMEs' and those characteristics specific to high technology industries can significantly affect the SMEs' marketing capability and overall performance. Furthermore, while in theory firms can engage in either incremental (i.e. new exploitation

of existing technology) or breakthrough innovation (i.e. new to the industry technology), in reality they should be able to manage both for the long-term health of the organization (Mohr et al., 2010).

This paper intends to inform the marketing literature by presenting knowledge specific to marketing strategies of high-tech SMEs. Drawing on extant studies in the marketing literature, this paper proposes a research framework to capture the strategic marketing issues in high-tech SMEs. From this, we identify some key strategic marketing challenges facing high-tech SMEs and corresponding implications for their marketing strategy formulation for both incremental and breakthrough innovations.

The paper firstly presents the typical characteristics of high-tech environments and the intrinsic features of high-tech SMEs impacting the firm's marketing strategies. From the literature a research framework is developed to depict our analysis specific to high-tech SMEs. The framework also serves as a point of departure for future research on strategic marketing in high-tech SMEs. Next, we analyze how the particularities of incremental and breakthrough innovation necessitate very different, contingent marketing approaches, tools and strategies, with consequential challenges on high-tech SMEs. Conclusions are then drawn followed by avenues for further research.

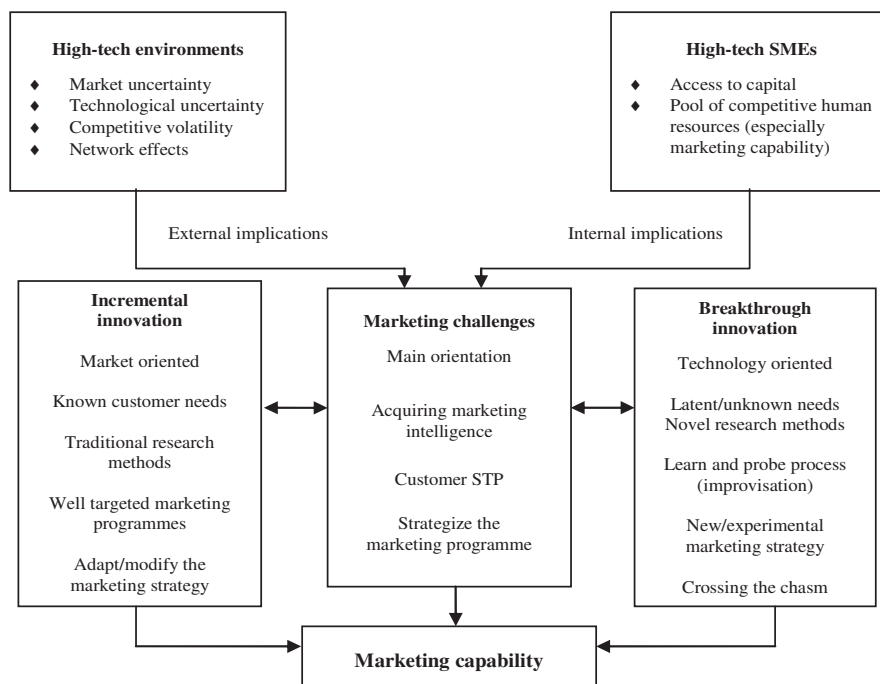
1. Characteristics of high-tech sectors and high-tech SMEs

High-tech SMEs have been defined and classified under a varied umbrella of indicators. Enterprises qualify as SMEs if they employ less than 250 people and/or their turnover is €50 million or less (European Commission, 2003). R&D expenditure has been a key determinant of industry classification. According to OECD industry classifications, companies that spend more than 4% of turnover on R&D are considered high-tech companies (such as ICT or pharmaceuticals). The European Network for SME Research (2002)

classifies enterprises as high-tech if they meet one or more of the following three criteria: highly innovative and/or R&D intensive and/or using sophisticated and complex production technologies. However, definitions of the high-tech firms remain vague. Another more comprehensive way to define high-tech sectors relies on examining the common characteristics that high-tech markets share, especially since this sheds light on the implications for marketing strategies (Mohr et al.,

2010). To be classified as high-tech, markets must be characterized by a combination of factors such as market uncertainty, technological uncertainty and competitive volatility (Moriarty and Kosnik, 1989; Mohr et al., 2010).

Following Figure 1, this paper begins with a brief discussion of relevant external and internal factors, followed by the key challenges and implications for high-tech SMEs in developing their marketing activities.



Source: Gliga and Evers (2010).

Fig. 1. A research framework for strategic marketing in high-tech SMEs

1.1. External factors. *Market uncertainty* is the result of customer anxiety, "fear, uncertainty, and doubt" or the FUD factor, as Moore (1999) calls it. With innovative value propositions, customers are facing several adoption dilemmas: investing in a completely new technology, choosing amongst a range of technologies providing similar solutions, and even deciding between keeping an existing product and upgrading to a new version. Furthermore, buyers are also often restricted by switching costs. This can be due to earlier investments in existing high-tech products or services (Moriarty and Kosnik, 1989; Heide and Weiss, 1995). Hence, for the buyer, the level of uncertainty grows as a result of the ever increasing rate of technological change (Norton and Bass, 1992; Heide and Weiss, 1995) and the lack of relevant prior experience (Von Hippel, 1988). Customer anxiety can also lead to delayed purchase or 'purchase inertia'. This occurs when the presence of competing and often incompatible technologies cause the supplier's target customers to wait until a dominant design takes the lead in the

market. Typically, the salient aspect of new technologies is that they bring an improvement to those who purchase it (increasing quality of life in consumer markets or advancing an organisational aspect in B2B markets). However, in reality, technology adopters consider both sides of an innovative value proposition: the benefits, but also the potential negative effects; the costs and the risks which come with the adoption decision; and an important moderating factor there is dealing with uncertainty (Mick and Fournier, 1998).

All of these factors lead towards technology buyers increasingly experiencing what is termed as 'technology fatigue' (Meuter et al., 2003; Thompson et al., 2005). This is because buyers, from both consumer and organizational markets, must deal with an acute lack of information. Thus, they often postpone their purchase decisions and procrastinate investment until the costs and benefits of the new technology are better understood or the technology itself undergoes further improvement.

Technological uncertainty comes from not knowing whether the technology will deliver on its promise (Davidow, 1986; Moriarty and Kosnik, 1989). Technologies, which show potential, can often fail. Issues may arise from potential unknown risks and unforeseen consequences of particular products (e.g. pharmaceuticals); or problems might occur during the final stages in the product development process with disastrous implications: financial crises for the company, competitor launching similar offerings, frustrated customers, not getting their orders as promised, etc.

The high levels of technological uncertainty have paramount implications on both buyers and makers/sellers of technology. On the one hand, the technological uncertainty impacts on customer buyer behavior, as discussed above. On the other hand, this has a cascading effect on the firm. The inability to forecast sales due to unpredictable adoption rates (Kahn, 2002; Hill, 1997), affects a series of critical management decisions, i.e budgeting, operating expenses, cash flows, inventory levels, pricing etc. (McDade et al., 2010). In addition, as new technology is constantly launched, high-tech products' life cycles become increasingly compressed; products are often facing a short maturity stage and a consequential steep decline stage (Goldman, 1982; Shanklin and Ryans, 1987; MacInnis and Heslop, 1990; Song and Montoya-Weiss; 2001, Lee, 2002).

The nature of technological uncertainty also means companies can never be certain of the viability of their product, not knowing when the introduction of a new and better technology might render their value proposition obsolete (Shanklin and Ryans, 1987; Barlow Hills and Sarin, 2003; Mohr et al., 2010). This shortened life cycle has put enormous pressure on small companies to constantly launch new products (Cooper, 2001; Cooper, 2005). Companies must often self-impose the cannibalization of their own products and bring new products on the market for long-term survival (Song and Montoya-Weiss, 2001). Short and fast changing product life cycles further underline the relevance of a good and strong marketing capability in high-tech environments; marketing planning should begin early alongside the development activities of the new product process (Cooper, 2001).

Another consequence is that the decision-making process within the firm increases in complexity due to other matters regarding the technology itself. A serious issue, for instance, is the dependence on complementary products and compatibility with other products before the establishment of an industry standard; in the case of incompatible designs, the firm is uncertain on whether it will compete against or collaborate with other players in the market (Mohr et al., 2010; Hill, 1997).

These are very topical issues faced by managers trying to develop and commercialize high-tech offerings. Existing research suggests that any new product development process is highly dependent on how the decision-making unit perceives the uncertainty of the external environment (Zirger and Maidique, 1990; Burns and Stalker, 1994). Due to imperfect levels of information, the technological environment is perceived and evaluated as more unpredictable and uncertain by the human actors within the organization. Such perceptions become the reality leading to specific and distinct managerial actions (Weick, 1979). In this sense, technological uncertainty has been defined as the individual's inability to accurately predict or completely understand some aspect of the technological environment (Milliken, 1987; Gifford et al., 1979). Hence, under uncertainty conditions decision regarding the new product development are more experiential and iterative (Brown and Eisenhardt, 1995). This means that the unpredictable and uncertain environment affects management's perception of risk, thus ultimately increasing the cautionary attitude and their reluctance to pursue high risk projects in the future.

This is further emphasized by other organizational inefficiencies, typical in new and uncertain projects, because teams and individuals must manage new activities and less straightforward tasks. The novelty factor, coupled with high perceived uncertainty, implies that firms may not be able to capitalize on previous marketing experience as new marketing capabilities may be required (Song and Montoya-Weiss, 2001). This means that the organization must depart from the existing knowledge base, reinterpret its existing competences, or acquire new competences in order to successfully conduct the new activities (Levinthal and March, 1993; Leonard-Barton, 1995; McGrath, 2001).

Technological uncertainty relates directly with the high degree of *competitive volatility* also characterizing high-tech markets, often found in a state of a hypercompetition, due to frequent market disruptions caused by innovations (D'Aveni, 1994). Competitive volatility includes uncertainty about competitors, often industry outsiders, about competitors' market strategies and the competitors' product offerings (Mohr et al., 2010). This makes both sellers and buyers perceive increased levels of risks as they are forced to make further decisions with little or insufficient information.

A further industry contingency found in extant studies has been the presence of *network effects* (or network externalities). *Network effects* can increase both the levels of market uncertainty and competitive volatility. A *network effect* is the effect that one user of a good or service has on the value of that product to other people. When *network effects* exist, the value of a

technology for any one user increases, as more people use it (Katz and Shapiro, 1986). This further underlines the need of an industry-wide product standard (Hill, 1997; Shapiro and Varian, 1999; Srinivasan et al., 2004), which not only decreases the levels of uncertainty and volatility, but also dictates the availability of specific complementary offerings. In turn, this chain process develops higher returns: as the number of adopters of a technology increases, so will the number of available complementary technologies, which boosts the value of the overall system (Hill, 1997; Barlow Hills and Sarin, 2003).

1.2. Internal factors. The challenges facing companies operating in high-tech markets intensify in the particular case of SMEs because of their intrinsic organisational characteristics. Innovator firms need several critical resources in order to succeed: remarkable capability in technological research and creative development, financing mechanisms, a pool of competitive human resources (Mowery and Rosenberg, 1979), including entrepreneur quality (Kakati, 2003) and marketing capability (with a high degree of flexibility and adaptability) (Berry, 1996). Paradoxically enough, except for the strength in R&D (technological research), the other “critical resources” have been also identified as bottlenecks for the development of high-tech SMEs (Berry, 1996; Mohr and Shooshtari, 2003; Hellman and van den Hoed, 2007).

Even though these critical resources (except the technological capability) are characteristic of start-ups in general, they are more problematic for high-tech SMEs due to the complex and dynamic environments in which they operate. High-tech SMEs find it more difficult to attract investment. Their projects are classified as high risk: the high investments in long-term research are coupled with uncertainty of returns as many new projects fail in the commercialization process (Beard and Easingwood, 1996) and product life cycles are getting shorter (Shanklin and Ryans, 1987; MacInnis and Heslop, 1990; Song and Montoya-Weiss, 2001). Moreover, as they initially address only small niche segments in the market, these firms are often challenged to manage long payback periods (Olleros, 1986). These factors make the venture unattractive to possible investors, who demand to see progress (i.e. revenue generation) in order to support the business for a long time. As well as that, investors often find assessing the commercial viability of projects difficult because there is a knowledge gap in between the inventor (often the entrepreneur), with a technology background and the possible investors who might not have the technological expertise needed to fully comprehend an innovation’s potential (Lehtimäki et al., 2009).

In terms of a competitive pool of human capital, while high-tech SMEs score highly on technological creative

capabilities, serious deficiencies in strategic marketing and management have been often quoted as an important factor responsible for high failure rates (Beard and Easingwood, 1996; Christensen, 1997; Costa et al., 2004). The main problem for high-tech SMEs is not invention, but commercialization – the translation of the idea into an attractive value proposition for customers (Gans and Stern, 2003).

Successfully marketing innovative products and services requires great marketing capabilities and skills (Berry, 1996; Dutta et al., 1999; Atuahene-Gima and Li, 2000; Costa et al., 2004; Traynor and Traynor, 2004; Sarin and Mohr, 2008). However, SMEs involved in the development of new technologies are usually young companies, set up by entrepreneurs with a research background and a strong technological orientation, but without any formal marketing or management training. That is why most high-tech firms seem to be product-driven, fostering a culture in which the technology and the engineering side of the business is valued more than marketing (Grinstein and Goldman, 2006). This means that while marketing capabilities and skills are needed more than in other industry contexts, they are less likely to be found or valued in high-tech firms (Meldrum, 1995; Mohr and Shooshtari, 2003). A total lack of business training might also imply that the entrepreneur might not even recognize the need for professional marketing advice, or the ones that do, won’t have the financial resources to outsource it.

Finally, in order to remain successful in the long run, high-tech SMEs must have great flexibility in their marketing capability, which would allow them to engage in both incremental and breakthrough innovation (Mohr et al., 2010). Engaging in incremental and breakthrough innovation are fundamentally different processes and they require equally different management and marketing strategies. Incremental innovations are evolutionary in nature; smaller improvements introduced over time, based on extensions of existing products. As these innovations come about in response to specific and articulated customer needs, they occur in demand-side markets (Shanklin and Ryans, 1984) and are based on market pull. Breakthrough or radical innovations are revolutionary in nature; they break the accepted norm, bringing about new and superior advantages as compared to the old technology. As customer needs are often unknown, breakthrough innovations occur in supply-side markets (Shanklin and Ryans, 1984), meaning that the technology push governs the process.

As they deal with different types of products, different types of markets and different types of customers, incremental and breakthrough innovations require very different marketing strategies. Marketing is contingent upon the type of innovation (Mohr et al., 2010) and the

first and main challenge of high-tech firms is to explicitly and strategically recognize the difference between the two and act accordingly (Shanklin and Ryans, 1984). This entails having the flexibility and ability to select and employ those (very different) organizational and marketing skills and capabilities suitable in each of the two circumstances.

Furthermore, high-tech SMEs are not only required to differently manage and market incremental and breakthrough innovation, but they must also be able to smoothly shift in between the two. The cycle of innovation moves in time from the breakthrough idea (technology driven) into incremental improvements for individual market applications (market driven) and this implies fundamental changes in the approach to marketing. High-tech SMEs have to move from a focus on “experimental design and exploration” (Costa et al., 2004), to a more analytical perspective as viable technology applications are found. This calls for proactive and entrepreneurial approaches to strategy (Shanklin and Ryans, 1987), requiring both willingness and capacity to continuously learn, adapt and change. High-tech SMEs have to avoid the mistake of following tried and tested “normal” marketing and management strategies for something that is not within the “normal” market conditions (Christensen, 1997).

Aligning strategy, tactics and activities to the type of innovation encompassed in a new product permeates many different aspects of the marketing process. If marketing incremental innovation shares more similarities with traditional low-tech markets, the marketing process and the strategies employed in the case of breakthrough innovations are quite different. The remainder of the paper will analyze the marketing challenges facing high-tech SMEs, while shifting in between the management of incremental and breakthrough innovation, with a focus on the particularities of the latter.

2. Challenges for marketing high-tech products

2.1. Acquiring and understanding marketing intelligence. Understanding the marketplace, identifying customers’ needs, wants and requests is the starting point of any successful marketing strategy (Kotler et al., 2008). However, when managing incremental and breakthrough innovation this process is challenging, as it implies “moving on a continuum which ranges from responding to a known need with an improved solution to creating an evolving solution to an uncertain need” (Friar and Balachandra, 1999, p. 42).

For incremental innovation, customers’ needs and wants are or can be known, hence more traditional marketing research methods can be used, such as surveys, focus groups, concept testing, conjoint analysis, etc. Opposed to this, for highly innovative

products and services the needs and wants of potential customers are harder to pin down and clearly define, as customers themselves find it difficult to articulate them. In the context of breakthrough innovations, companies have to assess future markets and demand for, products that don’t yet exist for customers who don't know about them (Friar and Balachandra, 1999). Marketing managers have to work with concepts such as future, unknown/unarticulated or latent needs. Hence non-traditional market research methods are required in this scenario (Day and Schoemaker, 2000), involving probe-and-learn processes and customer driven innovations.

In this type of research the customer takes on an active role; the process points towards multiple and shifting loci of innovation, as firms outsource innovation to others, both firms and customers (Nambisan and Sawhney, 2007). Customer driven innovations are based on the idea that supplier and consumer can work together and co-create value (Vargo and Lusch, 2004), in an interactive process of learning together (Ballantyne, 2004). Co-developing relationships can diminish the uncertainty risks coming from the lack of information for both seller and buyer. By working together, the sellers can better define market needs, as the buyers impart important tacit information; in turn, the buyers learn first hand about the capabilities of the new technology, lessening the anxiety of adopting the innovation.

2.2. Customer segmentation, targeting and positioning (STP). In terms of segmentation, targeting and positioning, in the case of incremental innovations the market already exists, specific needs and wants are known and targeted with specific value offerings. The new technology is positioned to replace an old one, by being better, faster or cheaper. By contrast, radical innovations do not simply replace an existing technology, but might in fact generate multiple new applications addressing new segments and new markets. In this instance, the process of segmentation, targeting and positioning is more difficult, as the decisions on to whom, why, how, what and where to market are complicated by the “fuzzy” aspects of the novel idea (LaPlaca, 2008). The market is largely intangible and mostly unknown, as needs and wants cannot be defined a-priori and can not be used to clearly segment the market before product launch (Lynn et al., 1996; Friar and Balachandra, 1999; LaPlaca, 2008). Companies have to improvise; they adopt an inside-out approach, an empathic marketing strategy, based on a technology push. Specific targeting strategies develop only as new applications evolve and the product itself undergoes further development (Friar and Balachandra, 1999). In other words, for radical innovations the technology must be on the market first and specific targeting occurs only

after further development (Shanklin and Ryans, 1987). The success of a high-tech SME marketing a breakthrough innovation is hence dependent on this back and forth movement between the market and the R&D lab. This has been referred to as “empirical marketing” (Bahrami and Evans, 1989), or “operational marketing” (Beard and Easingwood, 1996), as new products are launched on the market in an attempt to learn about refining the product towards better and wider applications. It is a “probe and learning process”, where early variants of the product are experimentally launched in potential niche markets, giving the firm the opportunity to acquire market knowledge and accumulate experience (Lynn et al., 1996).

As the technology is shaped more in line with the information coming from the market, companies make the transition to a market driven phase. The process of “listening” to the market is extremely important as the technology in itself is not valuable unless it is used to create viable products and services. Hence “neither the first companies to enter nor the companies with the “best” technology win. Rather, the companies that find the right applications for the technology succeed” (Balachandra et al., 2004, p. 10). Empirical evidence shows that the most successful firms in high-tech markets are the ones that manage to establish a close integration between the marketing function (marketing pull) and the technology function (R&D push) (Cotterman et al., 2009).

Positioning, in its turn, is affected by the amount of learning or behavioral change that must be undergone by customers in order to use the new technology product. Launching a value proposition based on a breakthrough innovation has significant implications on the buying and acceptance behavior of the consumer (Friar and Balachandra, 1999). According to Moore (1999), in the case of radical innovations, there is a chasm or a major gap between the early adopters (or the technology enthusiasts and visionaries) and the early majority (the pragmatists), representing main stream markets (and hence considerable returns on investment). There are significant differences in terms of attitudes (acceptance of innovation), and buying behavior (readiness for the trial and use of new technologies), between these segments which show once again that the high-tech environment is shaped by customer adoption decisions (John et al., 1999).

If the innovators and the early adopters are willing to take a chance, and quite often happy to suggest improvements themselves, early adopters want a complete product and are only willing to accept incremental improvements. Companies can only cross the chasm if they have an increased awareness about

this shift amongst the adopter categories within the market and if they are able to change their marketing strategy accordingly (Moore, 1999).

2.3. Strategising the marketing programme. In the case of incremental innovations, the market access process is less demanding in terms of marketing expertise and effort. Empirical data from the biotechnology sector, for instance, shows that incremental innovations face more straightforward paths to market (Costa et al., 2004), as companies are aware of the specificities of the process from previous market experience, common practice within industry and first hand marketing research data. This facilitates the design of a marketing programme that will deliver the intended value to target customers. For breakthrough innovations however, information on how “value” is defined and perceived by customers is not available and often not accessible. Hence the firm is faced with difficult decisions regarding product, channels of distribution, price and marketing communications.

In terms of product, high-tech SMEs engaging in breakthrough innovation are often faced with the difficult decision on whether to diversify or not. As SMEs have scarce resources, they can only pursue a limited number of alternatives without losing effectiveness in creating viable competitive value offering (Veugelers and Cassiman, 1999); this, however, implies the risk of becoming overly reliant on one or two projects. The other option is to pursue a broad portfolio of technology applications, with its own risk of over-diversifying (Costa et al., 2004). Nevertheless, since it is very difficult to predict the most successful market application for their innovation, high-tech SMEs often have to test several options in order to identify the most promising opportunity/ies. This in turn has considerable distribution implications, as multiple channels are needed to reach different market segments or different markets altogether (e.g. a technology might be first intended for industrial use and then moved towards the larger consumer markets).

Pricing decisions are also more difficult for breakthrough innovations, as firms find it difficult to define the “value” which customers place on a new (and completely different) product or service. The high investments, the long payback periods, and the difficulty of forecasting sales also contribute towards complicated pricing structures. At the same time a new, state-of-the-art technology could skim the market with a higher price and SMEs must identify and seize the opportunity. This however must be supported by appropriate marketing communications. The seller has to educate the customer about the benefits of the new technology, which is not an easy task, considering the technical knowledge gap between the two parties (Lehtimäki et al., 2009); the seller must translate specific high-tech knowledge into a language that the

end consumer understands, an even bigger challenge if bearing in mind that the seller (often the inventor or the entrepreneur) might not be a marketing person at all (Sarin and Mohr, 2008). Furthermore, the seller has to customize this dialogue to the different market applications pursued, in sometimes significantly varied fields (Athaide et al., 1996).

Conclusions

Marketing high-tech products and services presents unique challenges to SMEs, different from those faced by small and medium firms operating in low-tech sectors. This is determined by a combination of SME intrinsic attributes and sector characteristics. The idiosyncratic nature of marketing in high-tech SMEs is further emphasized by the fact that these companies need to adopt distinctive approaches to the marketing process, depending on whether they are pursuing incremental or breakthrough innovations.

Companies in the high-tech sector must have the marketing capability which would allow them to exploit their R&D efforts and technological skills in the different situations entailed by incremental and breakthrough innovation. They have to successfully merge the aspects of the technology/marketing interface and apply contingent marketing strategies.

If managing incremental innovation shares more similarities with marketing in low and medium tech sectors, engaging in breakthrough innovation comes with a unique set of marketing challenges. High-tech SMEs must perpetually transform their internal capabilities and constantly switch from being a technology driven firm (in the discovery phase) to a market driven one, which is necessary as the right application is found, in order to ensure that customers' unique needs and requirements are catered for. This entails a significant change in the management philosophy of the organization.

Directions for future research

There are multiple and complex issues facing high-tech SMEs, yet it still remains an underexplored research context. This study suggests some avenues for further investigation in marketing strategies for high-tech SMEs managing both incremental and

breakthrough innovation.

Firstly, this study suggests that more research is required in examining the SMEs management and response to the industry dynamics of shorter and more unpredictable product life cycles – factors idiosyncratic to high technological environments. In effect, accurate forecasting and inventory planning is almost impossible in quintessentially uncertain environments. Hence, second, we suggest the use of qualitative methods to provide more narrative insights into this issue. Qualitative insights would not only expose the critical success factors for successful marketing in high tech SMEs but also those reasons for failure. For instance, case studies would bring about relevant empirical evidence by investigating this area of research within its real-life context (Yin, 2003). Case studies and industry examples would be also most useful to generate testing and theoretical development to further our understanding of an area still in its infancy in the literature (Eisenhardt, 1989).

Thirdly, researchers should also extend to their inquiry to explore relationships between performance of high-tech SMEs and their marketing resources and capabilities. Greater detail is required of the marketing challenges for high-tech SMEs in rapidly growing sub-sectors of, for example, biotechnology, environmental and nano-sciences.

For practitioners, studies would be useful that would evaluate the most effective marketing tools and techniques to assist high-tech SMEs in accomplishing their goals and which are result-orientated for short and long-term gain. Gaining a better understanding of where the problems lie for small firms operating in dynamic and turbulent environments, would also guide policy-makers and the various support agencies. Governments around the world are committed to stimulating the formation and growth of innovative, high-tech SMEs as part of their national economic agenda. Well-informed research studies would guide policy-makers to invest more strategically in resources committed towards the sustainability of high-tech SMEs as a key indigenous driver in their national economic policy.

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