Editorial: considerations for technology marketing

Introduction

The *International Journal of Technology Marketing* (IJTMKT) focuses on the interaction of technology and marketing. It aims to become a platform to exchange ideas in technology marketing, both theoretically and practically. To facilitate the discussion in this area, some considerations and communications between the editorial board members are compiled in this section, which indicate the intent of the journal. These communications are divided into several parts. Part one raises issues in setting up an overall framework for technology marketing from the perspectives of both technology developers and customers. Part two concerns the practices of technology marketing in different areas such as e-business and bio-business. Part three concerns the use and adoption of new media and methods in conducting technology marketing. Part four deals with technology marketing in a global context with an emphasis on developing countries. The purpose of these communications is to raise questions, not to offer solutions. It is apparent that more research is called for in the domain of technology marketing.

I Issues related to setting up an overall framework for technology marketing

1 Technology marketing: a commercialisation perspective

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Successful marketing requires accurate thinking, which must be properly put into practice. In the field of technology marketing, we have the conceptual framework on marketing in technology-intensive markets recently put forward by John *et al.* (1999). This conceptual framework has been proven to be influential. John *et al.* define technology-intensive markets as ones that are 'characterised by products and services that are based on scientific and technical know-how', and they identify eight features of technology-intensive markets: unit one cost structures, intellectual property tradability problems, diverse technologies, issues of network compatibility, demand-side increasing returns and customers' expectations about the pace, size and uncertainty of improvements. They address four key marketing issues: vertical positioning, product design, transfer rights and customer migration assistance.

Deliberately outside the John *et al.* framework is the question of how technology commercialisation capability is or should be acquired, organised and managed. But firms need to effectively commercialise technology, a process that requires the use of internal

and external resources (Zahra and Nielsen, 2002). I believe that further research on this question of commercialisation capability will bring additional insights as well as greater utility to technology marketing scholarship. Three strands of enquiry, in particular, seem promising to me.

The first has to do with the value co-production or interactivity with customers. The value co-production perspective (Ramirez, 1999) amplifies the insights provided by the diffusion of innovation tradition's 'co-invention' phase of innovation diffusion, and it provides ways of looking at product and service innovation within networks of players. This way of innovating is typical in knowledge-intensive industries such as information and communication technologies, but it is easily extended to other forms of commercialisation such as service innovation and customer-centred product innovation, where the use of lead users has been recognised by the marketing field for decades (Von Hippel, 1986). The value co-production perspective also sits well with strategic network approaches to management of the business environment (Möller and Svahn, 2003).

The second strand of enquiry looks at the organisation of the management of the technology commercialisation capability within the firm. This strand draws on resource-based views and extends the market orientation literature to consider the ways in which commercialisation capability is developed and deployed within firms and their business environments. In technology-based industries, marketing practice overlaps with new product development and business development practices. Business development, a little-explored firm competence, is a corporate entrepreneurial capability that supports practices of co-creation of value with customers and complementors, linking the firm's value-creating processes with its external environment (Davis and Sun, 2005).

The third strand of enquiry concerns the challenges of sense-and-respond capability in commercialisation. Personalisation and customer virtualisation are new commercialisation modalities made possible by IT tools such as customer relationship management systems and virtual product development platforms. These are also made possible by the proliferation of new IT-based interaction channels. These allow the identification of ultra-specific market segments, but at the cost of complex customer knowledge management challenges (Nambisan, 2002; Jayachandran *et al.*, 2004). These issues have been investigated especially in relation to end consumers, but they have their analogues in business-to-business relationships.

The field of technology marketing promises to be exciting in the coming years, and I am sure that IJTMKT will play an active role in this development.

References

Davis, C.H. and Sun, E. (2005) 'Business development capabilities in information technology SMEs in a regional economy', *Journal of Technology Transfer*, in press.

Von Hippel, E.L. (1986) 'Lead users: a source of novel product concepts', *Management Science*, Vol. 32, pp.791–805.

Jayachandran, S., Hewett, K. and Kaufman, P. (2004) 'Customer response capability in a sense and respond era', *Academy of Marketing Science*, Vol. 32, No. 3, pp.219–233.

John, G., Weiss, A.M. and Dutta, S. (1999) 'Marketing in technology-intensive markets: toward a conceptual framework', *Journal of Marketing*, Vol. 63, pp.78–91.

Möller, K., and Svahn, S. (2003) 'Managing strategic nets', *Marketing Theory*, Vol. 3, No. 2, pp.201–226.

Nambisan, S. (2002) 'Designing virtual customer environments for new product development', *Academy of Management Review*, Vol. 17, No. 3, pp.392–413.

Ramirez, R., (1999), 'Value co-production: intellectual origins and implications for practice and research', *Strategic Management Journal*, Vol. 20, pp.49–65.

Zahra, S.A. and Nielsen, A.P. (2002) 'Sources of capabilities, integration and technology commercialization', *Strategic Management Journal*, Vol. 23, pp.377–398.

2   The synergistic relationship between technology and marketing

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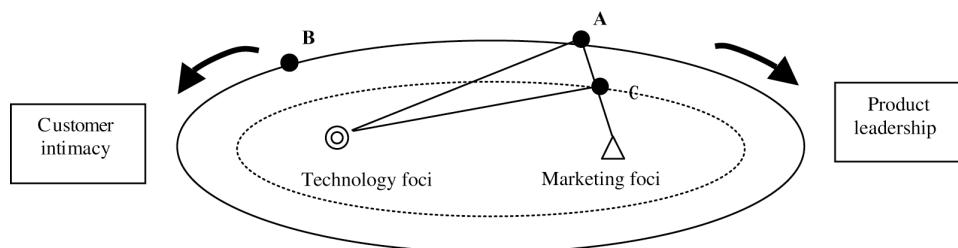E-mail: dwilemon@som.syr.edu

In a study of 80 companies, Treacy and Wiersema (1995) focused on how companies can deliver superior customer value in line with one of the three value disciplines – operational excellence, customer intimacy or product leadership. These value disciplines are generally comparable to Porter's (1980) generic strategies, which are overall cost leadership, focus and differentiation.

Since each value discipline serves a market differently, special organisational capabilities are required. Companies pursuing a 'customer intimacy' strategy, for example, need proficient marketing, whereas companies pursuing product leadership generally need proficient technological capabilities.

Though the degree and content of competence varies for each type of value discipline an organisation pursues, each requires capabilities in *technology* and *marketing* since all the generic strategies and the sustainable competitive advantages are related to at least one of them (in some cases, both).

Figure 1 illustrates the conceptual relationship between technology and marketing using an ellipse. It is based on the inference that different capabilities in technology and marketing as well as different combinations of technology-marketing relationships are needed according to the requirements of each value discipline.

Figure 1   A conceptual diagram on the relationship between marketing and technology

An ellipse is a closed curve formed from two foci or points in which the sum of the distances from any point on the curve to the two foci is a constant. Since an organisation's resources are constrained, it has to allocate its finite resources in an investment in technological and marketing capabilities. In this respect, we can define the distance from the foci as the degree of the capability of an organisation according to its decision on allocation. In addition, if we define the size of the ellipse as the maximum magnitude of organisational performance or sustainable competitive advantage when both capabilities are well managed and utilised, then we can develop the following interpretations. First, capabilities in technology (or marketing) enable an organisation to pursue its value discipline. As seen in Figure 1, for some companies (for example, 'A'), technology is the dominant engine for growth. On the other hand, for other companies (for example, 'B'), marketing leads and facilitates much of the organisational growth.

Second, any deficiencies in capabilities in accompanying marketing (technology) limit its performance. For example, when a technology is coupled with an ineffective marketing program, an organisation (for example, 'C') usually achieves limited performance. Figure 1 illustrates that an organisation's technological capabilities are not fully actualised (shown by the smaller ellipse in dotted line) due to a lack of sufficient marketing support.

Based on Figure 1, we advance the following managerial implications. First, the *decision on selecting a specific value discipline* is important, since it has a long-term impact on an organisation. In addition, the performance and appropriateness of each value discipline will vary according to markets. The decision of a value discipline is illustrated as the decision on the directions of an ellipse (right or left in Figure 1). For optimum decisions, organisations need to carefully identify their current internal capabilities as well as their external market characteristics.

Second, *knowledge of approaches* regarding how best to manage the relationship between technology and marketing is important, since the harmony between technology and marketing determines the size of the ellipse. Any strength in technology (or marketing) cannot be fully maximised when accompanied with deficient or marketing (or technology). Thus, all technology-based organisations need to find appropriate ways to integrate effectively their market and technology functions. To achieve the effective synergy between technology and marketing, the characteristics and requirements of technology and marketing need to be carefully examined in order to find a productive match.

In conclusion, an organisation that makes the right selection of a value discipline through careful consideration of its internal capabilities and its external environment is likely to perform well. Moreover, an organisation that achieves synergy between technology and marketing is likely to perform better than competitors who pursue the same value discipline with limited synergy between technology and marketing. Thus, companies need to view their marketing and technological capabilities as a 'set' or 'system' of integrated activities – not just two activities that need to be integrated from time to time. We suggest that a *system view* of these two functions will be increasingly important in the future. To achieve the notion of a system of interacting/interdependent activities is the key message we advance to both practitioners and scholars.

References

Porter, M.E. (1980) *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York: Free Press.

Treacy, M. and Wiersema, F. (1995) *The Discipline of Market Leaders: Choose your Customers, Narrow your Focus, Dominate your Market*, Addison-Wesley.

3   Exploration and exploitation in technology marketing: building the ambidextrous organisation

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The competitive arena in business environments has changed in many radical ways. The globalisation of markets, rapid technological change, shortening of product life cycles and increasing aggressiveness of competitors require firms to respond flexibly and rapidly (Volberda, 1996). These changes are not only faced by fast-moving, high-tech industries; even industries that were supposed to be stable are heating up. As competition intensifies and the pace of change accelerates, firms are increasingly confronted with a tension between exploiting existing competencies and exploring new ones (Floyd and Lane, 2000; Levinthal and March, 1993; March, 1991). Firms seek to absorb new external knowledge (Jansen *et al.*, 2005), explore new ideas or processes and develop new products and services for emerging markets. In addition, they need the stability to leverage current competences and exploit existing products and services (Benner and Tushman, 2003).

Various literatures have increasingly discussed the need for firms to achieve a balance between exploration and exploitation activities. In this sense, Benner and Tushman (2003) argue that ambidextrous organisations pursue both exploratory and exploitative innovations simultaneously. *Exploratory innovations* are radical (technological) innovations that are designed for emerging customers or markets. *Exploitative innovations* are incremental (technological) innovations that are aimed at meeting the needs of existing customers (Benner and Tushman, 2003,p.243). The underlying assumption of organisation behaviour and organisation theory literatures is the importance of balancing and synchronising exploratory and exploitative innovations. The difficulty of achieving both types of innovations in any singly organisation has often been noted (Duncan, 1976; Tushman and O'Reilly, 1996). There is little empirical evidence on how ambidextrous organisations are able to pursue exploratory and exploitative innovations simultaneously. This is precisely the challenge facing numerous organisations (Brown and Eisenhardt, 1997). Researchers have yet to determine how ambidextrous organisations can be organic as well as mechanistic (Nord and Tucker, 1987) and develop new technologies for emerging customers as well as improve existing technologies for current customers. Accordingly, new models need to be developed that can address this interaction between technology and marketing and explain how ambidextrous organisations may pursue exploratory and exploitative technologies and marketing strategies.

References

Benner, M.J. and Tushman, M.L. (2003) 'Exploitation, exploration, and process management: the productivity dilemma revisited', *Academy of Management Review*, Vol. 28, pp.238–256.

Brown, S.L. and Eisenhardt, K.M. (1997) 'The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations', *Administrative Science Quarterly*, Vol. 42, pp.1–34.

Duncan, R.B. (1976) 'The ambidextrous organization: designing dual structures for innovation', in R. Kilman and L. Pondy (Eds.) *The Management of Organizational Design*, New York: North Holland, pp.167–188.

Floyd, S.W. and Lane, P.J. (2000) 'Strategizing throughout the organization: managing role conflict in strategic renewal', *Academy of Management Review*, Vol. 25, pp.154–177.

Jansen, J.J.P., Van den Bosch, F.A.J. and Volberda, H.W. (2005) 'Managing potential and realized absorptive capacity: how do organizational antecedents matter?', *Academy of Management Journal*, Vol. 48, forthcoming.

Levinthal, D.A. and March, J.G. (1993) 'The myopia of learning', *Strategic Management Journal*, Winter Special Issue, Vol. 14, pp.95–112.

March, J.G. (1991) 'Exploration and exploitation in organizational learning', *Organization Science*, Vol. 2, pp.71–87.

Nord, W.R. and Tucker, S. (1987) *Implementing Routine and Radical Innovations*, Lexington, MA: Lexington Books.

Tushman, M. and O'Reilly, C.A. (1996) 'Evolution and revolution: mastering the dynamics of innovation and change', *California Management Review*, Vol. 38, pp.8–30.

Volberda, H.W. (1996) 'Toward the flexible form: how to remain vital in hypercompetitive environments', *Organization Science*, Vol. 7, pp.359–374.

4   Consumer acceptance of technology-marketing integration: a new era?

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We are witnesses to a time where technology and marketing are being fused together to bring customers integrated product and service experiences. Consider the following examples:

- Disney is considering adding a new show to their morning children's cable lineup. To really understand what the target demographic (pre-school aged children and their parents) think, they air several brief segments during commercial breaks of the existing programming. Then they invite viewers to offer their comments and feedback online. The website itself provides not only interactive games and activities that reinforce Disney characters, but also information for purchasing Disney merchandise or planning a Disney vacation.

- An Apple IPod recently purchased at Best Buy comes bundled with a $15 gift card for the online ITunes store. From there, an album's worth of songs or a single audio book can be downloaded for use on a PC or transferred to the IPod for greater portability. The site also offers accessories that enable music to be shared wirelessly, provides customers the chance to upload and share their favourite playlists, as well as allows the customers to rate the lists of others. In addition, customers can earn additional free music if they create and pay through a PayPal account.

There are two interesting points about these examples. The first is the apparent seamlessness with which technology has been integrated with more traditional media and systems. Consumers are able to shift from one to the other with little or no effort, and, in some cases, make use of multiple media simultaneously. This integration has led to a level of comfort with technology that has not been previously seen or experienced. The second point is the utility of control. At each stage, consumers use the available technology to elect participation in marketing efforts. This gives them a sense of control, and as such, when they do 'opt-in' to market research or promotional activities, they are more amenable to the message marketers are trying to send.

Viewing this from a holistic perspective, we can see what is new and exciting at the intersection of marketing and technology: consumers are willing to have their consumption experiences changed through the use of technology and other related products. Technology cannot only improve products and services directly, but can (and should) be used to provide customers the options for information search, product acquisition and research participation.

When done well, technology-marketing integration represents an opportunity to develop deeper and more meaningful relationships with customers by allowing them to develop an experience that is meaningful to them. The challenge for us as marketers will be to open ourselves to this opportunity.

5   Marketing of technological knowledge

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Technology marketing has become one of the hottest management issues for all technology-oriented companies, as well as for university Technology Licensing Offices (TLOs) working on licensing or selling their technological knowledge (*e.g.*, patents and know-hows). Recognising that such an activity is an important source for increasing corporate profits, companies are searching for effective ways of marketing of the technological knowledge. Unfortunately, however, there have not been enough accumulated studies in the field of marketing that can provide companies with useful insights about it.

Marketing of technology differs from marketing of consumer goods, service goods and industrial goods. This difference lines in the fact that technology as knowledge is distinct from these goods on some important dimensions. Technology is invisible in its own nature, whereas consumer goods like automobiles, TV sets and PCs are all visible products. Although the nature is common to service goods, (*e.g.*, services provided at hotels and restaurants), technology is still different from them in terms that it is a kind of intermediate good, the value of which has to be realised by the users' attempts to put it into practice. In other words, technology contains uncertainty in realising its potential value. In this respect, industrial goods like materials and components that are utilised as parts of final products share the same characteristic. But, they are apparently visible, and this makes them separate or distinct from technology goods.

It is obvious that the specific nature of technology requires new perspectives on its marketing. Visualising the invisible and demonstrating the future value of the technology would be the key factors of success. Based upon deep understanding about technology as knowledge, we shall launch our attempt for building the theory of technology marketing.

II   Practices of technology marketing in different areas

6   Consumer product reviews in an internet store: issues and implications

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A consumer product review system is a new form of communication where community members share information and knowledge about product usage experiences in cyberspace (see Figure 1). Since internet shoppers want to buy products of good quality online, they make an effort to obtain reliable information, suggestions and recommendations provided by reviewers who have purchased and used the same product. In fact, many internet vendors such as Amazon.com are providing their website visitors with consumer reviews on each product they are selling. This information has been shown to influence a potential customer's decision on purchasing.

An important consideration in introducing a consumer product review system to internet vendors is the *reliability* of reviews provided by consumers in an internet store. In reality, consumers' reviews are often written down by the sellers themselves or their employees using assumed user ID numbers. This should serve as a strong warning to consumers and internet users. Sellers are often tempted to provide consumers with very positive product experiences about the products they sell in order to promote their products. However, there are two effective tools for improving the reliability of consumer product reviews: (1) the review score system and (2) the reviewer credit system.

Firstly, the scoring of each review exposed to consumers may play a role in filtering off unreliable reviews. This can be done only if most of the consumers who have purchased a specific product based on product reviews have sincerely scored each review according to usage experience. For example, Amazon.com asks their customers who have purchased the same product the question 'Was this review helpful to you?' The score of each review given by consumers who have used a specific product will help potential buyers make proper purchasing decisions.

Secondly, in order to protect buyers from sellers who wear the 'mask' of consumers, a reviewer credit level system can be considered. In other words, reviewers should be assigned credit or reputation scores based on their reviews. When the creditability levels of reviewers, which are, accumulatively evaluated by online shoppers, are dynamically offered to potential buyers, buyers will be helped in making correct purchasing decisions based on reliable information. In the long run, this practice should persuade sellers to throw away the consumer's mask. Unscrupulous sellers who make it their business to give customers distorted information are likely to be rejected by customers owing to their
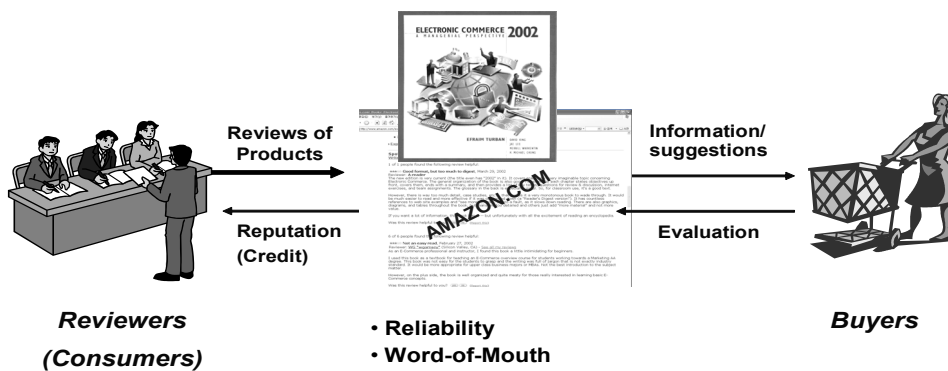
low credit ratings. With the help of such reviewer rating systems, customers can filter out manipulated or distorted information on product experiences which sellers have uploaded on product review systems. Furthermore, this will encourage many customers to keep a lookout for such dishonest product sellers (reviewers). Ultimately, product sales will decrease when such sellers lose the trust of their customers. Accordingly, this system seems to be effective for customers as well as for product providers in increasing purchasing satisfaction in the internet shopping context.

Compared with traditional marketing concepts, however, consumer online reviews of products are not a completely new concept. For example, consumer word-of-mouth, which has been studied by previous marketing or EC researchers (*e.g.*, Hennig-Thurau and Walsh, 2003/2004; Swanson and Kelley, 2000) might be similarly compared to the consumer online review system. The major difference between the consumer word-of-mouth and the online consumer review system is the exchange mode for product experience information between involved persons (from 1:1 communications via face-to-face to m:n communications via the internet). Someone might call such a product review system an ad hoc virtual community where consumers exchange reliable information or knowledge on product usage experiences. Recently, there have appeared many columnists who provide consumers with very high quality information on their product experiences, having devoted themselves to obtaining credits in cyberspace. They are also forming their own communities for distributing reliable information (Koh and Kim, 2003/2004), which influence the purchasing behaviour of offline shoppers as well as of online shoppers.

To sum up, owing to such advantages as the high reliability of information, scope of influence (on and off) and diffusion speed, an online product review system of consumers appears to be spreading over internet stores, complementing (or substituting for) consumer word-of-mouth. I would like to stress that the online product review system of consumers might indirectly influence even offline store sales since online reviews of product experiences tend to be rapidly diffused through offline stores by consumer word-of-mouth.

Regarding this point, I suggest that marketing practitioners understand consumer product review systems or virtual consumer communities as emergent forms of marketing channels. These should be managed effectively. For example, the additional service to a product review system such as Blogs (*i.e.*, linking personal web pages) might help increase the quality of information exchanged among consumers, ultimately heightening the loyalty of consumers who visit internet stores.

Figure 1   Online product review system of consumers

References

Hennig-Thurau, T. and Walsh, G. (2003/2004) 'Reading customer articulations on the internet: a motive-based approach to explain the relevance of "Electronic word-of-mouth"', *International Journal of Electronic Commerce*, Vol. 8, No. 2, pp.51–74.

Koh, J. and Kim, Y-G. (2003/2004) 'Sense of virtual community: a conceptual framework and empirical validation', *International Journal of Electronic Commerce*, Vol. 8, No. 2, pp.75–94.

Swanson, S.R. and Kelley, S.W. (2000) 'Attributions and outcomes of the service recovery process', *Journal of Marketing Theory and Practice*, Vol. 2, No. 4, pp.37–49.

7   Super-convergence: the driving force for the shift of marketing in the biotech age

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Along with the revolutionary biotechnological progresses started from 1950s, more and more business activities are engaged in profiting or gaining from biotech-related research, development, service and control. It forms a new business domain – bio-business – ranging from medicine and defence to food and cosmetics. By the end of 2004, over 100 genetic drugs are on the market with over 400 medicines at various stages of clinical trials. Genetically modified crops are grown in over 10% of farmland in the Earth (Tucci, 2004). A key component of bio-business, 'biotech and drugs industry', has become the eleventh largest single industry among all industries listed in the US stock exchange, with a capitalisation of $574 billion by the end of 2004.

In the new bio-business domain, marketing becomes an increasingly important and complex part (Roselund *et al.*, 2004). In handling bio-business marketing, scholars have been working on two streams. One is to highlight certain unique features of marketing practices in biotech industry. In their discussion on building up a global 'biobrand', Simon and Kotler (2003) argue that traditional experience-based marketing is being replaced by evidence-based marketing. Abate (2003) suggests that segmented marketing has to be used in biotech firms because it is inherited from the nature of biotech. Wansink and Kim (2001) point out that managing both short-term and long-term public opinion is a critical objective in the marketing of biotech. The other stream is related to revealing the feature of bio-business. In their award-wining paper, Enriquez and Goldberg (2000) state that the key feature of businesses based on the life sciences is the stronger convergence, which is rooted in four genetic or life codes – A, T, C and G. They represent the four nucleotides that form DNA. The alterations in these genetic codes will change the shape of life, enabling organisms to break the boundaries between plant and animal, animal and human being, organic process and physical process. Such a convergence is without any predecessor.

Although increasing work are added on the two streams, the bridge for connecting them is still missing. The following questions remain unaddressed:

- How has the 'stronger convergence' reshuffled business activities including marketing efforts?

- How should a biotech firm organise and conduct its marketing under the rule of the 'stronger convergence'?

Since a better understanding of the 'stronger convergence' plays a key role in decoding and applying the emerging marketing paradigm in today's biotech age, further exploration on the relationship between them is of value to both scholars and practitioners. Firstly, the 'stronger convergence', or super-convergence (termed by the author), differs from that associated with previous technologies. The larger scope of convergence as mentioned by Enriquez and Goldberg (2000) is only the quantitative measurement. A 'closed development circuit' – human beings' activities fall in altering themselves through genetic therapies (Abate, 2003) – could be the gate for qualitative exploration. However, the implications of this closed development circuit are hardly addressed and understood. The uniqueness of the closed development circuit makes it a candidate for becoming the cornerstone of the emerging marketing paradigm and for generating new marketing strategies and philosophies.

Secondly, the 'stronger convergence' or super-convergence brought about by biotech creates living creatures across different species including human beings, animals and plants. In this process, food becomes a drug; a drug links to a lifestyle; a plant has animals' features; and an animal becomes the living warehouse of human organs. To face the blurring of these various boundaries, marketers need to redefine market niche and marketing appropriateness accordingly (Costa *et al.*, 2004).

Thirdly, the 'stronger convergence' or super-convergence brought about by biotech facilitates the restructuring of 'labour division' in many activities including marketing. The vertical division of marketing efforts based on the 'phased-operation' nature of biotech firms, including the horizontal division of marketing efforts based on marketing outsourcing and strategic alliances, affects the transformation of marketing in the biotech age (Stegall, 2001). Marketers have to pay attention to the interaction of them.

Given the importance of linking the convergence of biotech and the changes of marketing practices, it is anticipated that more academic explorations and practical experiments will be happening in this area.

References

Abate, T. (2003) *The Biotech Investor: How to Profit from the Coming Boom in Biotechnology*, New York: Times Books.

Costa, C., Fontes, M. and Heitor, M.V. (2004) 'A methodological approach to the marketing process in the biotechnology-based companies', *Industrial Marketing Management*, Vol. 33, No. 5, pp.403.

Enriquez, J. and Goldberg, R.A. (2000) 'Transforming life, transforming business: the life-science revolution', *Harvard Business Review*, Vol. 78, Iss. No. 2, pp.94–103.

Roselund, T., Lovich, D., Lubkeman, M. and Flanagan, A. (2004) 'Biopharmaceutical marketing excellence: driving business results', *International Journal of Medical Marketing*, Vol. 4, No. 3, pp. 209–218.

Simon, F. and Kotler, P. (2003) *Building Global Biobrands: Taking Biotechnology to Market*, New York: Free Press.

Stegall, A. (2001) 'Science doesn't sell itself: the special challenges of marketing biotech products', *Medical Marketing and Media*, Vol. 36, No. 10, pp.78–81.

Tucci, L. (2004) 'Monsanto's chief sees the future of biotech in our back yard', *St. Louis Post*, December, Vol. 3, p.C5.

Wansink, B. and Kim, J. (2001) 'The consumer marketing of biotechnology', *Journal of Commercial Biotechnology*, Vol. 7, No. 3, pp.249–259.

III Methods and media in conducting technology marketing

8   Leveraging technology at the customer interface

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Technology change has been a hallmark of the past two decades. The ongoing enactment of Moore's law has enabled considerable advances in the areas of Information and Communication technologies. The leveraging of these advances has produced a revolution in the supply end of the value chain. Drawing on developments in such areas as computer networks, internet platform technology, EDI and automatic identification systems, supply chain managers have been empowered to deliver speed, flexibility, responsiveness and reduced cost. This empowerment has resulted from an enlargement of Supply Chain Management from a focus merely on material flows to one that also encompasses information and knowledge flows (Holland and Naude, 2004). Within the supply chain arena, the challenge has not been the technology itself. Rather it pertains to the recognition of the opportunities that the technology presents and the making of prudent choices from among the array of opportunities. This has been demonstrated by the stellar performing firms of supply chain management such as Dell and Walmart (Fisher *et al.*, 2000). In the process, such firms have been instrumental in transforming their industry products and services into commodity items.

At the demand end of the chain, embracing the opportunities afforded by technological advances is still at an early stage (Howard and Worboys, 2003). Although many firms have adopted Customer Relationship Management Systems and self-service technologies, the full potential of the capability rendered by technology has only begun to be realised. Thus, although the use of technology to capture and learn from the transaction phase of the customer interface is established, the capabilities afforded by technology in capturing and utilising the richer and deeper experiences of the customer interface still remain to be maximised (Chen and Ching, 2004). The challenge for practitioners and researchers alike is in exhaustively identifying the opportunities that technology will afford them whether it is embedded within the product itself, within the channel delivery mode or at the transaction stage (Holland and Naude, 2004). Firms that successfully make these determinations and creatively act upon them are likely to be the stellar performers of the future.

References

Fisher, M., Raman, A. and McClelland, A. (2000) 'Rocket science retailing is almost here – are you ready?', *Harvard Business Review*, July–August, pp.115–124.

Holland, C. and Naude, P. (2004) 'The metamorphosis of marketing into an information-handling problem', *Journal of Business and Industrial Marketing*, Vol. 19, No. 3, pp.167–177.

Howard, M. and Worboys, C. (2003) 'Self-service – a contradiction in terms or customer-led choice', *Journal of Consumer Behaviour*, ABI/Inform Global, Vol. 2, No. 4, pp.382–393.

Chen, J-S. and Ching, R.K.H. (2004) 'An empirical study of the relationship of IT intensity and organizational absorptive capacity on CRM performance', *Journal of Global Information Management*, Hershey: ABI/Inform Global, January–March, Vol. 12, Iss. No. 1; pp.1–16

9 Combating the rapid pace of price declines in the high tech industry

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High-tech firms today are burdened with the ever-shortening life cycles of their products as new and improved technology is released. However, this rapid pace of change does not come without a price. Shortened product life cycles risk potential obsolescence and cannibalism of current products. Moore's law, which states that for every 18 months or so, the number of transistors per square inch on a chip would double, has held true. Unfortunately, the increased improvement in product performance and competition has come at no increase in price. Consumers are given products with better price and performance ratios as time progresses. Knowing this expected price/performance trend, consumers are seen to delay their purchases in the hope that prices will fall. Can high-technology marketers combat this trend? The impact of mispricing on the bottom line is huge. Among volume, fixed cost, variable cost and price, a 1% change in price is seen to have the largest impact to profitability than any of the other parameters. This article will discuss this pricing paradox and offer solutions to the problem.

Mohr (2001) introduced five solutions to this pricing paradox. First, companies must squeeze out cost inefficiencies. The obvious implication of the pricing paradox is that high-tech companies must know how to keep costs falling faster than prices. Companies must redefine the value for their product in an environment where technology is at times virtually free. Technology companies must avoid getting stuck in making just commodity goods. Second, companies must avoid commodity markets. When products are near commodity status, companies must give customers something that provides value beyond the competition's offerings. A classic example is the Dell customisation model in the PC industry. Third, companies should possess the agility and speed in getting products to the market. Sometimes in a market where getting product to market quickly is the most important goal, it may be acceptable to strive, not for perfection, but for the minimum level of market acceptability with the first generation of a radical new product. Fourth, companies should find new uses for products. For example, Intel cultivates partnerships with a wide variety of companies and is seen to continually engage in research for additional usage models to expand the market for its chips. Lastly, companies should

develop long-term relationships with their customers. Especially in high-tech markets, where the cost of manufacturing one more unit is negligible, companies must focus on building relationships with your customers to retain loyalty. Strive to be a one-stop shop. When at all possible, companies should strive to give the installed base away at a bargain or for free and make money on complementary goods and services that are required to make the good useful. Examples include cell phone providers giving away phones at virtually no cost and charging for service, messaging or other wireless web services.

Although pricing is the most tangible of the four P's in marketing, it is definitely the most difficult to define. The solutions offered for the pricing paradox in high-tech markets are not without their disadvantages. For example, a drawback to a penetration (low-price) strategy is that giving away products for free may signal to the consumer that the product is not worth that much. Nevertheless, astute marketers will need to balance this and other various concerns with the five solutions in mind when defining their pricing strategies.

Reference

Mohr, J. (2001) *Marketing of High-Technology Products and Innovations*, Prentice-Hall, Inc.

10 Recruiting government as a marketing partner

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Much has been written and discussed about US consumers lagging behind consumers in Finland, Japan or South Korea with regard to the adoption of information, communication or entertainment technologies. For global marketers of products and services based on such technologies, this is an important issue. Even though the USA is the largest potential country market, early adoption rates in the USA are lower than in the other mentioned countries. This affects global firms' resource allocation decisions for the prioritisation of entry into various country markets. Whereas marketers tend to explain these differences based on culture or consumer behaviour, there is another, often overlooked, factor at work: the role of government in setting priorities to encourage investment and industry cooperation in targeted technologies. The governments of South Korea and Finland are far more active in promoting technology than the US government, which prefers a 'laissez-faire' approach.

On a recent visit to Seoul in June 2004, I had the opportunity to visit the Ministry of Information and Communication (MIC) led by Dr. Chin Daeje, a former CEO of Samsung. Under his leadership, the MIC has developed Korea's IT '839' Strategy[1] for the future. This strategy has the goal of doubling Korea's GDP to $20,000 per capita by the year 2010. The '8' stands for eight new services that will be introduced to Korean consumers in this time frame; '3' stands for three technology infrastructures that will be needed for these services; and '9' stands for the nine product areas that the industry will need to develop to support infrastructures and services.

The eight new services for Korean consumers are the following: Wireless Broadband (WiBro) portable internet service, Digital Multimedia Broadcasting (DMB) services, Home Network Service, Telematics service, Radio Frequency (RFID) service and W-CDMA third generation mobile service, among others. The three infrastructures needed are the following:

1 a Broadband Convergence Network (BcN)

2 a Ubiquitous Sensor Network (USN) to manage RFID tags

3 a Next Generation Internet Protocol (IPv6).

The nine product areas to support the above will provide new growth engines for industry are the following: Next Generation Mobile Communications, Digital TV, Home Networks, IT System-on-Chip, Next Generation PC, Embedded Software, Digital Contents, Telematics and Intelligent Service Robots. The Korean government will take the lead in formulating policy, passing legislation and coordinating industry efforts. But the investments in technology development, products and services will have to come from the private industry.

As a result of the '839' strategic initiative, six leading companies (KT, Samsung Electronics, LG Electronics SK Telecom, KTF, LG Telecom) have invested in the 'Ubiquitous Dream'[2] showroom on the ground floor of the MIC building. These companies have cooperated to showcase their future technology applications including the Digital Home of the Future, Digital School of the Future and Digital Grocery Store of the Future, among others. This investment by selected companies in a government project is an impressive example of a government-industry partnership to promote technology. Global marketers targeting the US or other technology-lagging countries would do well to follow the South Korean example. The unconventional, indirect approach of coopting the government as a marketing partner could yield rich rewards for global technology marketers.

Notes

1 The Road to $20,000 GDP/capita: IT 839 Strategy, Ministry of Information and Communication, Republic of Korea, downloadable from http://www.mic.go.kr/index.jsp (Accessed February 10, 2005)

2 Ubiquitous Dream Hall, http://www.ubiquitousdream.or.kr.htm_en/main.htm (Accessed February 10, 2005)

11 Intelligent software agents and their role in technology marketing

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People have been doing business for thousands of years, and the only intelligent agent whom people have had is another human being (Murch and Johnson, 1998). An analysis of current research in artificial intelligence would indicate that this human agent will continue to be the most intelligent one for quite some time. Unfortunately, a human agent is not always available. Also, a human agent is usually very expensive, sometimes very emotional, not adequate for repetitive tasks, time restricted and limited in managing complexity.

On the other hand, the dynamic, uncertain, massive and distributed nature of information on the internet has made it very difficult for humans to process this information. In this new environment, help is required to support activities, which range from simple web surfing to sales, shopping and marketing. For instance, effective agents will contribute to the development of new marketing practices. Agents can change the nature of interactions on the internet from simple access to large databases, to dynamic and personalised information and advice sources, to helping develop better products – in particular those that are technology-intensive. To implement this approach, an information system will have to:

1   learn its users' criteria

2   learn how to aggregate information from different media and help reinforce this
      information using these media.

In order to perform both these tasks, these agents must be *intelligent* and implemented in the software. This next generation of software that not only responds to requests for information but also predicts, adapts and aggressively develops and provides the means to understand complexity, that is currently being researched and developed, has been termed an intelligent software agent.

Reference

Murch, R. and Johnson, J. (1998) *Intelligent Software Agents*, Prentice Hall.

IV   Technology marketing in a global context

12   The relevance of global diffusion research

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Despite the trends in globalisation, marketers of telecommunications services have to bear in mind that there are huge differences across market areas. For example, the penetrations of internet use vary from 1.4% in Africa to 68% in North America. In the mobile phone market, Europe leads the world with its 51% penetration rate, whereas Africa has reached only 6.2%. Among countries, the highest internet penetration is in

Sweden (75%), and cellular penetration in Taiwan (111%). As a result of these differences in some parts of the world, marketers are primarily concerned with how to achieve the critical mass. In some other markets, penetrations have nearly reached the maximum potential, the basic services have become a bulk product, and marketers are fighting for market shares and trying to figure out how to keep their customers loyal and lure them to use new value-added services.

Bearing this in mind, it is important to think what kind of guidance diffusion research could offer a company to face the challenges such as those mentioned above. The marketing decisions that a global company makes could be roughly categorised into two levels: issues like the selection of target markets, entry timing and entry mode on a more strategic level, followed by marketing mix decisions on the operational level. Diffusion models have already been used for analysing and predicting the demand for more than half a century, and the track record in terms of forecasting accuracy is impressive. However, truly global scale empirical studies on diffusion research are scarce. Furthermore, diffusion research seems to be more suitable for giving insights for the strategic level decisions because the effects of marketing mix factors on diffusion have not been extensively studied on a global scale. This is naturally at least partly due to the difficulty of obtaining the necessary empirical data.

At its current state, global diffusion research has helped companies to find answers to problems like:

- What is the market potential of an innovation? Why is it higher in some markets than in other markets? Along with many other methods, diffusion models have been used to predict market potential.

- Why is the diffusion of an innovation faster in some markets than in other markets? Several studies have suggested some methods for predicting the diffusion in lagging markets based on an analogy from older innovations and/or leading markets. The effects of various economic, social or cultural factors on diffusion have been established (*e.g.*, Helsen *et al.*, 1993; Dekimpe *et al.*, 2000; Talukdar *et al.*, 2002).

- Is the diffusion of an innovation in one market independent of its diffusion in some other markets? Should we launch the innovation in all markets at the same time? If not, then which markets should be entered first? The research results concerning the learning effect have shed light on these issues (*e.g.*, Ganesh *et al.*, 1997).

- What is the critical mass after which the diffusion will really take off? What factors affect the level and timing of the critical mass? Only a few recently published studies exist on this issue (*e.g.*, Tellis *et al.*, 2003).

However, there are still unanswered questions. Only a few years ago, many European telecom operators paid dearly for the third generation mobile service licenses, expecting the transition from 2G to 3G to be as swift as the one between 1G and 2G. An often heard explanation for the huge losses of a company is that the customers were not ready for the new product. The dilemma of market-making versus market-taking (or technology push vs. market pull) is extremely relevant for entry timing decisions. To tackle these issues, diffusion researchers could pay more attention to innovations consisting of successive generations, or to the incubation times after which the innovations took off in various market areas, or innovations that failed to take off at all.

References

Dekimpe, M.G., Parker, P.M. and Sarvary, M. (2000) 'Global diffusion of technological innovations: a coupled-hazard approach', *Journal of Marketing Research*, Vol. 37, No. 1, pp.47–59.

Ganesh, J., Kumar, V. and Subramaniam, V. (1997) 'Learning effect in multinational diffusion of consumer durables: an exploratory investigation', *Journal of the Academy of Marketing Science*, Vol. 25, No. 3, pp.214–228.

Helsen, K., Jedidi, K. and DeSarbo, W.S. (1993) 'A new approach to country segmentation utilizing multinational diffusion patterns', *Journal of Marketing*, October, Vol. 57, No. 4, pp.60–71.

Talukdar, D., Sudhir, K. and Ainslie, A. (2002) 'Investigating new product diffusion across products and countries', *Marketing Science*, Vol. 21, No. 1, pp.97–115.

Tellis, G.J., Stremersch, S. and Yin, E. (2003) 'The international takeoff of new products: the role of economics, culture, and country innovativeness.' *Marketing Science*, Vol. 22 No. 2, pp.188–208.

13 Technology marketing in developing countries

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Up to now, developing countries have not been very attractive technology markets. Low personal income, lack of access to utilities infrastructure, trade barriers and lack of education have a few of the barriers to technology companies making profitable inroads into these markets. However, this trend is changing since many developed markets are becoming 'technology saturated' and present limited opportunities for growing revenues. Developing markets, therefore, represent an opportunity that technology companies cannot afford to ignore. As the 27 September 2004 issue of *Business Week* suggests, the next one billion technology customers will belong to the developing world.

However, the major challenge to technology marketers is to understand the uniqueness of developing countries and to not simply transfer 'first world' technology. Here are a few examples of the uniqueness of developing technology markets:

- In 1993, the business case for mobile telephony in South Africa was based on a forecast of less than one million subscribers. Currently the market stands at approximately 17 million users, largely due to the early implementation of pioneering prepaid mobile services. When technology addresses a compelling need, it must be relevant to local conditions and affordable. The acceptance of new technology can be surprising.

- Technology can open up new markets for developing world businesses. For example, lesser-known musicians from developing countries have little to lose by making their music available online.

- New technology often presents business opportunities in developing countries. In rural India, Hewlett-Packard rents portable solar-powered digital cameras and printers to entrepreneurs, who earn an income from photography in their communities (*Business Week*).

- Some developing countries are developing their own 'centres of excellence'. Take for example the Indian software development market that supplies top IT skills globally at competitive costs.

- In most developing countries, cultural conditions present a challenge as well as an opportunity. In Africa, for example, the relative scarcity of healthcare skills opens up an opportunity for remote technology-based healthcare solutions.

The key lessons for technology marketers when considering developing markets are the following:

- Understanding local cultures and needs is key to developing successful technology solutions. This often requires going beyond conventional market research methods.

- Being successful often means being patient and willing to experiment and adapt.

- Product development requires 'out-of-the-box' thinking, often going beyond simply adapting existing products and services.

- Technologies developed in developing countries often have commercial applications in the developed world. For examples, prepaid mobile services have been successful all over the world.

- Simply entering these markets with innovative products is not enough. Often, local players are already strongly established. In many cases, local players are well positioned to enter first world markets successfully. An example of this is the Korean group LG in the mobile phones and appliances markets.

14 Technology and marketing in emerging markets: looks can be deceiving

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It has become almost popular to consider emerging markets in every conceivable managerial context. It appears that in the case of technology in marketing a similar notion prevails. However, significant within-country diversity and cross-border diversity of markets might limit the scope of generalisations about these markets. While it might be relatively safe to argue that many of these emerging markets have limited exposures to cutting-edge technology (hence limiting the options available to the modern marketer), there also appears to be evidence that for certain technologies, one might be surprised by the level of technology adoption in these markets. In South Africa, for example, one can easily make the mistake of assuming that people living in 'townships shacks'

(constructed from various pieces of scrap materials and with little, if any, compliance to construction standards) have no televisions or sophisticated stereo systems present. Only upon entering these homes it becomes clear that one should be careful of such assumptions. It seems that these consumers, living a rather 'limited' life, do often have access to these technologies. A similar argument might be developed for cellular phones and possible even for computers with internet connectivity. Hence, this observation warrants closer consideration by marketers wishing to access the high volumes of emerging markets. Such insight is offered by C.K. Prahalad in what he refers to as the *principles of innovation in BOP* (bottom of the pyramid) *markets,* published in a recent book titled, *The fortune at the bottom of the pyramid*. It is useful to consider these basic brush strokes by Prahalad as it might assist in offering an appropriate context for considering technology in emerging markets.

In emerging markets the focus on price performance of products and services is as relevant as in developed markets. Providing inferior technology just because it is 'cheap' seems to be a risky business, especially when it is perceived as the dumping of dated technology. In short, it is not just about lower prices in emerging markets. Similarly, emerging markets often require hybrid solutions (not old technology) because of the diversity of problems. In addition, emerging markets are large, and solutions need to be scalable and transportable across countries, cultures and languages. These characteristics of emerging markets demand an in-depth understanding of the market.

The dominant logic behind resources are often significantly different in emerging markets, and a focus on conserving resources is required. Emerging markets are not as accustomed to resource wastage as developed markets. Thus, marketers should seek to eliminate, reduce and recycle resources. This notion can also be extended to product usage as multiple uses of the product will often be required. Hence, a deep understanding of product functionality is a must. Also, the lack of infrastructure might demand appropriate process innovations (not only product innovations). However, in emerging markets, the presence of infrastructure cannot be assumed.

Prahalad also draws the attention to the importance of skills and customer education in emerging markets. While it is argued that technology must take the skills levels into consideration, it is also noted that consumers need to be educated. However, this process might contain critical dynamics in an emerging market, and often the context within which it must be executed can present significant challenges.

In emerging markets products must work in hostile or harsh environments. This is often the real test for product quality as the technology might be applied in conditions where the required supporting environment is fundamentally different from those in developed markets, and the application boundaries might be extended. In a similar context, research on the technology interfaces in emerging markets then might become critical due to the diversity of the population and the diversity in the application of the technology.

Finally, designing methods for accessing the poor at low cost with good technology appears critical in emerging markets. Paradoxically, the feature and function evolution of technology in emerging markets can be rather rapid. Surely, various factors might impact on the adoption rate of technology in emerging markets (such as the rate of economic development and the learning curve effect). More importantly, Prahalad argues that this requires product developers to adopt a broader approach to create an appropriate platform for adding new features and functionality.

Surely these principles are not applicable to all businesses. Rather it points to the fundamental understanding that is required for using technology in emerging markets. This is not limited to production and product technology only. Marketers should pay attention to these dynamics as it might provide additional insight into the realities of what it means to be market orientated in emerging markets. Clearly, there is a plethora of approaches in considering the challenges of using technology in marketing to emerging markets. Research opportunities on this area abound.