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Marketing of the Life Sciences: A New Framework and Research Agenda for a Nascent Field

Stefan Stremersch and Walter Van Dyck

With the growth of the life sciences industry, unique and challenging marketing problems emerge. This report proposes a new research program—bridging medicine, business, and economics—which would have a broad influence on public policy and business issues.

Report Summary

What unique challenges do marketers in the life sciences face that require industry-specific knowledge development? Although marketing scholars often seek to contribute new knowledge that is applicable across industries, the authors argue that specific knowledge development is necessary for the life sciences industry, which is defined as companies in pharmaceuticals, biotechnology, and therapeutic medical devices.

Through a study of prior literature and through surveys of marketing experts, Stremersch and Van Dyck identify industry-specific decision areas that life sciences marketers must deal with, including therapy creation, therapy review, and therapy promotion. In therapy creation, marketers face decisions concerning therapy pipeline optimization, innovation alliance formation, and product positioning. Therapy review involves marketing decisions concerning global market entry timing and key opinion leader selection. Therapy promotion centers mostly on salesforce management, communication management, and stimulation of patient compliance. The authors qualify these decision areas according to their practical importance and academic potential.

Based on prior research and practice, the authors formulate preliminary generalizations for key decision areas, to evaluate early streams of research and develop propositions to direct future research. Offering a clear definition of life sciences and discerning the boundaries of the domain, the authors suggest that the field of life sciences marketing needs to establish itself not only practically but also theoretically and methodologically.

A fertile area of future research, life sciences marketing presents unique and often challenging marketing problems, for which high-quality data are available. The authors note that investment in research on life sciences marketing as a research program would also address concerns across disciplines such as business, medicine, and economics. Research on life sciences marketing will have a broad social influence, on public policy, companies, the press, and people's quality of life. ■

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Introduction

While marketing scholars often seek to contribute new knowledge that is applicable across industries (Stewart 2002), some industries have unique characteristics that require industry-specific knowledge development (Eliashberg, Elberse, and Leenders 2006). Examples are the services industry (Parasuraman, Zeithaml, and Berry 1985; Rust and Chung 2006; Vargo and Lusch 2004), the entertainment industry (Eliashberg, Elberse, and Leenders 2006; Eliashberg and Shugan 1997), and the high-tech industry (Bourgeois and Eisenhardt 1988; Glazer and Weiss 1993; Heide and Weiss 1995; John, Weiss, and Dutta 1999; Stremersch et al. 2007; Weiss and Heide 1993).

In this paper, we argue that this requirement also applies to the life sciences industry. In our definition, this industry spans companies in pharmaceuticals, biotechnology and therapeutic medical devices, and forms the innovative producer side of the health-care industry. Two fundamental dimensions underlie the life sciences industry: science-based knowledge (know-why) and quality of life.

Life science companies are significantly more linked to science than is any other industry, and convert the know-why they develop into new therapies (therapy creation). The resulting therapy is scientifically reviewed by society in terms of its impact on people's quality of life, by examination of the therapy's safety, efficacy, and incremental cost-effectiveness (therapy review). Life science firms promote their life sciences therapies, to health-care provider and patient, within the regulatory framework designed by society (therapy promotion). Marketers face unique challenges in decisions on therapy creation, therapy review, and therapy promotion (see Figure 1).

The scant survival probability of newly created therapeutic inventions—only 1 in 5,000–10,000 new inventions eventually makes it to market—leads to life sciences development portfolios being uniquely shaped as funnels (Ding and Eliashberg 2002). Life sciences marketers decide on product positioning (the match between indication and new therapy) many years before market entry. Market entry for new therapies is strictly regulated, differentially so across countries. If market access is granted, manufacturers get a limited time of market exclusivity—in most cases, 20 years as of initial application filing, of which 10 to 12 years are typically spent in clinical development—after which generic therapies may enter the market. Life science firms' marketing efforts are typically capped (e.g., in many European countries) and/or regulated (e.g., some states in the U.S. require medical sales reps to undergo a certification process). It is also one of the only industries in which manufacturers are legally prohibited from communicating directly with their end customer (with the exception of New Zealand and the U.S.).

The life sciences industry constitutes an important and growing part of our economy: e.g., the U.S. life sciences industry represents $271 billion of global sales in 2007 (PhRMA 2008). In the U.S., prescription drug spending, the life sciences industry's largest component, is expected to accelerate through 2017 (CMS 2008).

Because of the industry's vast importance and its unique challenges, marketing literature has recently turned to the life sciences industry to study salesforce effectiveness (Manchanda and Chintagunta 2004; Manchanda and Honka 2005; Manchanda, Rossi, and Chintagunta 2004; Mizik and Jacobson 2004; Venkataraman and Stremersch 2007), therapy compliance (Bowman, Heilman, and Seetharaman 2004; Wosinska 2005), communication effectiveness (Cleanthous 2004; Iizuka and Jin 2005; Macias and Lewis 2003; Mukherji, Dutta, and Rajiv 2004; Wosinska 2006), and innovation (Chandy et al. 2006; Ding and Eliashberg 2002; Prabhu, Chandy, and Ellis 2005; Sorescu, Chandy, and Prabhu

Figure 1
Key Marketing Decision Areas in Life Science Firms

2003 and 2007; Wuyts, Dutta, and Stremersch 2004), among others.

The objectives of the present paper are to evaluate past research, suggest new directions for future research, and ignite life sciences marketing as an important area for scholarly research. We achieve these objectives by defining the life sciences industry and discerning its boundaries, deriving the key marketing-decision areas in this industry, formulating generalizations and propositions derived from prior research and state-of-the-art practice, and suggesting specific directions to steer future research.

Defining the Life Sciences Industry and its Boundaries

Underlying dimensions of the life sciences industry

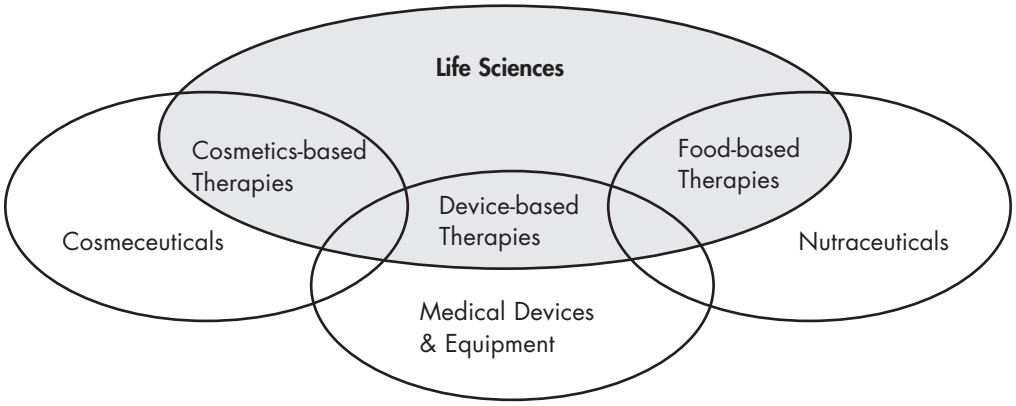
A first constitutive characteristic of the life sciences industry is that this industry creates scientific knowledge as to why a certain therapy affects the human body in a certain way. Science represents "know-why" (Kogut and Zander 1992), in contrast to technology, which represents "know-how" (Quinn, Baruch, and Zien 1997). The average number of scientific papers a firm cites (science linkage) when applying for a patent on its inventions, rather than the number of other, prior patents (know-how development), can be used as a measure of the extent to which a firm is science based (Narin 2001).

A second constitutive characteristic of the life sciences industry is that the preventive or curative therapies it creates are scientifically reviewed as to their effect on people's quality of life, after which these therapies are promoted to patients and providers to convince them of the acclaimed effects. Improvement in quality of life is expressed as an increase in "quality-adjusted life years," (QALYs), and can lie in enhanced effectiveness, reduced side effects and improved convenience (Garber and Phelps 1997). Improvement is based on both quantity and quality of life years generated by medical interventions.

The components of the life sciences industry

We discern three components of the life sciences industry: pharmaceutical, biotechnological, and therapeutic medical devices. These three industries are science based, as their patents typically refer to more scientific papers than do any other industries. For instance, a study by Narin (2001) has shown that pharmaceutical and biotechnology firms cited respectively 7.3 and 14.4 scientific references per patent, which were the two highest science linkages of all technology areas. While not separately identified in the study by Narin (2001), therapeutic medical devices are also very much science based. First, the average science linkage of all medical devices and equipment companies, which includes therapeutic medical devices, is more than twice the average of the high-tech industry, such as

Figure 2
The Life Sciences Industry and Its Boundaries



aerospace or ICT (Narin 2001). Second, therapeutic medical devices companies, such as Nektar Therapeutics or Arthrocare,1 belong to the most science-based companies in the economy.

These three industries also market products that aim to improve the quality of life. These include inorganic compounds (pharmaceuticals), organic compounds (biotechnology), and therapeutic devices that affect the (diseased) human body. Take breast cancer as an example. Pharmaceutical firms aim to improve breast cancer patients' conditions through chemotherapy, while biotechnology firms may offer targeted therapies (e.g., Herceptin by Genentech) for well-identified patient types. Device-based therapies also are often used with the same objective of increasing quality-adjusted life years, for instance, through radiotherapy.

Discerning the boundaries of the life sciences industry

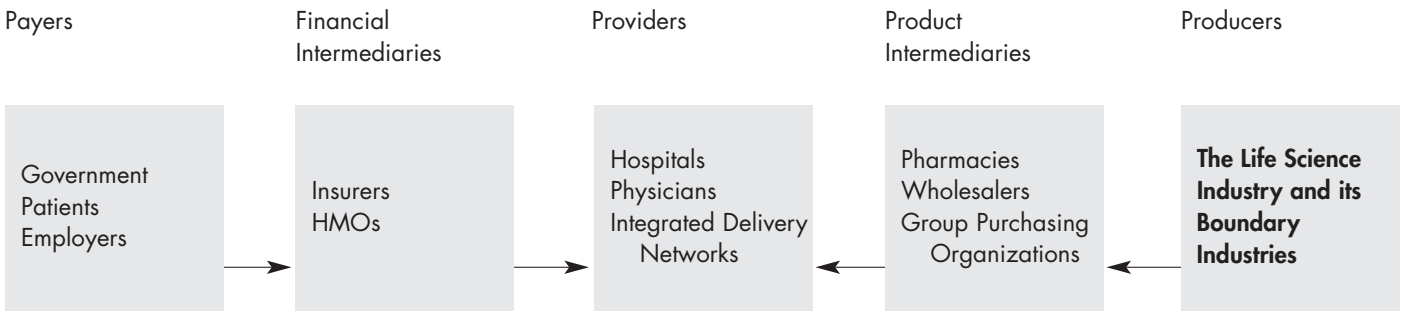
The above definition allows us to discern life sciences boundary industries (see Figure 2): cosmeceuticals, medical devices and equipment, and nutraceuticals. These industries contain a small segment that belongs to the life sciences industry because they produce therapies that are science based and that improve quality of life.

Typical cosmeceuticals are antiwrinkle agents or balms to treat eczema or burn wounds. These products prevent, treat, or cure diseases, mostly of the skin. Therefore, these products are distinct from mere cosmetics, which aim to alter the appearance of the skin, eyes, hair, nails, etc. Some cosmeceuticals (i.e., cosmetics-based therapies) are science based, e.g., acne-care products with therapeutic antiseptics.

Medical devices and equipment range from wheelchairs to imaging devices (such as MRIs) to stents. Equipment such as a wheelchair improves the patient's quality of life (e.g., through mobility) but is not science based. Medical imaging devices do not therapeutically improve humans' quality of life and do represent know-how (technology) rather than know-why (science). Some devices (i.e., device-based therapies) enhance the quality of life and are science based, such as stents, implants, and pacemakers.

Nutraceuticals refer to products such as nutritional supplements, vitamin- or calcium-enriched foods, and polysaturated fatty acids. Nutraceuticals may improve quality of life beyond merely feeding the body as food. However, only a subset of these products (i.e.,

Figure 3
The Life Sciences Industry in the Health-care Market



Source: Adapted from Burns (2005).

food-based therapies) is science based and thus part of the life sciences industry. An example is sterol-derived, cholesterol-lowering Benecol.

Therapies exist that include both a devices component and a cosmeceutical or nutraceutical component. Examples include breast implants (cosmeceuticals and devices) and nutrigenomics, personalized diet recommendations based on diagnostics of bodily fluids (nutraceuticals and devices). Figure 3 (adapted from Burns 2005) positions the life sciences industry in the health-care market. Payment flows from left to right, from payers to providers over financial intermediaries. Products flow from right to left, from producers to providers, over product intermediaries. The life sciences industry is the producer side of the health-care market.

Key Marketing Decision Areas in the Life Sciences Industry

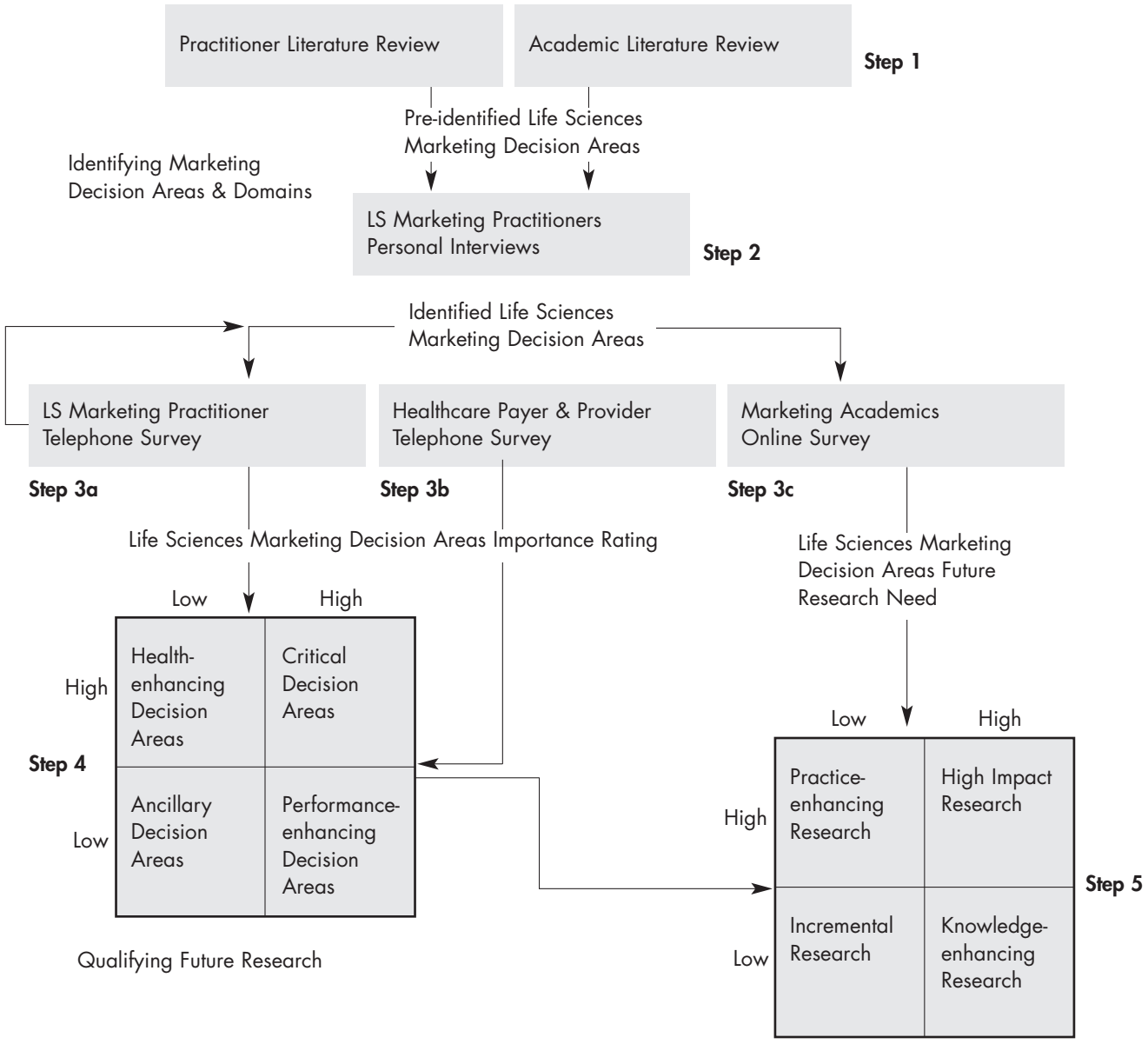
Next, we derive the key decision areas for marketers in the life sciences industry. We first discuss our methodology, after which we identify and qualify the key marketing decision areas on managerial relevance and scholarly potential.

Methodology

Figure 4 graphically depicts our methodology. We first identified marketing decision areas in life sciences from a literature study (step 1).2 Table 1 provides an overview of the major publications in life sciences marketing, according to the three areas we defined—therapy creation, therapy review, and therapy promotion—in *International Journal of Research in Marketing*, *Journal of Consumer Research*, *Journal of Marketing*, *Journal of Marketing Research*, and *Marketing Science*, which have been claimed to be a good representation of major journals in marketing (Stremersch and Verhoef 2005; Stremersch, Verniers, and Verhoef 2007).

Given its relatedness in the health-care value chain, Table 2 provides an overview of the health psychology literature, in the same major marketing journals. The table discerns three frameworks in this literature: health-related behavior, health-risk perception, and health communication. Two early schools of thought underlie these frameworks: protection motivation theory and the health belief model. Protection motivation theory predicts protection intentions as a function of severity, vulnerability, response efficacy, and self-efficacy and is used to test the effectiveness of health communication (Maddux and Rogers 1983;

Figure 4
Methodology



Rogers 1975; for a review: Keller and Lehmann 2008). The health belief model (Becker 1974; Rosenstock 1974) proposes that increasing risk perceptions should lead to precautionary behavior (for a review, see Menon, Raghubir, and Agrawal 2008).

Although it is more distant to the life sciences–marketing field, we also reviewed the health economics literature. The following articles provide good reviews on the health economics literature for interested readers: on the cost of innovation (DiMasi, Hansen, and Grabowski 2003); on price competition among pharmaceutical firms (Bhattacharya and Vogt 2003; Scherer 1993); on the effect of generic entry on branded drug prices (Frank and Salkever 1997; Grabowski and Vernon 1992);

Table 1
Overview of Life Sciences–marketing Literature

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Creation					
Sorescu, Chandy, and Prabhu (2007)	IAF	Pharmaceutical firms with large product–capital assets are better at selecting targets with innovation potential and deploying this innovation potential. The performance consequences of this superiority in the selection and deployment of target firms manifests itself in long-term financial rewards to the acquiring firm.	Resource-based view of the firm	OLS regression model	238 acquisitions in 7 countries (1992–2002)
Chandy et al. (2006)	TPO	Firms that (1) focus on a moderate number of ideas in areas of importance and in which they have expertise and (2) deliberate for a moderate length of time on promising ideas have the highest conversion ability.	Problem-solving view of the firm	Discrete choice model	322 drug ideas by 38 firms (1980–1985)
Prabhu, Chandy, and Ellis (2005)	IAF	Innovation outcomes of acquisitions are driven by the preacquisition knowledge of the acquirer and its similarity with the targets' knowledge.	Knowledge-based view of the firm	Distributed-lag model	35 pharmaceutical firms that acquired 157 targets (1988–1997)
Moorman, Du, and Mela (2005)	PP	Firms can make strategic use of regulation by thinking about costs and benefits of regulation relative to competition. The introduction of the Nutrition Label and Education Act (NLEA) led to (1) an increase in small-share firm exits and (2) a greater increase in distribution for large-share firms. No concurrent increase in price by large-share firms following the NLEA was observed.	Economics of information	Random effects probit on longitudinal quasi-experimental data	UPC-coded firm- and brand-level on 109 categories from 2,186 firms (Supermarket Review Data) and on 265 categories from 29,374 firms (Infoscan) per year (1991, 1993, and 1995)
Wuyts, Dutta, and Stremersch (2004)	IAF	Alliance-portfolio technological diversity positively impacts incremental and radical innovation output but has a negative direct effect on profitability. Repeated partnering has a positive effect on radical innovation and a curvilinear effect on profitability. Alliance portfolio size has a positive effect on incremental innovation output and firm profitability.	Knowledge-based view of the firm	Negative binomial and OLS regression model	991 R&D agreements (1985–1998)

Continued on next page

Table 1
Continued

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Creation, continued					
Sorescu, Chandy, and Prabhu (2003)	TPO	Firms that provide higher per-product levels of marketing and technology support obtain much greater financial rewards from their radical innovations than do other firms. Firms that have greater depth and breadth in their product portfolio also gain more from their radical innovations.	Risk- and resource-based view of the firm	Random effects Poisson model	255 breakthroughs introduced by 66 publicly traded firms (1991–2000)
Moorman and Slotegraaf (1999)	PP	Product marketing and technology capabilities coinfluence the degree to which firms improve the quality of their brands and the speed of these improvements. Capabilities' most valuable characteristic is to serve as flexible strategic options consistent with a changing environment.	Resource-based view of the firm and economics of information	Regression on longitudinal quasi-experimental data	124 brands across 22 categories (1991–1993; 1994–1996)
Moorman (1998)	PP	Marketers respond to the introduction of the Nutrition Label and Education Act (NLEA) by changing the quality of their brands and extensions thereby occupying distinct strategic positions. Doing so also shifts healthy brands away from competing on price. Conversely, nonhealthy brands relied more on price promotion post-NLEA.	Economics of information	Regression on longitudinal quasi-experimental data	269 consumers pre-NLEA, 212 post-NLEA, 124 products (1987–1996)
Therapy Review					
Aboulnasr et al. (2008)	METG	The likelihood of competitive product response to radical innovation is substantially higher when the introducing firm is large or when it derives a larger part of its revenues from the introduction market. The response is highest when the radical innovation is introduced in a small market by a large firm.	New-product growth	Hazard model	52 radical product innovations introduced by 32 different companies in 27 therapeutic categories (1997–2001)
Rao, Chandy, and Prabhu (2008)	METG	New biotech ventures that acquire legitimacy externally by forming alliances with established firms gain more from their new products than new ventures that do not form such alliances. Among new ventures that do not form alliances, those that acquire legitimacy internally by creating a history of product launches or by hiring reputed executives or scientists gain more from their new products than those that do not. Pursuit of external legitimacy by firms that already have internal legitimacy leads to lower rewards from innovation.	New-product growth	Maximum likelihood estimation and OLS regressions	93 FDA-approved biotech product introductions (1982–2002)

Continued

Table 1
Continued

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Review, continued					
Akçura, Gönül, and Petrova (2004)	METG	Price promotions may be deficient as a tool to increase market share in OTC leg-and-back pain relievers.	Choice behavior with learning	Bayesian learning model with Kalman filter	3519 purchase observation in panel of 69 consumers of OTC leg-and-back pain relievers (1993–1995)
Desiraju, Nair, and Chintagunta (2004)	METG	Developing nations have lower diffusion speeds and maximum penetration levels than developed countries. Laggard developed countries have higher speeds. Laggard developing countries do not have higher diffusion speeds. Per capita expenditures on health care have a positive effect on diffusion speed (particularly for developed countries). Higher prices tend to decrease diffusion speed.	New-product growth	Hierarchical Bayesian diffusion model	Newly launched antidepressant drugs in 15 countries (1987–1993)
DeSarbo et al. (2001)	METG	The specialist–physician population can be split into three segments with respect to the stage of adoption of innovations in a therapeutic category.	Market information mapping	Latent structure spatial model	Top 7 brands prescribed among 258 specialists
Shankar, Carpenter, and Krishnamurthi (1999)	METG	Growth-stage entrants reach their asymptotic sales level faster than pioneers or mature-stage entrants. They are not hurt by competitor diffusion, and enjoy a higher response to perceived product quality than pioneers and mature-stage entrants. Pioneers reach their asymptotic sales levels more slowly than later entrants. Mature-stage entrants are most disadvantaged. Buyers are most responsive to pioneer marketing efforts.	New-product growth	Dynamic brand sales model	29 ethical brands in 6 therapeutic areas (1970s, 1980s)
Shankar, Carpenter, and Krishnamurthi (1998)	METG	Compared to pioneers or noninnovative late movers, innovative late movers can create a sustainable advantage by enjoying higher market potential and higher repeat-purchase rates. They grow faster than the pioneer, slowing the pioneer's diffusion and reducing the pioneer's marketing effectiveness. They are advantaged asymmetrically; their diffusion can hurt other brands' sales, but their sales are not affected by competitors. Noninnovative late movers face smaller potential markets, lower repeat rates, and less marketing effectiveness compared with the pioneer.	New-product growth	Generalization of the Bass diffusion model for brand sales	13 ethical brands in 2 chronic ailment therapeutic categories (1970s, 1980s)

Continued on next page

Table 1
Continued

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Review, continued					
Shankar (1997)	METG	A pioneer who adopts a follower (leader) role with respect to a marketing-mix variable in a static (growing) market and witnesses a decrease (increase) in own elasticity and margin upon a new entry generally should accommodate (retaliate) in that variable.	New-product growth	Game theory	Full category of chronic-care ethical drugs (1970s, 1980s)
Therapy Promotion					
Chintagunta and Desiraju (2005)	SFM	There is considerable heterogeneity in preferences and market response for pricing and detailing across markets, which favors a regional approach to strategy. The effects of within- and across-market interactions vary across markets and across brands within a market.	Competitive marketing-mix interactions	Category sales and market share model	Antidepressant sales (1988–1999)
Wosinska (2005)	CM, SPC	The impact of direct-to-consumer advertising on patient compliance is small in economic terms, the effect spills over to other brands, and in certain cases the effect may decrease average compliance rates.	Compliance behavior	Negative binomial model	Panel of 16,011 patients, 123,736 gaps between prescriptions (1996–1999)
Bowman, Heilman, and Seetharaman (2004)	CM, SPC	Mindfulness is a predictor of patient compliance. Patients are most at risk for noncompliance right after a medical treatment and for some duration afterward. Satisfaction with efficacy is a better predictor of compliance than satisfaction with side effects or costs. Advertising shows a mixed influence. Direct channel shoppers are more compliant than indirect channel consumers.	Compliance behavior	OLS regression and Tobit models	6,238 patients making 44,345 purchases (2001–2002)
Manchanda, Rossi, and Chintagunta (2004)	SFM Hierarchical Prescription	High volume physicians are detailed to a greater extent than low volume physicians, without regard to responsiveness to detailing. Unresponsive but high-volume physicians are detailed the most.	Monthly prescription behavior	Bayesian estimation of negative binomial model	volume of 1,000 U.S. physicians for one drug, of which the name is not revealed (1999–2001)

Continued

Table 1
Continued

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Promotion, continued					
Narayanan, Desiraju, and Chintagunta (2004)	SFM, CM	Direct-to-consumer advertising (DTCA) and detailing affect pharmaceutical demand synergistically. Detailing raises price elasticity and has a higher return on investment than does DTCA. The interaction between price and detailing is negative. DTCA has a significant effect on category sales; detailing does not. Both detailing and DTCA affect brand shares, and detailing has a much greater effect than DTCA.	Prescription behavior	Category sales and market share model	Monthly antihistamine prescriptions in the U.S. (1993–2002)
Gönül et al. (2001)	SFM	Physicians show fairly limited price sensitivity. Detailing and samples have a mostly informative effect on physicians. Physicians with a relatively large number of Medicare or HMO patients are less influenced by promotion than other physicians are.	Prescription behavior	Latent-class multinomial logit model	1,785 patient visits to 157 physicians in the U.S. for a chronic condition common among the elderly (1991–1994)
Ahearne, Gruen, and Jarvis (1999)	SFM	Perceived salesperson attractiveness has a significant positive effect on salesperson performance, but the effect diminishes as the length of the salesperson–physician relationship increases. Attractiveness leads to higher levels of perceived communication ability, likeability, expertise, and trustworthiness.	Social psychology	Regression analysis on survey data	339 U.S. physicians
Dekimpe and Hanssens (1999)	SFM, CM	Strategic scenarios (business as usual, hysteresis in response, escalation, and evolving business practice) have a major impact on marketing effectiveness and long-term profitability. Multivariate persistence measures are proposed to identify which of four scenarios is taking place.	Marketing-strategy response	Vector-autoregressive models	Monthly sample of 5 years for a pioneering and challenger brand in one pharmaceutical category in the U.S.
Hahn et al. (1994)	CM	Effectiveness of communication on product trial is related mainly to product quality and market growth. Effectiveness of word of mouth is associated with product-class characteristics and market competitiveness. The effect of product trial on repeat purchases is related to product quality and market characteristics, such as size, growth, competitiveness, and familiarity.	New-product growth	4-segment trial repeat model	21 ethical drugs in 7 therapeutic categories, launched from 1981 to 1984

Continued on next page

Table 1
Continued

Authors	Decision Areas	Main Findings	Conceptual Framework	Method Used	Empirical Base
Therapy Promotion, continued					
Mantrala et al. (1994)	SFM	The agency theoretic model-based approach can assist management in evaluating and optimally structuring multiproduct sales-quota bonus plans.	Agency theory	Utility model on conjoint data	12 sales people in a single company
Parsons and Vanden Abeele (1981)	SFM	Sales-call elasticity varies over time as a function of the collateral material (samples and handouts).	Marketing-strategy response	OLS regression model	Monthly sales for an established drug within the steroid group of prophylactic medicines for women in Belgium (1973–1974)

Decision Areas: IAF: innovation-alliance formation; CM: communication management; SPC: stimulation of patient compliance; METG: market entry timing globally; PP: product positioning; SFM: salesforce management; TPO: therapy pipeline optimization. Note that no papers had been published on key opinion leader selection in the five major marketing journals we studied.

on health-care policy (Drummond, Jönsson, and Rutten 1997; Scherer 2004); and on reference pricing (López-Casasnovas and Puig-Junoy 2000).

Step 2 was to conduct two-hour personal interviews with nine marketing experts in life science companies, such as Amgen, GlaxoSmithKline, Novartis, Novo Nordisk, and Philips Medical Systems. To have sufficient confidence in our findings and to qualify the marketing decision areas we identified in terms of importance, we conducted quantitative telephone surveys with marketing managers at life science firms (step 3a) and with health-care payers and providers (step 3b) and conducted an online survey of marketing academics (step 3c).

We sampled marketing managers (step 3a) through snowballing, first contacting respondents we knew personally, after which we contacted executives the first respondents identified as useful respondents, and so on. In total, we contacted 110 executives. Representing a response rate of 87%, 96 executives agreed to participate in a telephone interview: 40 managers of pharmaceutical firms (such as Astellas Pharma, AstraZeneca, Bristol-Myers Squibb, GlaxoSmithKline, Johnson & Johnson, Merck AG, Novartis, Novo Nordisk, Organon BioSciences, Pfizer, Roche, Sanofi-Aventis, Schering, and Wyeth), 28 managers of biotech firms (such as Amgen, Biogen Idec, Galapagos, Genzyme, Novo Nordisk, and Organon BioSciences), and 28 managers of medical devices companies (such as 3M, Medical Division; Agfa Medical Products; B. Braun Medical; Coloplast; Johnson & Johnson Medical Products; Philips Medical Systems, and Siemens Medical Solutions). We overweighed the pharmaceutical industry, given its larger size. From these managers, we inventoried key decision areas (via open question) and the importance of each previously identified (in steps 1 and 2) decision area for the firm, on a 1–7 scale.

Table 2
Overview of Health Psychology Literature

Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Berger and Rand (2008)	In the context of alcohol and junk food consumption, associating risky health behavior with a social identity people do not want to signal can lead consumers to make healthier choices.	Health-related behavior	Experiments	50 undergraduate students 87 resident college students 75 college students
Bolton et al. (2008)	Consumer belief that a drug alone will take care of their health risk makes drug marketing create a boomerang effect by undermining intentions to engage in health-protective behavior. This occurs because (1) drugs reduce risk perceptions and perceived importance of, and motivation to engage in, complementary health-protective behavior, and (2) drugs are associated with poor health, a perception that reduces self-efficacy and perceived ability to engage in complementary health-protective behavior. An intervention combined with a drug remedy that targets both motivation and ability mitigates the drug boomerang on a healthy lifestyle.	Health communication and health-related behavior	Experiments	185 patients at risk of high cholesterol 81 staff and college students 213 staff and college students
Hong and Lee (2008)	Regulatory fit, experienced when a person's strategy of goal pursuit fits with the person´s regulatory focus (promotion or prevention based), enhances self-regulation toward desirable outcomes through intensified motivation. Regulatory nonfit impairs self-regulation by reducing motivation.	Health-related behavior	Experiments	48 undergraduate students 64 university participants 182 MBA students 228 undergraduate students
Riis, Simmons, and Goodwin (2008)	In an examination of the willingness of young, healthy individuals to take drugs intended to produce psychological enhancement, it was found that people were much more reluctant to enhance traits believed to be more fundamental to self-identity (e.g., social comfort) than traits considered less fundamental to self-identity (e.g., concentration ability). People were more inclined to ban enhancements that were morally unacceptable.	Health-related behavior	Experiments	357 undergraduates 176 undergraduates 90 undergraduates 359 undergraduates 500 participants aged 18–45
Wong and King (2008)	Risk understanding in the context of breast cancer is influenced by the dominant illness narrative of restitution within Anglo–Western cultures. Restitution stories reflect the cultural values of personal responsibility and taking control in fighting disease and returning to a normal life. Restitution promotes early detection, aggressive treatment, and reconstructive surgery as concealment. This risk understanding contributes to the consumption of health-care interventions exceeding U.S. medical guidelines.	Health-risk perception	Phenomenological interviews	12 participants diagnosed with breast cancer

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Table 2
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Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Agrawal, Menon, and Aaker (2007)	When people are primed with a positive emotion (e.g., happiness, peacefulness), the compatibility between the referent and the discrete emotion fosters the processing of health information. When the primed emotion is negative (e.g., sadness, agitation), compatibility hinders processing of the message.	Health communication	Experiments	80, 103, 188, and 98 undergraduate students
Bolton, Cohen, and Bloom (2006)	Remedy (e.g., smoking-cessation aids) messages undermine risk perceptions and increase risky behavioral intentions as consumer problem status rises, hence among those most at risk.	Health communication and health-risk perception	Experiments	97 college students 99 individuals 72 university/hospital staff and students
Keller (2006)	A person's regulatory focus determines the salience of self-efficacy (perceived ease) or response efficacy (perceived effectiveness) of health behaviors. Greater regulatory-efficacy fit and higher intentions to perform the advocated behaviors occurs when self-efficacy features are paired with promotion focus and when response efficacy features are paired with prevention focus. Self-efficacy is weighed more than response efficacy when the regulatory focus is promotion, whereas the reverse is true in prevention–regulatory focus.	Health-related behavior	Experiments	60 undergraduate students 61 middle school adolescents
Thompson (2005)	Dissident health-risk perceptions are culturally constructed in the natural childbirth community, internalized by consumers as a compelling structure of feeling and enacted through choices that intentionally run counter to orthodox medical risk-management norms.	Health-risk perception	Phenomenological interviews	10 couples of a natural childbirth community
Chandran and Menon (2004)	Every-day health-hazard framing makes risks appear more proximal and concrete than every-year framing, resulting in increased self-risk perceptions, intentions to exercise precautionary behavior, concern and anxiety about the hazard, and effectiveness of risk communication.	Health communication and health-risk perception	Experiments	46, 64, and 153 undergraduate students
Dellande, Gilly, and Graham (2004)	In the context of a weight-loss clinic, provider expertise and attitudinal homophily play a role in bringing about customer role-clarity, ability, and motivation. Compliance leads to goal attainment, which results in satisfaction. Compliance also leads to satisfaction directly; consumers who comply with program requirements have greater satisfaction with the program.	Health-related behavior	Survey, archival data, and interviews	376 patients and 36 nurses in southern California

Continued

Table 2
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Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Moorman et al. (2004)	Subjective knowledge (i.e., perceived knowledge) can affect the quality of consumers' choices by altering where consumers search. Subjective knowledge increases the likelihood that consumers will locate themselves proximate to stimuli consistent with their subjective knowledge. As such, subjective knowledge influences choice by affecting search selectivity between environments rather than search within the environment. The need for self-consistency drives the effect of subjective knowledge on search.	Health communication	Experiments and survey	44 individuals 212 undergraduates 947 shoppers in 20 product categories
Thompson (2004)	In the natural-health marketplace, a nexus of institutional, competitive, and sociocultural conditions engender different ideological uses of this market-place mythology by two types of stakeholders: advertisers of herbal remedies and consumers seeking alternatives to their medical identities.	Health communication	Ethnographic study	3 advertisements for natural-health products
Kahn and Luce (2003)	Given a false-alarm result, life-threatening test consequences are associated with more disutility for future testing than when test consequences are less significant. This does not hold for normal test results. Patients receiving a false-alarm result experienced more stress and were less likely to believe that a positive mammography result indicated cancer and more likely to delay mammography than patients receiving normal results, unless they were also told that they may be vulnerable to breast cancer in the future. Delays in planned adherence following a false-alarm result can be mitigated by an information intervention.	Health-related behavior and health-risk perception	Experiments	64 women involved in a university hospital mammography waiting room
Keller, Lipkus, and Rimer (2003)	In the context of a message on breast cancer risk, people induced with a positive mood are more persuaded by the loss-framed message (the cost of not getting a mammogram), whereas people induced with a negative mood are more persuaded by the gain-framed message (the benefits of getting a mammogram). People in a positive mood have higher risk-estimates and lower costs in response to the loss frame than to the gain frame, whereas the reverse is true for people in a negative mood.	Health communication and health-risk perception	Experiments	85 women aged between 40 and 70 124 women aged between 40 and 70

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Table 2
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Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Spangenberg et al. (2003)	Self-prophecy through mass-communicated prediction requests can influence normative behaviors for large target populations.	Health communication	Experiments	72 undergraduate students 1,665 health and fitness club members 202, 74, and 92 undergraduate students 83 university staff members
Keller, Lipkus, and Rimer (2002)	Compared to nondepressives, depressives lower their risk (of getting breast cancer) estimates such that they are more accurate or closer to the medical estimates provided in risk feedback. Nondepressives with higher baseline risk estimates do not revise their follow-up risk estimates because they are in a positive mood after receiving the risk feedback.	Health-risk perception	Experiments	55 women aged between 40 and 60 74 women between 25 and 40
Menon, Block, and Ramanathan (2002)	Message cues can reduce self-positivity bias (i.e., the tendency for people to believe they are invulnerable to disease) and engage people in more precautionary thinking and behavior. Risk-behavior cues in the message affect people's estimates of their vulnerability (self-risk estimates), depth of message processing, attitudes, and behavioral intentions.	Health communication and health-risk perception	Experiments	137, 110, 160, and 152 undergraduate students
Thompson and Troester (2002)	Natural-health consumers use narratives to articulate the values manifest in their wellness-oriented consumption outlooks and practices. Narratives reveal the meaning-based linkages between these articulated values and the consumption goals being pursued through natural-health practices.	Health communication	Phenomenological interviews	32 natural-health consumers
Luce and Kahn (1999)	In the context for chlamydia and mononucleosis, false-positive outcomes increase perceptions of vulnerability and test inaccuracy, even holding constant test-error base rates. Increased perceived vulnerability appears to be directly related to the testing event, as the effects are not replicated by simply asking subjects to imagine having the malady. False-positive test results increase planned compliance if there are poor alternatives to testing or if the value of test-initiated treatment is high, but does not affect compliance if good testing alternatives are available or the treatment value is low. The results of a false-positive outcome on compliance are partially mediated by changes in perceived vulnerability and test accuracy.	Health-related behavior	Experiments	152, 49, and 129 undergraduate students

Continued

Table 2
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Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Raghubir and Menon (1998)	In judgments about the risk of contracting AIDS, the perceived similarity of another person to oneself and the ease with which related information can be retrieved from memory moderate self-perceptions of risk in an absolute sense and reduce the self-positivity bias. Increasing the accessibility of a cause of AIDS, in an advertisement propounding safe sex, increases perceptions of one's own risk of contracting AIDS, reduces the self-positivity bias, leads to more favorable attitudes and intentions toward practicing precautionary behaviors, and also leads to deeper processing of AIDS educational material.	Health-risk perception and health-related behavior	Experiments	28, 76, 109 undergraduate students
Keller and Block (1997)	There exists an inverted-U relationship between resource allocation and persuasion for vivid information, and a positive linear relationship between resource allocation and persuasion for nonvivid information when vivid information is less resource demanding than nonvivid information. When nonvivid information is less resource demanding than vivid information, there is an inverted-U relationship for nonvivid information, and a positive linear relationship for vivid information. The contrasting persuasion functions for vivid and nonvivid information can predict when vivid information will be more versus less persuasive than nonvivid information.	Health communication	Experiments	120 graduate and undergraduate students 94 undergraduate smokers 190 undergraduate students
Keller and Block (1996)	In the context of messages that prompt smoking cessation, when a low level of fear is ineffective, it is because there is insufficient elaboration of the harmful consequences of engaging in the destructive behavior. When appeals arousing high levels of fear are ineffective, it is because too much elaboration on the harmful consequences interferes with processing of the recommended change in behavior.	Health communication and health-related behavior	Experiment	97 smoking university students
Block and Keller (1995)	In the context of skin cancer and sexually transmitted disease, the authors show that a low-efficacy condition (i.e., when it is uncertain that following the recommendations will lead to the desired outcome) motivates more in-depth processing. When subjects process in depth, negative frames are more persuasive than positive ones. A high-efficacy condition generates less-effortful message processing in which positive and negative frames are equally persuasive.	Health communication	Experiments	94 undergraduate students 115 students

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Table 2
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Authors	Main Findings	Conceptual Framework	Data Type	Empirical Base
Moorman and Matulich (1993)	The interaction of health ability and health motivation affects consumers' health behaviors. The impact of these characteristics depends on the particular health behavior and the specific health-ability characteristic.	Health-related behavior	Experiment	404 consumers
Friedman and Churchill Jr. (1987)	In the context of health-care delivery, the effectiveness of expert and legitimate social-power behaviors, in terms of patient satisfaction, compliance, and action, is contingent on the aspect of the situation that is manipulated. In contrast, high-referent and low-coercive power are preferred by patients regardless of the situation.	Health-related behavior	Experiment	396 female graduate students
Burnett and Oliver (1979)	Response to fear appeals is specific to the situation, topic, person, and criterion. This supports segmenting target consumers by demographic or psychographic traits in the use of fear appeals.	Health communication and health-related behavior	Experiment	1,600 individuals served by a health management organization (HMO)
Oliver and Berger (1979)	Health belief models incorporating evaluative components, normative influences, emotional factors, and intervening summary concepts may yield a greater understanding of health-care decisions.	Health communication	Experiment	332 students and 469 residents

We sampled health-care payers and providers (in step 3b) from contact lists provided by IMS Health. Out of a sample of 545, 112 respondents participated (response rate = 21%), among which 81 were physicians (health-care providers) and 31 were representatives of health-care government and health management organizations (health-care payers). From this sample, we obtained the impact of the previously identified (in steps 1 to 3a) marketing decision areas on patient welfare, on a 1–7 scale.

We sampled academics (step 3c) using two criteria: (1) they have a position in marketing; (2) they have knowledge relevant to the life sciences industry, through their academic research. Of a sample of 78, 29 academics eventually participated (response rate = 37%): N. Agrawal, M. Ahearne, R. Bezawada, L. Bolton, D. Bowman, R. Chandy, A. Ching, M. Dekimpe, M. Ding, X. Dong, J. Eliashberg, P. A. Keller, L. Krishnamurthi, M. F. Luce, P. Manchanda, M. K. Mantrala, N. Mizik, C. Moorman, H. Nair, J. C. Prabhu, V. Shankar, C. Sismeiro, A. Sorescu, E. R. Spangenberg, P. Stern, D. Vakratsas, C. Van den Bulte, S. Venkataraman, and S. Wuyts. From these academics, we obtained (on a 1–7 scale), for each of the previously identified marketing decision areas (step 1 to 3a), the following: (1) the extent to which these areas are covered by present marketing research in progress; (2) the extent to which they deserve more scholarly attention in the future; (3) the extent to which the academics sampled conceived these areas to be important for life sciences marketers in practice.

Step 4 yields the practical impact of life science marketing decision areas, from both a firm profit and patient welfare perspective. Step 5 consists of mapping the need for academic research, as perceived by academics, on decision area importance, as perceived by practitioners (combining the input of both marketing managers and health-care providers and payers).

Table 3
Description of Key Decision Areas in Survey

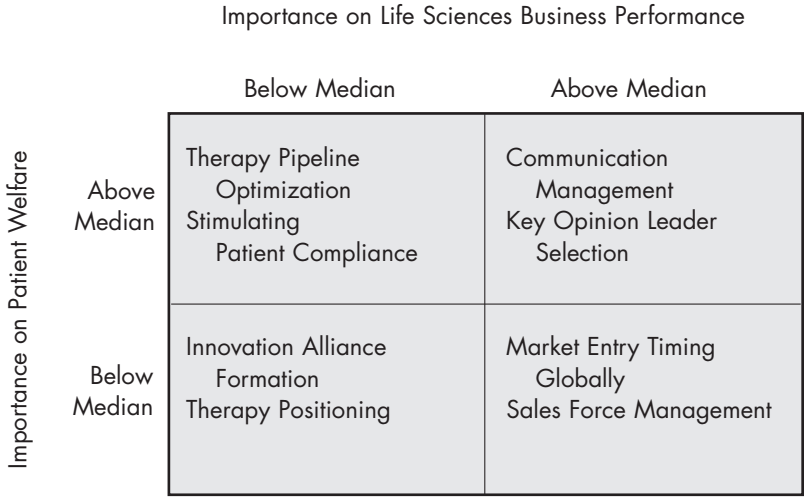
Decision Area	Clarification Provided to Respondents	Associations Made by Respondents
Therapy Creation		
Therapy Pipeline Optimization	Includes premarket decisions on portfolio or pipeline optimization	"Our pipelines of the future will have to contain more targeted therapy-diagnostic combination projects" (Johnson & Johnson).
Innovation Alliance Formation	Includes decisions regarding alliances during product development	"How do we get synergy amongst alliance partners?" (Philips Medical Systems).
Product Positioning	Includes premarket decisions on competitive positioning (including segmentation, targeting) of the product	"Instead of being product-minded we should become more solution-minded" (Philips Medical Systems).
Therapy Review		
Market Entry Timing Globally	Includes decisions regarding optimal market-entry timing, pioneer versus follower advantages, international launch strategy, and new-product market-potential forecasting	"At present, marketing and pricing is too country-specific. How do we make a good tradeoff between local and global market entry?" (Johnson & Johnson).
Key Opinion Leader Selection	Includes the structuring of the company's key opinion leader network for maximum effectiveness	"We assured fast product uptake in a socially retarded area by convincing the members of a local fertility control council exerting high impact on the local doctors" (Organon).
Therapy Promotion		
Salesforce Management	Includes decisions on optimal sizing and targeting of the sales force, decisions optimizing sales-call quality, optimizing the use of product samples, including sales-response models	"It is absolutely necessary for sales people to have the level necessary to build relationships with healthcare providers" (B. Braun Medical).
Communication Management	Includes the design of optimal communication strategies, including the use of medical publications, DTCA, and Internet-based communication reaching patient and physician disease communities	"How to reach patients with the present regulatory restrictions?" (Roche).
Stimulation of Patient Compliance	Includes the design of optimal patient-compliance programs	"There's a gamut of new technologies like smart pill bottles coming available now to support compliance. We should consider them in our product delivery designs" (Johnson & Johnson).

Identification of key marketing decision areas

Figure 1 contains the key marketing-decision areas, grouped into three higher-level decision domains: therapy creation, therapy review, and therapy promotion. In therapy creation, the key decision areas are therapy pipeline optimization, innovation alliance formation, and therapy positioning. The key decision areas in therapy review are market entry timing globally and key opinion leader selection. The key decision areas in therapy promotion are salesforce management, communication management, and stimulation of patient compliance. Table 3 describes each decision area. The second column presents the clarification we provided

Figure 5

Importance of Critical Decision Areas on Firm Performance and Patient Welfare



to our respondents when asking them to rate the decision area's importance. The third column contains associations respondents made to each decision area during our interviews.

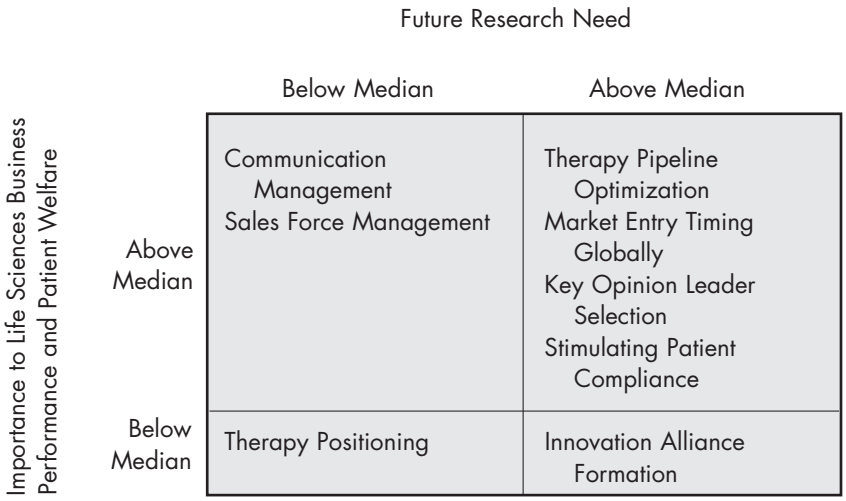
Qualifying key marketing decision areas in terms of research potential

In step 4, we join relevance in terms of business performance (averaged over all life science firms we surveyed) and relevance in terms of patient welfare (the average of the averages over all surveyed payers on the one hand and all surveyed providers on the other hand3). Average importance to business performance ranged from 4.8 (innovation alliance formation) to 5.6 (salesforce management), while average importance ratings to patient welfare range from 3.6 (product positioning) to 5.2 (communication management), all on a scale from 1 to 7. In Figure 5, we qualify the different cells as follows: (1) critical decision areas of above-median importance to both business performance and patient welfare; (2) performance-enhancing decision areas of above-median importance to business performance, below-median importance to patient welfare; (3) health-enhancing decision areas of below-median importance to business performance, above-median importance to patient welfare; (4) ancillary decision areas of below-median importance to both business performance and patient welfare.

Communication management and key opinion leader selection appear to be critical decision areas. Market entry timing globally and salesforce management are performance-enhancing decision areas. The low relevance of salesforce management to patient welfare may explain why many hospitals and physicians have started to deny access to pharmaceutical sales reps. Therapy pipeline optimization and stimulation of patient compliance are health-enhancing decision areas. Innovation alliance formation and therapy-positioning decisions are ancillary, probably to therapy pipeline optimization.

In step 5, we confront the practical importance of decision areas (those taken to be the highest of importance in terms of business performance and importance in terms of patient welfare) with the need for academic research, as perceived by academics. The average need for future academic research ranges from 5.0 (salesforce management) to 5.8 (stimulation of patient compliance), on a scale from 1 to 7. In Figure 6, we qualify the cells as follows: (1) high-impact research: research that promises to be an important contribution to academic knowledge and that is of high, immediate practical relevance to business performance and/or patient welfare; (2) knowledge-enhancing research: research that promises to be an important contribution to academic knowledge but that is not necessarily of immediate practical relevance; (3) practice-enhancing research: research that is of high, immediate practical relevance to business performance and/or patient welfare but that is not necessarily of immediate academic importance; (4) incremental research: research that neither is of high, immediate practical relevance nor necessarily represents an important contribution to academic knowledge.

Figure 6
Research Agenda



While all four types of research are valuable in their own right, the chance of gaining a breakthrough insight is the highest in the "high impact" (top-right) quadrant. Such decision areas are therapy pipeline optimization, market entry timing globally, key opinion leader selection, and stimulation of patient compliance. Future research on innovation alliance formation is qualified as knowledge-enhancing research. The academic knowledge generated can be ancillary to decision areas such as therapy pipeline optimization. Communication and salesforce management are practice-enhancing areas. Research on therapy positioning will likely be incremental.

Academics assessed the need for future research on therapy positioning as a low priority, because they considered this decision area of low practical relevance, while they assessed the need for future research on salesforce and communication management as a low priority because it is already largely addressed by past and ongoing research, despite its relevance remaining high in the eyes of other academics.

Generalizations, Propositions, and Directions for Future Research

Based on prior research and practice, we formulate preliminary generalizations (G) to evaluate early streams of research in this area and develop propositions (P) that provide direction to future research. Preliminary generalizations are already supported by the existing literature but may benefit from additional testing through techniques such as meta-analyses. Propositions are exploratory and at least partly supported by verbal logic, mathematical proof, or empirical evidence (Stremersch and Tellis 2002). Following the qualification of decision areas in Figure 6, we emphasize past research (generalizations) or future research opportunities (propositions) and provide an overview in Table 4.

Therapy creation

Therapy Pipeline Optimization. In life science firms, therapy pipelines contain all innovation projects along the following temporal stages. During discovery, therapy candidates are screened for maximum activity on the biological target. Preclinical development and clinical development use, respectively, in vitro or animal experiments and human experiments.

Prior research on therapy pipelines aimed to determine the optimal number and sequencing of innovation projects that a firm's resource base can support and that serve its goal to maximize the number of commercially launched innovations (see Blau et al. 2004; Chandy et al. 2006; Ding and Eliashberg 2002; Loch and Kavadias 2002). This prior research finds that there exists an inverted-U relationship between the number of innovation projects undertaken and the number of innovations commercially launched. However, scholars in this literature stream have not discerned the different temporal stages in the therapy pipeline. While companies' ability to convert innovation projects in commercially launched products may suffer from the firms'

Table 4
Overview of Generalizations and Propositions

Decision Areas	Generalizations and Propositions
Therapy Creation	G1: There exists an inverted-U relationship between knowledge similarity between alliance partners and the number of new therapies that the alliance yields.
	G2: As the level of repeated partnering in a firm's innovation alliances portfolio increases, its radical innovation output increases.
	G3: As the number of alliance partners in a firm's innovation alliances portfolio increases, its incremental innovation output increases.
	P1a: There exists a positive relationship between the number of innovation-discovery projects initiated and the number of patented inventions of a firm.
	P1b: There exists an inverted-U relationship between the number of innovation-development projects initiated and the number of commercially launched innovations of a firm.
	P2: Innovation-development projects on targeted therapies lead to more commercially launched innovations than the same number of innovation-development projects on nontargeted therapies.
Therapy Review	P3: Pioneering yields market share advantages for generic therapies.
	P4: Firms that launch a new therapy in a referencing country early relative to the set of referent countries will obtain a higher price than firms that launch a new therapy in a referencing country late relative to the set of referent countries.
	P5a: The higher the uncertainty on therapy effectiveness, the higher the impact of clinical leaders, as compared with market leaders, on other physicians' prescription behavior.
	P5b: The higher the uncertainty on therapy side effects, the higher the impact of market leaders, as compared with clinical leaders, on other physicians' prescription behavior.
	P6a: Clinical leaders have a higher impact on hospital-based physicians' prescription behavior than do market leaders.
	P6b: Market leaders have a higher impact on general practitioners' prescription behavior than do clinical leaders.
Therapy Promotion	G4: The mean effect of detailing on brand prescriptions is (a) positive but (b) small.
	G5: DTCA has a positive effect on (a) the number of patients seeing a physician for the respective disease for which a therapy is advertised, and (b) total category-level demand in the category of the therapy that is advertised.
	P7a: Communicating complete (including both favorable and unfavorable) therapy information in sales calls may affect the firm's long-term ROI on detailing more positively than communicating just favorable therapy information.
	P7b: The effect postulated in P7a is larger in the case of therapies for life-threatening illnesses than in the case of non–life-threatening illnesses.
	P7c: The effect postulated in P7a is larger in hospital environments than in outpatient environments.
	P8: The effect of a direct-to-consumer ad on brand-level demand is higher the more the ad depicts favorable rather than unfavorable therapy information.
	P9: The effect of a direct-to-consumer ad on brand-level demand is higher among female viewers than among male viewers.
	P10a: As disease complexity increases, CRM-enabled compliance programs increase in effectiveness to stimulate patient compliance, as compared with technology-enabled compliance programs.
	P10b: As symptom salience decreases, technology-enabled compliance programs increase in effectiveness to stimulate patient compliance, as compared with CRM-enabled compliance programs.

taking on too many projects in development, this may not be the case in discovery, in which more exploration leads to more effective knowledge on biological targets, resulting in more new therapy opportunities. Therefore, we propose the following:

P1a: There exists a positive relationship between the number of innovation-discovery projects initiated and the number of patented inventions of a firm.

P1b: There exists an inverted-U relationship between the number of innovation-development projects initiated and the number of commercially launched innovations of a firm.

The optimal number of innovation-development projects a firm should undertake may also be contingent on the type of innovation project. Targeted (specific for certain patient types) therapy innovation projects require fewer resources in development and feature higher probabilities of ultimate regulatory approval (Vernon and Hughen 2005). Therefore, we propose the following:

P2: Innovation-development projects on targeted therapies lead to more commercially launched innovations than the same number of innovation-development projects on nontargeted therapies.

Scholars may also find it worthwhile to study other types of innovation projects as contingency factors, beyond targeted or nontargeted projects, such as radical versus incremental projects. Studying the therapy pipeline in the context of patent expiry may also be fruitful. Firms may anticipate expiry in multiple ways, such as the development of combination drugs, more convenient administration and dosage methods, and re-engineered variants with higher effectiveness or less serious side effects. To develop and test such a contingency framework, scholars can analyze databases, such as the Pharmaprojects database, the R&D Focus Database maintained by IMS Health, and the FDA's Orange Book, all of which contain detailed pipeline information. As outcome variables, scholars could gather information on the number of approved new patents (recorded by the U.S. Patent and Trademark Office) and therapies (listed in the FDA Orange Book).

Innovation Alliance Formation. As Figure 5 shows, practitioners consider decisions on innovation alliances to be ancillary decisions. At the same time, this decision area has provided an ideal and often-used testing ground for theory development on interfirm cooperation. The reason is that the life sciences industry provides possibly the richest documentation on such alliances (e.g., Recap's database on interfirm agreements) and its outcomes (e.g., patents, new products).

Similarity between parties in an alliance is probably most often studied. Dissimilarity between partners yields greater learning opportunity, as there is less knowledge redundancy, while similarity between partners makes it easier to understand one another and share information. The tension between both arguments has led many researchers (Cloodt, Hagedoorn, and Van Kranenburg 2006; Prabhu, Chandy, and Ellis 2005; Wuyts et al. 2005) to find a curvilinear relationship between knowledge similarity among alliance partners and the innovative outcome that the alliance yields. This leads us to preliminarily generalize the following:

G1: There exists an inverted-U relationship between knowledge similarity between alliance partners and the number of new therapies that the alliance yields.

Scholars have also studied the differential effect of alliances on radical versus incremental innovation (Wuyts, Dutta, and Stremersch 2004). For radical innovation, it is instrumental that alliance partners repeatedly cooperate to stimulate knowledge transfer through the development of relationship-specific heuristics

and the sharing of mental models, among others (Madhaven and Grover 1998; Uzzi 1997). Genentech and Roche provide a successful example of such repeated collaboration. For incremental innovation, large portfolios may be beneficial because of scale effects in development (Ahuja 2000; Wuyts, Dutta, and Stremersch 2004). We can preliminarily generalize the following:

G2: As the level of repeated partnering in a firm's innovation alliances portfolio increases, its radical innovation output increases.

G3: As the number of alliance partners in a firm's innovation alliances portfolio increases, its incremental innovation output increases.

Future research on interfirm cooperation will likely continue to use the life sciences as a testing ground for theory development, with continued use of databases such as Pharmaprojects and Recap, study of newspapers and magazines, and surveys. Novel breakthroughs are likely in the area of social networks and the balance between internal and external innovation.

Therapy Positioning. Therapy positioning refers to research and development decisions on the envisioned therapy toward specific indications. The practitioners we surveyed consider therapy positioning an ancillary decision area, while academics did not see a strong need for future research. Therefore, we will not derive theoretical generalizations or propositions. Decision makers need to balance three key dimensions: (1) the likelihood of the therapy being approved for the respective indication, (2) the price firms will obtain from the therapy, and (3) the market size for the respective indication over time.

If positioned for a mild indication, a therapy may reach a large market, but at relatively low prices and with possible denial of approval. Consider Elidel (pimecrolimus), a therapy for eczema by Novartis. Novartis introduced Elidel for a mild-to-moderate indication of eczema, hence for first-line use. Competitor Fujisawa introduced a variant of this molecule, Prograf (tacrolimus), targeted at moderate-to-severe indications of eczema, hence for second-line use. While both firms could show scientific evidence, only tacrolimus got endorsed by the U.K. government, while Novartis could not show that pimecrolimus represented good value for money (Gregson et al. 2005) for the moderate indication. Later, the company did get endorsement for the moderate to severe indication after resubmitting. If positioned for a severe indication, a therapy may have a higher likelihood of being approved at a high price, but it may concern a relatively small market. For instance, Symbicort by AstraZeneca was first approved for severe asthma, after which AstraZeneca enlarged the market for Symbicort to COPD (chronic obstructive pulmonary disease).

As there are many possible indications, all with different levels of uncertainty for the respective therapy to be approved and with varying price expectations, future research may aim to specify decision-support models using Markov chains simulating market size using patient flow dynamics (first use, reuse, switching from competition) at various price expectations and approval likelihoods.

Therapy review

Market Entry Timing Globally. Research outside the life sciences industry has shown that pioneers do not have long-lasting market advantages (Golder and Tellis 1993; Shankar, Carpenter, and Krishnamurti 1999). In the life sciences industry, an important moderator on the market return on pioneering may be whether it concerns generic or branded therapies. In the case of branded therapies, pioneers are the first entrants in a therapy category, e.g., Mevacor (1987) for statins. In the case of generic therapies, pioneers are the first generic available for a specific therapy, e.g., the first generic simvastatin, the statin introduced by Merck as Zocor.

There are many cases of late-branded entrants that take over pioneers through increased effectiveness, higher convenience, or weaker side effects. Examples include Zocor and Lipitor in statins (increased effectiveness), Symbicort in asthma- and COPD (higher convenience), and Xyzal in antihistamines (weaker side effects).

Quite contrary to common wisdom in other industries and contrary to branded variants in life sciences, generics may yield strong pioneering advantages. The first generic variant for a specific therapy ("the pioneer") may attract and maintain a disproportionately large market share. Reasons are multifold. First, it takes substantial effort from physicians and pharmacists to explain bioequivalence between different variants (Gupta, Yu, and Guha 2006). At the same time, only the pioneering generic benefits from the large price differential with the alternative (the branded variant). Generics that subsequently enter do not show that large a price differential, and when they do, the generic pioneer may readily match the lower price, with market shares remaining stable (Hollis 2002). The first generic entrant typically also made supranormal profits before the entry of a second generic, because the first provided the only (cheap) alternative for a very expensive branded variant (Gupta, Yu, and Guha 2006). The arguments above lead us to the following proposition:

P3: Pioneering yields market share advantages for generic therapies.

The life sciences industry lends itself well to the examination of order-of-entry effects, as entry is very much documented, e.g., with the FDA (drugs@fda) for the U.S. These entry dates can be complemented with dollar sales estimates of IMS Health. Moderators that one may consider in such research efforts are clinical profile of the treatment (e.g., profiles maintained by the UK National Institute for Health and Clinical Excellence NICE or published meta-analyses in scientific journals) and marketing support (commonly available from firms such as IMS Health, Kluwer, or Verispan).

Firms typically do not launch a new treatment simultaneously across the globe. Rather, they use specific launch sequences, often driven by countries' regulatory systems, economic wealth, and size (Danzon, Wang, and Wang 2005; Kyle 2007; Verniers, Stremersch, and Croux 2008). Differential launch timing across countries has been shown not to affect unit sales (see Stremersch and Lemmens 2008), while it shows an inverted-U relationship with launch price (Verniers, Stremersch, and Croux 2008). In the life sciences industry, launch price is rarely a market price; rather it is often an agreed-upon price between supplier and government or an insurance firm that acts as a (co-)payer. In such negotiations, entry timing may be used both by the payer and by the firm as an instrument to affect the agreed-upon price.

An important contingency factor that has not received any attention is the role of cross-country influence in launch sequencing. Often, this cross-country influence is institutionalized, as payers will use the price of a therapy in a defined set of other countries (the "referent" countries), if available, as a reference price for the negotiations in their own country (the "referencing" country). Such regulation incentivizes companies to avoid spillover effects (Hunter 2005). We propose the following:

P4: Firms that launch a new therapy in a referencing country early relative to the set of referent countries will obtain a higher price than firms that launch a new therapy in a referencing country late relative to the set of referent countries.

To test this proposition, one can gather regulatory data from Urch Publishing and the OECD, both of which track international regulatory health systems (including identification of the set of referent countries for each referencing country), and integrate it with IMS Health data on international prices and

introduction dates. One can think of also including firm effects (firms may have differential policies dependent upon their home market or size) or therapy effects (payers across countries may have differential price- and market-access policies for different therapy classes). In addition, international diffusion studies can deliver valuable and complementary insights into international launch decisions.

Key Opinion Leader Selection. Life science firms often stimulate reviews of their therapy by select key opinion leaders, as they may serve as product champions to their peers. The effect of such opinion leaders on other physicians' prescriptions can be large when considerable uncertainty exists (e.g., after a change in the regulation of or the introduction of a therapy) or when physicians experience normative pressures, e.g., when there is strong formulary adherence (Coleman, Katz, and Menzel 1966; Iyengar, Valente, and Van den Bulte 2008). Nair, Manchanda, and Bhatia (2006) show, for instance, that the effect of opinion leader prescriptions is 100 times larger than the detailing effect on regular physicians, after the market underwent a change in NIH (National Institutes of Health) guidelines.

However, we cannot take the positive role of opinion leaders for granted (see, e.g., Van den Bulte and Lilien 2001), and future research should inventory the contingencies that affect the role of opinion leaders. In such research, it is worthwhile to consider two types of key opinion leaders with potentially differential effectiveness: clinical and market leaders. Clinical leaders are experts within the respective disease and therapy class with a strong reputation, as evidenced by their publication records in top-ranked medical journals. They are typically involved in premarket product testing and have cooperated with the firm to reduce clinical uncertainty of the therapy. In contrast, market leaders are tightly connected to the local patient and physician communities. They are typically general practitioners (GPs) with large practices, who gain recognition by the satisfaction and loyalty of their patients. They deliver key experiential messages on the therapy to their peers.

For instance, consider as a contingency factor whether uncertainty manifests itself on effectiveness or side effects of a life science therapy. Uncertainty on effectiveness can be reduced through quantitative assessments, without much detail on specific physician practices (based on large scale studies). On the other hand, side effects information is more qualitative and very much dependent upon the specific composition of a practice (based on case studies). As clinical leaders support quantitative assessments of effectiveness, while market leaders share case detail on side effects from practices similar to those of other physicians, we can propose the following:

P5a: The higher the uncertainty on therapy effectiveness, the higher the impact of clinical leaders, as compared with market leaders, on other physicians' prescription behavior.

P5b: The higher the uncertainty on therapy side effects, the higher the impact of market leaders, as compared with clinical leaders, on other physicians' prescription behavior.

Another contingency factor one may consider is the physician's institutional setting. As compared with general practitioners, hospitals have formal ethical guidelines (Gallego, Taylor, and Brien 2007) for what an individual practitioner may adhere to, which increases the return on legitimacy. Clinical leaders enhance legitimacy to a greater degree than do market leaders, which fits with clinical leaders' high impact on formulary decisions. At the same time, market leaders achieve their influence through similarity of practice. The practice of a market leader generally is more similar to a general practitioner practice rather than a hospital-based practice. For these reasons, we propose the following:

P6a: Clinical leaders have a higher impact on hospital-based physicians' prescription behavior than do market leaders.

P6b: Market leaders have a higher impact on general practitioners' prescription behavior than do clinical leaders.

Researching the propositions above can include surveying all physicians in a certain area to inventory their opinion leaders, as well as utilizing Likert-type scales on each of the identified leaders as to the extent to which they are clinical and/or market leaders.

Therapy promotion

Salesforce Management. A first decision area in therapy promotion is salesforce management. Visits by the sales force of life science firms to physicians are referred to as "detailing." Much academic research has emerged on the effectiveness (ROI) of detailing (Azoulay 2002; Berndt et al. 1995; Leeflang, Wieringa, and Wittink 2004; Manchanda and Chintagunta 2004; Manchanda, Dong, and Chintagunta 2004; Manchanda and Honka 2005; Manchanda, Rossi, and Chintagunta 2004; Mantrala, Sinha, and Zolters 1994; Mizik and Jacobson 2004; Narayanan, Desiraju, and Chintagunta 2004; Narayanan, Manchanda, and Chintagunta 2005; Parsons and Vanden Abeele 1981; Venkataraman and Stremersch 2007). A generalization of this literature is:

G4: The mean effect of detailing on brand prescriptions is (a) positive but (b) small.

"Mean" in G4 refers to the mean across brands and physicians, as prior literature did show high physician- and drug-level heterogeneity, including some brands and physicians showing a negative return on detailing (Leeflang, Wieringa, and Wittink 2004), and investigated specific contingency factors, such as drug characteristics—side effects and effectiveness (Venkataraman and Stremersch 2007)—and physician traits (see, e.g., Gönül et al. 2001). There is room for further study, in the following ways. A first opportunity is to increase through meta-analysis the reliability of the preliminary generalization stated above. Kremer et al. (2008) offer a first attempt at such a generalization, but they provide only a limited number of significant moderators and omit drugs' clinical profiles.

A second opportunity lies in the development of models that allow policy experiments. While we have a reliable read of the mean effect of detailing, all models are estimated on data showing relatively little policy variance, which inhibits any extrapolation to policy shifts in detailing, by either the manufacturer (many firms are presently considering drastically reducing their detailing efforts) or the regulator (several European countries are considering curtailing detailing).

The third opportunity lies in developing physician-targeting models, based on volume, physician responsiveness to detailing, and competitive detailing patterns (for working papers in this tradition, see Dong, Manchanda, and Chintagunta 2008; Kappe, Stremersch, and Venkataraman 2008).

By far the most room for novel research seems to be in the content of detailing visits. Past and, for most companies, present detailing calls only present favorable information using positively biased information sets; e.g., only studies favorable to the brand are presented, or side effects are omitted. This sales model seems increasingly dysfunctional, with hospitals and physicians reacting adversely to detailing, even rejecting it altogether—symptomatic of the conflicting logics between life science firms and the rest of the health-care value chain (Singh, Jayanti, and Gannon 2008).

We propose that life science firms can gain substantial returns from communicating unfavorable information in their detailing calls, for

two main reasons (Leffler 1981). First, physicians, in view of their ethical, gate-keeping function for patients, prefer more complete information, even if unfavorable, over ambiguity. Second, communicating unfavorable information may enhance the legitimacy of the sales rep and the firm (Singh, Jayanti, and Gannon 2008). This enhanced legitimacy, in turn, may deliver sustained physician access and increased trust in the firm's messages. Both will strengthen long-term ROI on detailing. Therefore, we propose the following:

P7a: Communication of complete (including both favorable and unfavorable) therapy information in sales calls may affect the firm's long-term ROI on detailing more positively than communicating just favorable therapy information.

P7b: The effect postulated in P7a is larger in the case of therapies for life-threatening illnesses than in the case of non–life-threatening illnesses.

P7c: The relationship postulated in P7a is larger in hospital environments than in outpatient environments.

In P7b and P7c, we conjecture that the effect of disclosure of complete information may be contingent on whether the disease is life-threatening and on what the physician's institutional setting is. Agents confronted with a decision of high importance attach a higher value to information (Celsi and Olson 1988). Therefore, physicians' preference for more complete information, even if unfavorable, over ambiguity will be higher in the case of life-threatening diseases than in the case of diseases that are not life threatening. For instance, there will be more value in reducing ambiguity about the side effects of chemotherapy, even if they concern an increased probability for pneumonia, than when detailing concerns information on the increased probability for insomnia caused by antihistamines. As argued above, practitioners in hospitals may have a higher return on legitimacy than do general practitioners in the outpatient environment. Revealing unfavorable information together with favorable information enhances a sales rep's legitimacy.

One may conceive of several tests of P7a–P7c. IMS Health's U.S. panel data include data on which attributes of a drug were discussed in a sales call. Adding information on how drugs in a category compare on each of these attributes may reveal whether favorable rather than unfavorable attributes were discussed. Several individual firms have records on which studies were covered in sales calls, which can reveal whether unfavorable studies were covered. Long-term detailing ROI can be regressed on both types of data to test the propositions above. One can also conceive of longitudinal experiments to test the propositions above, experiments in which physicians or medical school students are detailed within a simulation.

Communication Management. While communication efforts of life science firms may target both consumers and physicians, the budgets dedicated to the former group are more than 10 times larger than the budgets dedicated to the latter (Kremer et al. 2008), and based on the interviews we held with practitioners, direct-to-consumer-advertising (DTCA) is also the most challenging. The academic literature on DTCA (Berndt et al. 1995; Bowman, Heilman, and Seetharaman 2004; Iizuka and Jin 2005; Narayanan, Desiraju, and Chintagunta 2004; Wosinka 2005) studies mostly the overall effectiveness of DTCA and yields the following early generalization:

G5: DTCA has a positive effect on (a) the number of patients seeing a physician for the respective disease for which a therapy is advertised, and (b) total category-level demand in the category of the therapy that is advertised.

Future research on other potential outcomes of DTCA, such as its effect on brand choice, would be fruitful, as it is fraught with debate.

Iizuka and Jin (2005) and Wosinska (2005) find that DTCA does not affect drug-brand choice, while Berndt et al. (1995) and Narayanan, Desiraju, and Chintagunta (2004) find a positive effect of DTCA on drug-brand choice. Such future research could involve meta-analysis or the analysis of contingency frameworks.

An example of a contingency factor is the degree to which DTCA messages include favorable and unfavorable information. While unfavorable information—e.g., on serious side effects of therapy—may arouse consumers (Moorman 1990), it may at the same time yield negative emotions that hinder information processing (Agrawal, Menon, and Aaker 2007; Keller 1999). Therefore, we propose the following:

P8: The effect of a direct-to-consumer ad on brand-level demand is higher the more the ad depicts favorable rather than unfavorable therapy information.

At the same time, no study develops a process view on the effects of DTCA on the demand for a specific therapy. The process involves DTCA triggering a patients' request for a therapy at the physician's office, which the physician can accommodate or not. The role of patient requests and what factors affect the degree to which the physician accommodates them are not addressed by the academic literature at this point (for an exception, see Venkataraman and Stremersch 2007). Developing such a process view may yield relevant insights for managers, e.g., on audience targeting. Just as an example, consider audience gender. Prior research has shown that women are more concerned about their health than men are (Verbrugge 1985), and interact more assertively in health care settings than men do (Kaplan et al. 1995), and that physicians are more empathic to female than to male patients (Hooper et al. 1982). Consequently, one may expect that DTCA may more easily trigger requests among females and that female requests are more easily accommodated by physicians than are male requests. We propose the following:

P9: The effect of a direct-to-consumer ad on brand-level demand is higher among female viewers than among male viewers.

Many other boundary conditions can be formulated, on aspects such as the type of disease and patient–physician relationship, both of which may inform ad content and target the audience decisions of firms. Data availability on DTCA is high. Secondary data sources include ACNielsen and TNS Media Intelligence. Both data types can be connected with aggregate-level sales data, e.g., from IMS Health, or panel-level data, from IMS Health or Verispan. Also, experimental studies may have high potential, as they may reveal underlying psychological processes.

Stimulation of Patient Compliance. As our survey results show, life science firms undervalue the importance of stimulating patient compliance, both from a patient welfare and profit perspective. Our interviews with managers revealed that they consider their impact on patient compliance minimal, while they think it is mostly affected by the provider in his or her interaction with the patient. In contrast, our survey among providers and payers shows that they believe that life science firms' efforts to stimulate patient compliance may have important effects on patient welfare.

Despite the high relevance of patient compliance, academic research has not studied the role of the life science firm in patient compliance in depth. Prior research has found that provider expertise (Dellande, Gilly, and Graham 2004), the attitudinal homophily between patient and provider (Dellande, Gilly, and Graham 2004), the frequency of contact between patient and provider (Bowman, Heilman, and Seetharaman 2004), reminder messages (Becker and Rosenstock 1984; Rosenstock 1985), and the burden of therapy

(Kahn and Luce 2003 and 2006; Kahn et al. 1997) all affect patient compliance. The only research that exists on how life science firms may affect patient compliance studies warning labels. For instance, Ferguson, Discenza, and Miller (1987) have found warning labels that include information on the consequences of ill compliance to be effective.

Today, life science firms sporadically institute new types of compliance programs, of which the effectiveness remains void of academic scrutiny. We categorize such compliance programs in technology-enabled and CRM-enabled (customer relationship management-enabled) programs.

CRM-enabled programs typically used in practice are direct mail or call campaigns. Pfizer has developed a "Staying on Track" customer relationship program for its statin drug Lipitor (Arnold 2004). Such programs monitor patient disease and refill status, motivate patients to stay on therapy regimen, and provide patients with therapy risk–related information, tailored to the specific stage of therapy with a patient's specific symptoms and motivations (Hopfield, Linden, and Tevelow 2006).

Technology-enabled programs include a technological device to remind patients to take their pills. Bang & Olufsen Medicom's blister card–based "The Helping Hand" device gives a visual indication of therapy compliance through red or green LEDs as soon as a blister is inserted in the device. Another example is "SIMPill," a smart pill-bottle reminding patients through SMS that they have forgotten to take their medicine.

Interestingly, both types of programs connect to different behavioral rationales that can ultimately lead to ill compliance: a patient's belief in self-efficacy and mindfulness. A patient's belief in self-efficacy refers to one's belief of being capable of carrying through the prescribed therapy, while mindfulness refers to one's awareness of actions to be taken (Keller 2006). CRM-enabled programs promote a patient's belief in self-efficacy, and technology-enabled programs promote mindfulness. The potential of CRM programs to promote mindfulness is limited, because the reminder frequency within a CRM program is unable to match therapy frequency (one or multiple therapy occurrences a day). In contrast, technology programs cannot offer interpersonal coaching (see, e.g., Bandura 1982) of the patient to stay on therapy.

Given their differential behavioral rationale, the effectiveness of both programs is likely to depend upon factors such as disease complexity and symptom salience. First, the more complex a disease, the higher the likelihood that ill compliance is driven by disbelief in self-efficacy. CRM-enabled programs are able to effectively reduce such uncertainty, while technology-enabled programs are not. Second, the less salient the symptoms of a disease—think of the flu as a disease with salient symptoms and high cholesterol as a disease with low salience—the more compliance will be driven by one's mindfulness. When salience is low, technology-enabled programs will be more effective in stimulating compliance, as compared to CRM-enabled programs. Therefore, we propose the following:

P10a: As disease complexity increases, CRM-enabled compliance programs increase in effectiveness to simulate patient compliance, as compared with technology-enabled compliance programs.

P10b: As symptom salience decreases, technology-enabled compliance programs increase in effectiveness to stimulate patient compliance, as compared with CRM-enabled compliance programs.

Future research may consider a broader array of contingency factors than those developed in the propositions above. Such research promises to be very impactful for academia and practice

but at the same time very challenging to execute. Relatively few firms have instituted a compliance program, patient-level data are hard to obtain, and patients self-select into a program (which may cause sample selection issues). One method may be to conduct a conjoint experiment with physicians as informants on patient behavior. In such a conjoint experiment, one could manipulate program design factors and estimate their effect on patient compliance, as informed by the physician. Test–retest reliability and comparison with actual cases could further support the validity of such an approach. A more demanding alternative would require cooperation with a life science firm that is open to a field experiment, including a longitudinal survey of the compliance program participants.

Conclusion

Some industries require industry-specific knowledge development, as they have unique characteristics that yield specific challenges for marketers. With the present paper, we have aimed to advocate such knowledge development for life sciences marketing. Empirical evidence that life sciences marketing will indeed grow into a fruitful area of (specialized) research is eminent, and the body of research that is specific to the life sciences industry is growing.

In developing this article, we were often struck by how little is known about this exciting area. Defining life sciences—to our surprise, no useful definition exists in the literature—proved to be challenging, but at the same time eye-opening. Discerning clear boundaries of the domain also allows us to demarcate areas, such as nutraceuticals and cosmeceuticals, illustrating the spread of life science therapies throughout other industries, such as the food and cosmetic industries.

Using both practitioner and academic input, we qualified decision areas according to their importance to practice and academic potential. Underlying this qualification is the understanding that not all scientific breakthroughs need to be of immediate practical relevance to be worthy of academic interest. It is more important for academics in this nascent field to be able to qualify their research in terms of academic and practical impact and the route through which this impact takes place than necessarily to work on an immediately practical problem. The field of life sciences marketing needs to establish itself not only practically but also theoretically and methodologically to have a future.

To us, at least, it is clear that a fertile future for this area is likely, both from the demand side and the supply side, within a wider perspective on marketing and health (Stremersch 2008). Among the inflow of scholars into this area, often-heard motivations are (1) that this context presents unique and often challenging problems, (2) for which high-quality data are available, and (3) of an impact that transcends any problems typically investigated by marketing scholars (compare the marketing of new oncology drugs with the marketing of detergent). At the supply side, universities are likely to invest considerable research funds in life sciences marketing as a research program that transcends different schools (the business school, medical school, and school of economics), creates vast societal influence (on public policy, firms, the press, and the public at large), and does not have a pure for-profit nature (as much of the other business school research has).

At the advent of a new domain, there obviously are as many cynics, who claim that nothing is fundamentally different about life sciences marketing and that conventional insights can easily be extended to such markets without adaptation, as there are enthusiasts, who embrace these markets as being as different as the moon is from the earth. The former group often finds a dominant argument in the data-driven nature of the original

contributions to life sciences marketing. That, however, in itself is not a reason why an industry cannot be guided by different principles, which lead to unique challenges. Similarly, the argument that some challenges are also present in other industries does not preclude the development of a new marketing domain for the life sciences. In the dialectic tradition, the present paper tries to build the case for the enthusiasts. Early interest at conferences, in journals, and in MBA program offices seems to favor the enthusiasts. The least we have hopefully achieved with this paper is to define the playing field on which cynics and enthusiasts will interact, both in research and in teaching.

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Notes

1. Nektar Therapeutics offers noninvasive deep-long delivery systems. Arthrocare offers minimally invasive surgical procedures involving tissue removal and treatment.

2. Our sample of academic literature included (1) marketing journals, such as *Journal of Marketing*, among others, (2) journals on the boundaries of the marketing discipline, such as *Management Science*, among others, (3) specialized journals in life sciences and health economics, such as the *Journal of Health Economics*, among others, (4) recent proceedings of conferences, such as the INFORMS Marketing Science Conference (2000–2008) and the Association for Consumer Research Conference (2000–2008), (5) unpublished working papers from our files. In our study of the industry literature, we included *Journal of Medical Marketing*, *Life Sciences*, *Medical Device Technology*, *Medical Marketing and Media*, *Pharmaceutical Executive*, and *Pharma Marketing News*, among others.

3. The responses of payers were very similar to the responses of providers. The correlation between the average ratings across both groups of respondents was .90, yielding a similar ranking on importance of decision areas.

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