DISCUSSION

KJELL GRØNHAUG and KRISTIAN MÖLLER

High-tech Marketing: Fact or Fiction?*

ABSTRACT

This paper raises and departs from the following questions: Is high-tech marketing something "special"? and if so, Why and how does it differ from traditional marketing? To answer these questions we first discuss and clarify the key concepts "technology" and "high-tech". The situation of "high-tech" marketing is then contrasted with the traditional view of marketing as reflected in leading text-books. Our comparison shows that marketing activities, e.g. product development, pricing and distribution partly are conceived differently in the two approaches, including that traditional market research is of less relevance in high-tech markets, and that marketing activities need to be organized differently in high-tech markets as well. Implications for the discipline of marketing are emphasized.

Key words: *high-tech, uncertainty, unpredictability, and marketing challenges.*

Introduction

"High-tech" (high technology) has become an accepted – and frequently used term in our language. The term is used to signify specific characteristics of products, industries, competence and working environments. A recent headline in the *Finnish Business Report* (1998) uses the term "high-tech centre" to encompass the ac-

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KJELL GRØNHAUG
Norwegian School of Economics and Business Administration• e-mail: kjell.gronhaug@nhh.no
KRISTIAN MÖLLER
Helsinki School of Economics and Business Administration • e-mail: kristian.moller@hkkk.fi

tivities taking place in Oulu Technopolis, Finland's counterpart to California's Silicon Valley. Another example is the annual book (report) by the Finnish Academies of Technology, *High Technology Finland* (2004) which gives a rather detailed picture of successful and fastgrowing Finnish firms in various "high-tech" industries.

The term "high-tech" is not only used in business, production and engineering. Today one also talks about "high-tech hospitals and treatments", and "high-tech" marketing as well. In the discipline of marketing the term (high-tech) has been used for some time. Several books (e.g. Smilor 1989) and journal articles (e.g. Moriarty and Kosnik 1989; Meldrum and Millman 1991) address problems related to high-tech marketing. Specific courses and programs focusing high-tech marketing are offered – also by high ranked academic institutions (e.g. by prestigous MIT). Also in Finland a variety of courses and programs related to high-tech marketing are offered by a variety of educational institutions such as technical universities (e.g. Lappeenranta University of Technology) and business schools (e.g. Helsinki School of Economics and Business Administration).

The focus on marketing in a high-tech context apparently presumes that operating in high-tech industries and markets imposes *specific* marketing challenges and problems that can not easily be dealt with by applying "traditional" marketing approaches and thinking. By "traditional" marketing approaches we mean marketing as reflected in major marketing textbooks (e.g. Kotler 1997). The reason for this choice is that marketing textbooks reflect how marketing often is taught and what most students and practitioners have been exposed to.

A common observation is that as disciplines mature more *specialized* subdisciplines emerge and develop. A few examples from marketing will show this. Consumer (buyer) behavior, i.e. a topic belonging to the core of marketing – as consumers (buyers) represent business firms' most important constituancy, and are the prime focus for marketing activities – has developed into a very sophisticated (sub)discipline with its own journals, e.g. the prestigous *Journal of Consumer Research* and its own association Association for Consumer Research. Another example is "international marketing" that for long has had the status as a rather well-developed subdiscipline. More lately "services marketing" has developed into a specific area with its own journals and conferences, so is the case for "relationships marketing", and the emerging field of high-tech marketing – with its new *International Journal of Technology Marketing* – is still another. Why do such developments take place – and what are the consequences – if any?

There are multiple answers to the first of these questions, i.e. why specialized subdisciplines emerge. One possible, but not a very idealistic reason is that somebody wants to carve his or her own "territory", i.e. someone wants to construct and label a specific field or phenomena to which the initiator(s) name(s) and activities can be attached and – hopefully – bring fame and fortune. Another – and probably more acceptable – reason is that such narrowing of focus allows for concentrating on *specific* problems having some communalities allowing for the development of more elaborated concepts, theories and methodological approaches to deal with these specific problems more adequately not covered in depth in the mother discipline. Development of specialized subdisciplines may, however, have draw-backs.

Fragmentation of the mother discipline is one example. Lack of a coherent perspective and overview of the mother discipline is another. "Reinventing the wheel" and lagging accumulated insights are also an important, but often over-looked draw-backs as well. At the extreme this can be found among practitioners claiming that "our firm/business is so special", and thus implicitly assuming that a "specific theory" is required for their firm, making accumulated research and insights almost impossible – and text-book knowledge in principle meaningless.[1]

The remaining part of the paper is organized as follows: To answer whether – and if so – how and why high-tech marketing differ from traditional marketing, we proceed by first discuss and clarify the concepts of "technology" and "high technology". Then we briefly describe some key tasks as well as characteristics of marketing as reflected in major text-books. Our point is not that such a text-book view necessarily is "right", but is characteristic for what is taught and disseminated, and thus what most both students and practitioners have been exposed to, also influencing their thinking and practicing of marketing. After this we discuss specific marketing challenges in high-tech markets. The paper ends by returning to our initial questions and discuss whether traditional marketing approaches and thinking are relevant in high-tech markets.

Some basic concepts and assumptions

In this section we discuss and clarify the concepts of "technology" and "high-tech". Here we also characterize key aspects of traditional marketing. We do so to enlighten specific characteristics and challenges of high-tech marketing.

Technology

The concept of "technology" is used – and has been defined in multiple ways. For example, a rather common conception of technology is as machinery, equipment, tools etc., i.e. as something very tangible. Others also include "techniques", i.e. specific ways of proceeding or completing instrumental acts, as well as specific arrangements of persons, materials and tasks (Barley 1990). To capture (some of) the core of the technology concept, we cite two rather well-known definitions:

- "The science of the application of knowledge to practical purposes" (Webster dictionary)
- "Technologies are bodies of skills, knowledge and products for making, using, and doing useful things" (Merill 1968, p. 576)

Inspection of the two definitions, show that technology may encompass much more than apparatus and equipments (even though such things of course are important). From the two definitions we see that:

- Technologies are developed and/or adopted and used to obtain something. Thus development and use of technologies represent *purposeful* behaviors.
- It is also assumed that technologies should be *"useful"* in some way or other.

1 Limitation of space does not allow us to pursue this argument in any length. A key aspect, however, is that concepts and theories are rather general, i.e. they are rather wide, but low in content. Use of knowledge requires – among others – adequate selection of concepts and theories (and methods) and adjustment to the actual problem. This as such is a demanding task requiring insights and training (Grønhaug and Haukedal 1997).

– From the above definitions we see that important aspects of technology are *knowledge and skills*, not only to develop, but also to *use* technology in an appropriate way. This also implies that to evaluate and make use of – or master a technology – can be seen as an important aspect of technology.

High-Tech

The notion of ″high technology″ is an ambiguous one and has been assigned multiple meanings. However, the term ″high-tech″ is usually associated with something novel and ″advanced″. It should also be noted that the term ″high-tech″ often is left undefined, for example in textbooks and journal articles related to high-tech marketing.

Technologies are created, they develop, change and mature. Technological breakthroughs can initiate new and change established industries (Utterback 1994). Often technologies develop, merge – and divide in unexpected ways. ″High-tech″ is often associated with the emergence and use of *new* technologies. Compared to established technologies high-tech solutions are often conceived as more ″advanced″ (LaPlaca & Punj 1989). In addition is high-tech often associated with novelty and rapid changes – and high R&D-investments, as reflected in a definition proposed by OECD: ″Products whose development has demanded the most R&D-investments″. R&D-investments are probably a good indication of advancement and novelty because a key purpose of R&D is exactly to bring forth something new.

Technological novelty may create *uncertainty*. The sources to and consequences of uncertainty related to novel technologies can be multiple. For marketing it can be useful to distinguish between two types – or sources of uncertainty, *technological* and *market* uncertainty (Moriarty and Kosnik 1989). Technological uncertainty is reflected in questions like: ″Will the new product function as promised″? ″Will the new technology make our present technology obsolete?″ For a firm development of new technologies can best be characterized as risky investments (cf. Teece 1986). Due to the technological race and the emergence of new solutions from competitors, a firm's investments in technology can – and in fact they do often fail. An additional point is that in the initial state of the development of a new technology often multiple competing solutions exist. Over time a dominant solution – or as termed – a ″dominant design″ will (may) emerge (cf. Anderson and Tushman 1990). An example of this is the triumph of VHS over Beta (Cusumano et al 1992). Key challenges – also for marketing – are to reduce the risks involved and safeguard technology investments.

Equally important – and challenging – for marketing is market uncertainty. When products/service offerings based on novel technologies are *new*, they can be difficult (impossible) for buyers to evaluate and appreciate. Due to lack of understanding – they (buyers) may have difficulties to grasp the inherent benefits of the new solutions. For novel solutions heavy investments in ″market education″ are often needed, i.e. educating the buyers (users) to see and appreciate the novel solutions as well as to use them properly. Such investments are inherently risky, particularly due to positive externalities. The firm can seldom or never internalize the benefits from such investments in market education. When customers have learnt to assess and appreciate new solutions, later entering competitors do not have to invest in the

same market educational effort again. Rather, later entrants may benefit by using this initial educational efforts both to improve – and compare and position their solutions according to the one carrying the market educational costs. A well-known example of a firm following this strategy is "the big blue", IBM that very rare has been the first to the market with new solutions, but rather has let others "pave the way".

However, letting other "pave the way" – or entering the market late involves risk. Early entrants may gain technological leadership, preempt opportunities and/or create customer loyalty and thus benefit on the behalf of later entrants as reflected in the literature on first mover advantage (Lieberman & Montgomery, 1988). Thus the question of timing, i.e. when to enter the market becomes a crucial one in novel, rapidly changing high-tech markets (Bayus et al 1997).

Market uncertainty also implies that it usually is difficult to assess factors such as size of market, market structure and competition. Stated the other way around: In novel high-tech markets (industries) Porter's (1980) well-known "five-forces" impacting industry structure and profit potential are mainly unknown, and thus – this "tool" is probably less useful than in established industries.

Marketing

As basis for enlightening our driving questions raised at the outset we here briefly will characterize marketing as reflected in major text-books (see e.g. the influential text by Kotler 2002). The authors are fully aware of that other views of marketing exist, as well as the traditional text-book view of marketing both is questionned and challenged. (For a very recent treatment, see Vargo & Lusch 2004). However, the traditional text-book view reflectes what is taught and dissemeniated, and thus what most have been exposed to also assumed to influence their thinking and practicing of marketing.

The term "marketing" has been (are) used in different meanings, e.g. as science, ideology or a business discipline. Here we consider marketing as a business (management) discipline, with emphasis on guiding and directing firms and managers in their marketing decisions. Key marketing tasks are to attract, establish contact with and keep customers, or as emphasized in a definition proposed by American Marketing Association: "....the performance of business activities that direct the flow of goods and services from producer to consumer or user".

In considering the business firm as an open system, i.e. recognizing that the firm is influenced by and dependent on its surrounding environments, the emphasis on the market is easy to grasp. For business firms the market, i.e. customers represent(s) their most important constituency. Without a sufficient number of customers willing to buy the firm's product/services – at prices that at least covering costs – the firm eventually can be forced to exit the market. To create a linkage with and serve the market (the customers) the firm performs a great variety of activities. It tries to study and understand actual and potential customers. It develops and modifies products and services and facilitates customers access to its offering. It communicates and tries to attract and influence the market by creating differential advantages. For example, a key purpose of branding – apparently one of the most popular marketing topics today (see e.g. Keller 1997) – is exactly to distinguish a firm's product/service offerings from those of its competitors in a positive way as perceived by the market.

DISCUSSION

Marketing is often characterized by the 4 P's, the "controllables", product, place promotion price (most recently suggested refocused to the 4 C's, crossdisciplinary, crosscultural, cross-functional and customer with the customer in the center, Marketing Science Institute 1999). The idea underlying the four controllable P's is in the heart of what Sheth et al (1988) have termed "the managerial school" of marketing. According to this "school" the key marketing management task is to manipulate the "action parameters", i.e. price and so on to influence sales and profit to benefit the firm (decision maker).

In traditional marketing analyses and planning are assumed important – and possible, as reflected in the title of Kotler's best selling text-book, *Marketing: Analysis planning and control*, first published in 1967 now in its 11th edition. Inspection of the analytical side reveals an overly "rational" view of man. For example, long lists of data to be gathered are recommended to analyze customers and competitors. The concept "information" is used interchangable with "data". Probably the most important assumption (observation) in contemporary social sciences, however, that human beings are constrained by cognitive limitations, and that data first become information when interpreted are more or less neglected. The assumption about limited cognitive capacity – or "bounded rationality" implies that individuals have limited capacity to notice, interprete, store, retrive, and make sense of data, and thus that they only can behave intendedly rational (Simon 1947).

The text-book view of marketing also reflects a strong belief in traditional planning presuming knowledge about future stages, consequences etc., and thus that the future can be known (or predicted) adequately, which in no way is easy (possible) in unpredictable, turbulent high-tech environments.

Very much of the focus in major marketing text-books is on *mass marketing*, where a few established firms are offering their products/services to millions of individuals and households. This of course is an exaggeration as in many business-to-business markets the number of potential buyers can be rather few. However, the main focus in traditional marketing so far has been on mass-marketing to consumers, i.e. to final buyers and users (ultimate demand).

In much of the marketing literature also *established industries* are implicitly assumed, i.e. product categories are established, where buyers are assumed to be acquainted with and capable of evaluating the various alternatives within each product/service category. This view, for example, is prevailant in the extant literature on buyer (consumer) behavior dealing extensively with the evaluation of and choice between established (branded) products within well-defined product categories.

The industries are not only assumed established in traditional marketing, they are also assumed as "given". Industries, however, are "man-made", they are created, they develop and change, and so do competitive conditions (cf. Utterback and Suárez 1993).

Marketing activities must – as other activities (and functions) be organized, because it is the concerted effort of people and activities that yields peak performance. Marketing activities can be organized in various ways. The traditional marketing text-books reveal a rather simplistic view on organization of activities, assuming more or less uncritically that marketing activities could (should) be organized as a separate unit (department).

Marketing in high-tech markets: some challenges

In this section we discuss specific challenges in high-tech markets. To do so we contrast major decisions and activities in high-tech markets with how they are dealt with in traditional marketing text-books.

Products

Product and services are of key importance to the business firm. They represent the prime link to its most important constituency, the customers. To attract and keep customers firms develop and modify their product/service offerings. Market research is assumed to play a major role in this respect – in particular to bring in insights regarding customers preferences and their needs and wants. Studies show, however, that market research may play a minor role in novel, fast changing markets, primarily due to lack of relevant insights from the consumers' side, making it difficult to assess their own needs and wants. In a recent article Workman (1998), for example, suggests that (traditional) marketing is *less significant* in the case of radical innovations when the time to market is substantial, at the early stage of the life of a high-tech start-up firm, and when the rate of technological changes is high. Research findings also show that the successrate is equally high (low) either the new product idea comes from the producer or the customer (for overview, see Zinkham and Pereira 1994). It should also be noted that some commercial successes are unrelated to predictions based on analyses of customers evaluations in market tests. An example is the Sony's Walkman that became the company's greatest success ever due to stubborn minds – in spite of being rejected in tests conducted among potential consumers. The process of developing new products as reflected in marketing textbooks may also be questionned. The prototypical view of product development – that the firm moves through various stages, including generation and evaluation of product idea, development of prototype, testmarketing and introduction of the new product in the market – is probably most relevant when the firm is developing products to be offered to multiple customers, the mass-market. In many markets such an approach would be disasterous. When the technology is developing and the number of potential customers is modest – as often is the case in business-to-business market, such an approach is too risky. After having developed the prototype and carried its associated costs and thus made asset specific investments without an a priori contract with buyers, these investments may have to be realized as "sunk costs", or due to the lost ex ante bargaining position, the firm may be exploited by one or a few opportunistic buyers (Williamson 1991). In such cases the situation becomes more one of "selling the problem" to the customers and then to agree on some risk sharing contract before developing the solution (see e.g. Grønhaug and Fredriksen 1999).

Several technological and high-tech products are associated with network externalities, i.e. user's utility of such a product are influenced by the number of users (adopters). For such products a "critical mass of adopters is often required for the product to "take off" (Rogers 2003). Key marketing challenges are thus to assess whether obtaining the critical mass at all is possible, and if so, how to influence the market so this is realized.

Price

The firm must price its products and services,

and do it in such a way that costs are covered – and preferable some excess profit is retained. Pricing has received substantial attention in economics and marketing. Anyone who has attended a standard course in business economics knows how to set the optimum price, i.e. where the marginal costs cut the marginal income curve from beneath. However, due to uncertainty it can be very difficult to assess factors such as buyers' willingness to pay, price sensitivity, competitor reactions, and the lifetime of the new high-tech product on the market, and thus pricing decisions become very difficult (see e.g. Dolan and Moon 2003). Of particular importance is also the importance of cost structure as reflected in the idea of "positive economics", where the firm is confronted with increasing return as more customers are buying. A key characteristics of situations where this is the case, is when the initial costs of making the first unit are formidable, while the costs of producing additional units are negligible. Thus the "real" profit is in mass-adoption some time in the future, making initial pricing not only difficult, but also standard text-book view on pricing almost obsolete (cf. Arthur 1990; Shapiro and Varian 1999).

Place

Products and services must be made accessible to the buyers. In the marketing literature substantial attention has been devoted to the question how products/services best can be made available to the customers. The question of distribution relates among other things to customers' buying habits, e.g. how often they buy, quantity bought, and to whether and what extent they can evaluate the product/service offerings. The principle of self-service for example implies that the customers know their preferences, and that they can search, evaluate, and choose the products themselves. However, in emergent high-tech markets buyers often lack experience with and understanding of the novel solutions being offered. In such situations substantial degree of interactions between sellers and buyers are usually required to clarify problems and solutions, also imposing challenges how the new high-tech solutions best can be made available to the potential buyers.

Promotion

Marketers communicate to actual and potential customers to make them aware of their products and services, and their inherent features and advantages, and try to influence customers to use their products. A common – even though often implicit assumption – in traditional marketing is that customers – at least to some extent – are assumed to know the product category, what to expect with regard to product performance, and how to evaluate the product/service offerings. Communication of completely new and complex products in emergent high-tech markets may impose specific challenges. As customers buy solutions to their problems and benefits – and not products and technologies per se, a key challenge is to communicate and convince customers of benefits of products and services they don't know – and of wants they may be unaware of (cf. Ryans and Shanklin 1989). This challenge relates to what recently has been termed as "customer sophisticated", i.e. making products offerings and their communications in such a way that they "make few demands on the user (and buyer)" (Marketing Science Institute 1999, p. 6).

Marketing knowledge and research

Firms need information (knowledge) to act. A distinction can be made between procedural and declarative knowledge. The former refers to procedures and rules how to proceed to attain some goal. Standard marketing text-books contain to a substantial degree such knowledge, e.g. how to develop new products, how to conduct analyses of customers and competitors and so on. Firms, however, do not operate in a vacuum, they also need knowledge about the actual context. This relates to what has been termed declarative knowledge, i.e. knowledge of factors and relationships of importance for their activities, e.g. knowledge about actual preferences and behaviors of customers. From our above discussion follows that contextual knowledge in high-tech markets can be extremely difficult to acquire. Due to the speed of change in many of these markets the validity of such knowledge acquired at one point in time may also be extremely short. Thus learning requirements to operate adequately in rapidly changing high-tech markets are substantial (Day 1994). Equally important is unlearning for not to be trapped by outdated knowledge and perspectives. This represents a specific challenge in particular so because many high-tech firms are staffed with well-educated people that may be "bound" and "blinded" by their substantial a prior knowledge as reflected in the fascinating article by Argyris (1991), "Teaching Smart People How to Learn". Thus the "competence-trap" may be a serious challenge to overcome to faster learning in high-tech markets.

Market research is assumed important in traditional marketing, and considered a central means for obtaining useful market knowledge. Traditionally market research makes extensive use of asking questions, e.g. to get insights information about customers' preferences. As noted above, however, consumers may have restricted ability to yield relevant information about novel ideas and products they hardly understand due to lack of adequate experiences and knowledge. In principle people can only assess things they know. This easily leads to that novel ideas are evaluated against known solutions. When unable to assess the new ones, the existing and known ones are preferred – until potential advantages of new solutions adequately have been demonstrated. Tauber (1974) also recognized – 30 years ago(!) that traditional market research tend to discourage radical innovations, exactly because the subjects in such research relate novel ideas to their past experiences and thus what is known to them. How to cope with limitations in customers knowledge and ability to evaluate novel solutions have to some degree been dealt with more recently, see e.g. von Hippel (1990); Urban and Hauser 2004; Zaltman (1997). The solution seems to substitute the lacking experience (knowledge) with information of the novel solutions – e.g. as animated presentations.

Planning

Planning is considered important in marketing. A plan relates to decisions to be realized in the future, and implies answers to questions such as: "What to do?", "How to do it?" and "When to do it?". Planning has multiple advantages, e.g. to facilitate coordination of activities and people, and to prepare for the future. The validity of plans relates, however, to the *predicability* of the future. Predicability in fast-changing markets is limited. This has implications for planning and how to cope. Recent research shows that even when long time predictions are difficult or impossible, adequate shortime pre-

dictions are possible (see Levy 1994). This imply that plans should be made such that they allow for learning, for example as suggested by McGrath and Macmillan (1995) in their article "Discoveryoriented planning".

Organization of marketing activities

Marketing activities are conducted by people, and they must – in some way – be organized and coordinated for the firm to perform adequately. (As noted above organization of marketing activities in the traditionally marketing literature has been seen as a business function. Prototypically this function has been organized as a separate department, around a product manager, or the marketing activities related to regions (markets). In fast-changing high-tech markets, the performance of marketing task usually requires intensive interactions with people from all departments as well as outside actors, because superior performance requires adequate coordination and adjustments and activities by the whole organization heavily influenced by rapid external changes. Because marketing tasks have become more knowledge intensive, marketing activities tend to an increasing extent to be spread out among several organizational units (see e.g. Cravens et al. 1996; Workman et al. 1998; and Möller and Rajala 1999). The reason is that no single person or department possesses the needed knowledge to operate adequately. Also, to ease flow of relevant information – and because information partly is sticky – relationships and networks between organizational members as well as with outside actors become increasingly more important, to ease flow of information of importance for adequate adjustments.

Figure 1 below summarizes our above discussion.

Inspection of Figure 1 reveals that creation and developments of new technologies may cre-

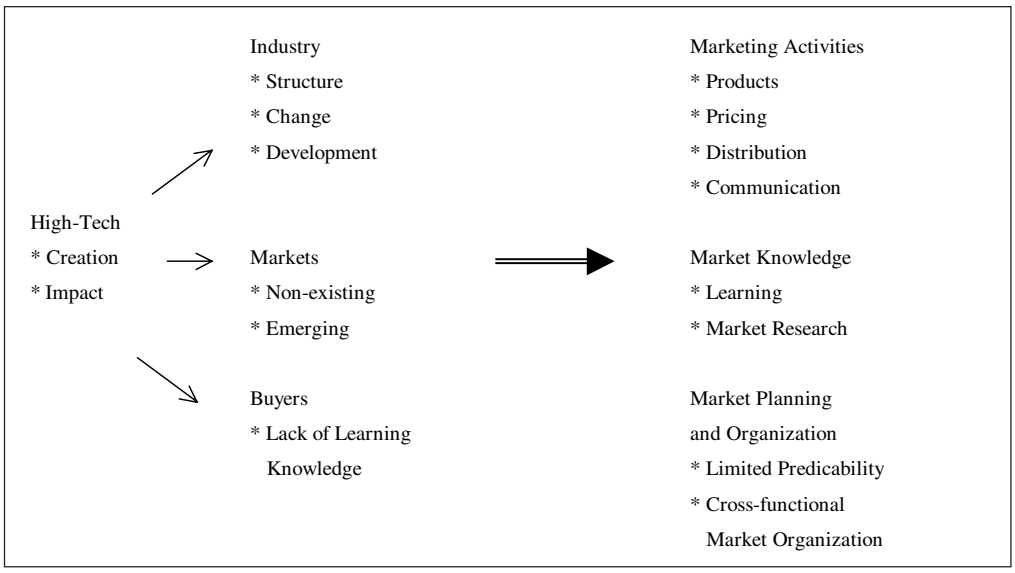

FIGURE 1. High-Tech and Marketing.

	High-Tech Marketing	Traditional Marketing
(1) Technology - Importance - Development	 Key focus Rapid	 Secondary Slow(er)
(2) Industry	Emergent/rapidly changing	Established
(3) Markets	Non-existing/emergent	Established
(4) Buyers	Lack of modest knowledge/ difficult to evaluate product/services	Possess knowledge/ can evaluate products/services
(5) Competitors	Partly unknown/difficult to assess	Known
(6) Market knowledge - Learning - Market research	 Important/difficult Partly irrelevant	 Important/more easy Highly relevant
(7) Planning	Difficult/short time	Possible/more predictable
(8) Marketing organization	Cross-functional/internal relationships and networks	Department/function
(9) Marketing decisions - Product developments - Pricing - Distribution - Marketing communication	 ”Producer driven”/ Producer-customer cooperation Difficult/Uncertainty Close contact between producer and customer/interactions Market education	 ”Market driven”/ ”Traditional” – idea, prototype-testing Price theory/calculation Great variations/ Intermediares Emphasis on own advantages

FIGURE 2. High-Tech and Traditional Marketing Contrasted.

ate and influence industries, create and change market opportunities, and make prior consumer knowledge obsolete (irrelevant) of importance for marketing activities such as product development, pricing, distribution and marketing communication. Factors such as technological and market uncertainty, speed of change influence learning requirements (and possibilities), and question the adequacy of traditional market research and planning, and the traditional organization of marketing activities.

In Figure 2 we have contrasted High-Tech marketing with ”traditional marketing” along factors and activities discussed above.

DISCUSSION

Closer inspection of Figure 2 reveals apparently considerable differences between high-tech and traditional marketing. For example, in high-tech marketing technology plays a far more predominant role than in traditional marketing. The perspectives on industries, markets and competition are different, as well as assumptions of buyers. In addition, planning and organization of marketing activities differ in traditional and high-tech marketing. Figure 2 also reflects that important marketing decisions such as product development and marketing communication may be dealt with differently in high-tech compared to traditional marketing. Such differences may easily lead to the conclusion that high-tech marketing is so different that traditional marketing knowledge no more is relevant, and that new theories and methods are required. As will be discussed in the next section, however, such a conclusion is premature and can be questionned.

Discussion

At the outset we raised the question whether marketing in high-tech markets was something ″special″, i.e. whether new approaches are needed to cope adequately with marketing challenges in high-tech markets, and if so – why and how high-tech marketing differ from traditional marketing. In our above discussion we have uncovered some discrepancies between high-tech and traditional marketing, primarily driven by factors such as the development of new advanced technologies causing technological and market uncertainties, and where future states and outcomes are difficult to predict.

At the outset in this paper it was indicated that the term ″high-tech″ is an ambiguous one, often associated with ″advanced″ and novel technologies imposing uncertainties. Here a distinction was made between technological and market uncertainty. It should be noted, however, that high technological and market uncertainty primarily are present in the initial phase of a newly created industry or product category (cf. Porter 1980, chap. 8; Utterback 1994), i.e. when the technology and/or the high-tech solution is novel – both to the seller (producer) and the customer. This indicates when customers have learnt to evaluate and appreciate the new products, and if for example they ″have learnt″ that ″products always improve″, they are willing to try new solutions/offering – when the yield advantages perceived are worth the extra costs. An interesting example is the observation that buyers are not only willing to evaluate and try, but also – due to prior experiences – willing to wait for the new product generation to come.

Is high-tech marketing ″special″, or stated differently – are new approaches needed to cope adequately with high-tech marketing challenges? According to the present authors the answer is both ″yes″ and ″no″. Factors such as novelty, the extreme degree of technological and market uncertainty, and the substantial knowledge and learning requirements imposed indicate problems not addressed as specific challenges in traditional marketing. But do we need a ″new theory″ of marketing? Probably not. Marketing still relates to attracting, keeping, satisfying and managing customers either the customers are private consumers, business customers or others. In our view very much of basic marketing thinking is still valid. Apparent contradictions between traditional and high-tech marketing can partly be explained that very much of the text-book literature has focused on marketing in well-established, rather stable industries to ultimate consumers. The marketing

of branded consumer products such as Coca Cola and McDonalds has become the prototypes. The dominance of such applications have probably shadowed for the generalicity of general marketing thought.

Disciplines develop and change influenced by such factors as the problems exposed to and knowledge developments. This is also the case for marketing. For example, the inadequacy of traditional market research has initiated development of new methodological approaches as well as new conceptualizations. New problems may – of course – initiate speculation and creation of new concepts and theories to better understand and cope. In sum, we believe it is important and necessary to carefully consider the actual context and the problems under scrunity and considering the possibilities and limitations of theories and methods available, as well as always looking for improvements. ■

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