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Science Marketing: A Study on Marketing Practice in Small Biotechnology Companies

This study explores the marketing practices of small biotechnology companies. It contributes to the small business marketing literature by examining how marketing practice emerges and evolves in biotechnology start-ups. This study introduces a new type of marketing practice called science marketing, which has not yet been identified in previous studies.
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ABSTRACT

This study explores the marketing practices of small biotechnology companies. The recent critical literature has questioned the direct applicability of traditional marketing concepts (e.g., sales, advertising, PR, pricing, etc.) to specific types of businesses, such as science-based and high-tech start-ups, and within the small business context more generally. This study contributes to the small business marketing literature by examining how marketing practice emerges and evolves in biotechnology start-ups. The primary data were collected during two years of ethnographic fieldwork examining a team of natural scientists who had established a university spin-off company. In addition, the dataset includes documents and interviews. This study introduces a new type of marketing practice called science marketing, which has not yet been identified in previous studies. The analysis reveals, first, how the practice of science marketing emerges in a biotechnology start-up and how science marketing differs from traditional marketing. Second, the analysis illustrates how an embodied and routinised means of promoting scientific work is transferred from a research group to the start-up to be infused and combined with more traditional marketing activities. As part of science marketing, the scientists conducted academic activities, such as publishing journal articles, making conference presentations and compiling publication lists, which are tasks that the previous literature has regarded as stubborn preoccupations of science but which have become an understandable and valuable asset in marketing small science-based ventures such as biotechnology start-ups.

Keywords: marketing, practice, science marketing, biotechnology
ABSTRAKTI


Asiasanat: markkinointi, käytäntö, tiedemarkkinointi, bioteknologia
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PART I

1 Introduction

It was 2 a.m. on a dark, cold and windy night. I was sitting in my car in the parking lot of a university waiting for my sister, who was inside the building at the chemistry lab checking her laboratory reactions. I was curious to see her lab, but the rule was that NO OUTSIDERS were EVER allowed inside the premises. So I waited outside and let my mind wander. I was then an entrepreneur and had been running my marketing-based business for several years. Sitting there in the darkness, I could not help but think how much scientists seemed to have in common with entrepreneurs. To me, it seemed to be in the entrepreneurial spirit to wake up in the middle of the night and rush in to check your test tubes and Erlenmeyer flasks.

So I sat there and watched the dark, unapproachable building. Its thick, massive door separated me from my sister: She was inside doing magical things, and I was outside, sitting in the dark. I felt a strong urge to know what was inside. I was not particularly interested in the science per se but in the people who worked inside. If they were to have looked outside from the tiny windows in my direction, what would they have seen? What would they consider to be in the entrepreneurial spirit? How would they see business? What would they think about marketing? Somehow, I felt that if I could only learn to see “with their eyes”, I would have a completely new perspective on myself, on marketing and on business in general. This insight was one of the impulses that motivated my journey to study biotechnology marketing.

1.1 THE CONTEXT AND OBJECTIVES

Few industries face such immense expectations as biotechnology does. Although biotechnology as a discipline dates back to the first production of beer, bread and wine using living organisms (Hine & Kapeleris 2006), biotechnology as a business is a much more recent phenomenon. The group of companies that began using biotechnology are regarded as the first industry to emerge as a consequence of a series of scientific discoveries: the 1953 discovery of the double helix, the 1957 discovery of the interferon, the development of recombinant DNA in 1973 and the production of monoclonal antibodies in 1975 (Prevezer 1997, Pisano 2006). The first science-based biotechnology company was founded as an alliance between
venture capitalist Robert A. Swanson and biochemist Dr. Herbert W. Boyer in 1976 to exploit recombinant DNA technology (Pisano 2006); this alliance combined two traditionally separate fields of expertise, basic science and business, into a new venture (Pisano 2006, Powell & Owen-Smith 1998). Before these first biotechnology companies, science and business had largely operated in separate spheres (Pisano 2006, Lehrer & Asakawa 2004), and the biotechnology industry is generally regarded as the first instance of an entire industry based on discoveries in basic science (Pisano 2006). At present, the biotechnology industry consists of companies of various sizes that produce or employ biotechnological applications as part of their business. These companies operate in fields as diverse as pharmaceuticals, agriculture and chemicals (Hall & Bagchi-Sen 2007).

In this study, I focus on small business marketing and, more specifically, on biotechnology marketing; thus, the context of this study is a small biotechnology company. As a combination of science and business, the biotechnology business is a particularly interesting research context because it has several features that distinguish it fundamentally from other businesses. These characteristics affect marketing decisions and the activities performed by marketing practitioners. In certain specific contexts, such as biotechnology businesses, approaches that assume that marketing concepts apply across industries and that marketing definitions can be generalised have major shortcomings with respect to guiding researchers and practitioners (Stemersch & Van Dyck 2009). In addition, there is evidence that companies have failed in certain unique industries because they followed general marketing principles in contexts that were not traditional (Christensen 1997). In this study, I argue that understanding the nature of marketing requires a focus on the everyday activities of practitioners and how marketing is conducted in practice (Brown 1999, Stemersch & Van Dyck 2009). Using practice as a lens to study marketing makes it possible to obtain a better understanding of the activities and different elements that comprise a marketing practice. Therefore, my research question in this study is the following.

How the biotechnology marketing practice is constituted in small biotechnology companies?

Biotechnology companies operate at the challenging intersection of science and business, which are traditionally entirely separate areas (Pisano 2006). The embedded nature of knowledge and the diversity of the social worlds of science and business raise significant challenges with respect to ensuring that partners from these different cultures understand one another (Polanyi 1967, Szulanski 1995, 1996). Individuals from different backgrounds employ different meanings in their functional settings and cannot easily share ideas; thus, they may ignore one another’s central ideas or reject them outright (Dougherty 1992). The literature has identified a significant role for individuals who are able to bridge scientific knowledge and innovation (Gittelman & Kogut 2003) and can act as knowledge brokers or boundary spanners (Levina & Vaast 2005). Operating a biotechnology business
requires creating a “mutual understanding” in which individuals can overcome these semantic differences by making tacit knowledge explicit across boundaries (Nonaka 1994). Thus, the following is my first sub-question:

1. How are science and business connected in small biotechnology companies?

Marketing practice draws on the social, historical, structural and institutional setting in which the company under examination is embedded. Practices are situated in a context that is partly given but simultaneously (re)produced through the practices employed (Orlikowski 2010). Thus, the context has a dual nature: the practice sustains and shapes the organisational reality in which it is situated. Thus, to understand a marketing practice, the context (Corradi et al. 2010, Nicolini 2013) in which such practice is conducted must also be understood. As a result of its historical roots in academic research and scientific discoveries, the biotechnology industry is characterised by several features that distinguish it from other industries and features a structure that is fundamentally different than that found in more traditional industries. Thus, my second sub-question is the following:

2. What is the context for small business marketing in biotechnology?

The gap between marketing theory and practice has been a recurring theme in numerous contemporary debates (Ardley 2008, McKenzie et al. 2002, Brennan & Ankers 2004, Reed et al. 2004, Skålen & Hackley 2011). Among other topics, critics of marketing theory have questioned the relevance of general marketing theory for small businesses (Reijonen 2010, Coviello et al. 2000) and in entrepreneurial contexts (Hills et al. 2008, Martin 2009). Given the increasing interest in the biotechnology business, it is surprising how little research has focused on how marketing is actually undertaken in these organisations. Prior research has argued that marketing-related deficiencies might explain the lack of commercial success in biotechnology (Costa et al. 2004, Hermans et al. 2004). Alternatively, it has been suggested that biotechnology marketing might differ from what is considered marketing in other industries (Renko 2006), which results in the question of whether there are deficiencies in biotechnology marketing or whether the definition of biotechnology marketing remains unexplored by the survey-based research designs that have been employed in prior studies. Thus, my third sub-question is as follows:

3. How do small biotechnology companies engage in marketing?

The combination of biotechnology’s origins in basic science and the multidisciplinary nature of biotechnology innovations results in a set of unique features that characterise biotechnology companies (Owen-Smith & Powell 2004, Etzkowitz & Leyesdorff 2000, Tahvanainen 2004). Biotechnology companies are typically established by university scientists who work for these companies on a part-time ba-
sis while maintaining their university researcher positions and academic careers (Zomer et al. 2010, Prevezer 2008, Hermans et al. 2004). Thus, biotechnology’s origins in basic science have combined with the multidisciplinary nature of biotechnology innovations (Owen-Smith & Powell 2004, Pisano 2006) that generates the unique context from which biotechnology marketing emerges. This unique context calls for a new approach in research, one that accounts for the specific nature of the biotechnology business. In this study, therefore, I adopt a practice-based approach that focuses on what actually occurs in organisations rather than addressing the theories and representations of various researchers; thus, this study has the potential to broaden the concept of marketing and to provide relevant and valuable insights for both marketing practice and academic research (Ardley 2008, McCole 2004, Srinivasan 2008, Stemersch & Van Dyck 2009). Thus, my fourth sub-question is the following:

4. How does science marketing emerge?

1.2 RESEARCH APPROACH

In this study, I employed a combination of practice-based approaches, which allowed me to provide a richer description (Nicolini 2013) that is capable of rendering a more detailed, accessible and understandable picture (Geertz 1973) of biotechnology marketing practice. In all my articles, I attempt to understand the reality of biotechnology marketing, although the articles draw from different theoretical backgrounds that I will explain below. The first two articles focus on the context in which small biotechnology companies perform their marketing practice. In the last two articles, written with Päivi Eriksson, we first focus on the activities of biotechnology marketing, and then, in the final article, we conceptualise biotechnology marketing practice.

Biotechnology companies operate at the challenging intersection of science and business, which are traditionally entirely separate areas (Pisano 2006). This nexus of scientists and marketers is intriguing because the differences between these two social and cultural worlds—basic science and business—have created significant challenges for business partners in terms of mutual understanding (Polanyi 1967, Szulanski 1995, 1996), and this culture clash thus occasionally results in failed ventures (Samson & Gurdon 1993). The extent to which practitioners from these two communities are able to collaborate effectively depends on how they are able to resolve the indexicality, i.e., how they are able to (re)negotiate shared meanings and understandings (Gherardi 2008). These constant negotiations occur in practice and through practice (Gherardi 2009, Gherardi 2008); in this process, the parties negotiate a shared way of understanding the world and the desirable outcome of a given practice (Reckwitz 2002). Thus, practices are indexical because they are not completely comprehensible outside the context in which they are created and used (Gherardi 2009, Gherardi 2008). In the article, The Bridge – connecting science
and business, I examine activities that connect science and business (Smircich 1983) and how those two communities are able to collaborate and (re)negotiate shared understandings. In conducting this examination, I adopt George Simmel’s theory of culture (Frisby 2002, Frisby and Featherstone 1997, Simmel 2004), and, more specifically, I adopt his concept of the bridge as a theoretical concept. In the article, my focus is on everyday work and all the various activities it entails. I also focus on the creation of a boundary object, the business plan, which helps ideas and understandings to traverse boundaries (Gherardi 2012, Carlile 2002).

To fully comprehend biotechnology marketing practice, it is also necessary to understand the specific setting in which these companies operate. The article Anticipating and Managing Challenges in Biotechnology Marketing focuses on the industry-level setting in which biotechnology marketers operate. As discussed above, scientific rationalism generates simplistic theories that may not be valid in any particular context. The practice-based approach holds that markets are constructed and shaped by multiple practices implemented by different actors, including companies and customers, rather than being generalised, pre-defined structures (Slater 2002, Araujo et al. 2008, Kjellberg & Helgesson 2006). In this article, I employ one of the central frameworks for marketing in technology-intensive industries and examine how the distinct features of biotechnology affect that framework’s applicability in the biotechnology industry. In contrast with the general approach to marketing, I focus on the issues that both make biotechnology markets special and make general marketing concepts inapplicable to them. Therefore, this article addresses the question of the specific features of the setting in which biotechnology companies operate.

In the article “Biotechnology marketing: Insider and outsider views”, written with Päivi Eriksson, we focus on the activities of biotechnology practitioners in small companies. We investigate biotechnology marketing as it is defined, performed and organised in biotechnology companies. The research is based on a novel methodological concept that combines insider and outsider perspectives. The outsider view focuses on the generalised formulations of researchers, whereas the insider view refers to the understandings of the practitioners themselves (Laukkanen & Eriksson 2013). In the article, we begin from an emic (insider) perspective to examine practitioners’ efforts from their own point of view. Then, we combine the insider perspective with the outsider (researchers’) perspective of marketing activities in biotechnology companies. Combining these two perspectives results in a deeper understanding of biotechnology marketing practice.

The first three articles are based on the belief that the abstract and general a priori truths of marketing (Tapp & Hughes 2008) cannot explain the activities, interpretations and understandings of the practitioners involved in practice (Laukkanen & Eriksson 2013, Gherardi 2008). However, according to Nicolini (2013, 14), “the attention on activity and the doing are only a departure point, a sort of ticket that grants entry to a novel world”. In the last article, “Science marketing practice of a biotechnology start-up”, written with Päivi Eriksson, we apply the practice theoretical framework to analyse how small biotechnology companies
engage in the practice of marketing. We understand practice as shared and routinised bodily behaviours that involve a shared conception of how things are done (Gherardi 2012, Nicolini 2013, Reckwitz 2002). Practices consist of several interconnected elements, including how the activities in question are performed and how certain objects are addressed (e.g., knowing how to do something or how to understand the world) (Reckwitz 2002, Nicolini 2013). Practices are shared and routinised behaviours that involve a shared conception of how things are done (Reckwitz 2002, Whittington 2006).

1.3 MY POSITION

Although my aim from the outset of this study has been to closely examine biotechnology marketing with an appreciation for practitioners’ views of their work, I began this study as a researcher examining the phenomenon from afar—and as an outsider—because the biotechnology industry was not easily accessible. Before I was able to engage with practitioners at the level of everyday work, I had to learn the vocabulary and understand the business and context in which companies operate to be able to communicate with practitioners. Accordingly, my first two articles that focus on the biotechnology business and the setting in which companies are embedded illustrate the ends of the continuum: as a complete outsider and then as a member of the group under study.

The third article, written with Päivi Eriksson, is based on the notion that combining the practitioners’ vantage point (the emic perspective) with that of outsiders or researchers (the etic perspective) is a fruitful starting point for a study (Agar 2007, Douglas & Craig 2006). The combination of outsider and insider views not only accounts for meanings in the socio-cultural context of the biotechnology business but also considers the practitioners’ view in relation to broader theoretical knowledge. In the third article, we were outsider researchers in an effort to understand the phenomenon from the practitioners’ perspective. In the last article, my position shifted, as I was part of the group under study. In the last article, we do not merely attempt to grasp the insiders’ view of biotechnology marketing. Instead, our aim is to advance the research using a narrative analysis in an attempt to present the phenomenon in a way that allows the reader to have a sense of how everyday marketing functions in small biotechnology companies and how marketing practice thus begins to emerge.

1.4 KEY CONTRIBUTION

This study contributes to the small business and biotechnology marketing literature by providing insights on marketing practitioners’ work in the context of the biotechnology business. Describing marketing from a practice perspective provides a rich and comprehensible picture of how marketing is performed in small
biotechnology companies. The study highlights how the historical, cultural and technological aspects of the industry affect the small companies that operate in the industry and how these companies engage in marketing.

This study also demonstrates that the “marketing-as-practice” (Skålen & Hackley 2011) approach is a useful framework in which to study marketing in biotechnology companies. The practice-theoretical framework enables an alternative view of biotechnology marketing to be formulated that is more multi-dimensional than the traditional, generalised conception of such marketing.

This study reveals how the insights generated from this line of inquiry have the potential to extend the concept of marketing and provide relevant and valuable insights for both marketing theory and practice (Srinivasan 2008, Stemersch & Van Dyck 2009, Eriksson & Rajamäki 2010). This study broadens the concept of marketing by introducing science marketing as a new type of marketing. Specifically, this study’s results illustrate how the routines of scientific work are transferred to a science-based start-up company and eventually combine with more traditional marketing practice to create science marketing, which is fundamentally different than the marketing that is described in the literature. Science marketing occurs in the dual context of science and science business and is a practice in which scientific work and traditional marketing interact in a specific manner.

The theoretical contribution of this study is that it demonstrates that scientific work and the competences developed in academia are essential elements in science marketing; this theoretical contribution also demonstrates how such scientific work and academic competences can be integrated into everyday marketing work in biotechnology companies. The practical contribution for entrepreneurs and managers of small biotechnology companies is to show that combining academic expertise and the routines developed in academia with more traditional marketing methods and techniques is a valid and fruitful way of engaging in marketing practice.

1.5 THE STRUCTURE OF THE INTRODUCTORY ESSAY

The remainder of this introductory essay is organised as follows. First, I will assess the previous literature on biotechnology marketing. Then, I will discuss the characteristics of the biotechnology industry and the companies that operate in it. Next, I will discuss the previous literature on biotechnology marketing.

In the third chapter, I discuss practice theory and the theoretical and philosophical underpinnings of each article in my dissertation. In the fourth chapter, I describe the process employed to collect the empirical data and provide a detailed description of how I used and analysed the data in each article. In chapter six, I present a brief summary of the three articles and one unpublished manuscript comprising my dissertation. Finally, I provide a brief discussion and the conclusions of my dissertation and present avenues for further study.
2 Biotechnology business and marketing

I soon realised that it was challenging to have a meaningful conversation with the biotechnology practitioners. It was not that they were unwilling to cooperate, but we did not know how to talk to one another. At first, I tried to conduct telephone interviews:

Me: How is your company doing marketing?
The respondent: I do not understand the question.

That was essentially the content of my first interview. I was so taken aback by the fact that he did not understand the word “marketing” that I was left speechless and could not formulate a single clarifying question. However, this “failed” interview only increased my curiosity: Why did he not recognise the word? Could it be that they really do not engage in any marketing? Do they not know how to do it? Or are they doing it but simply with another word in place of “marketing”? Above all, I wanted to kick myself for being so short-sighted to think that a concept that is so common in marketing textbooks would be self-evident to people operating in an entirely different social context.

2.1 BIOTECHNOLOGY AS A SCIENCE-BASED BUSINESS

The biotechnology industry is made up of both large and small companies that apply biotechnology techniques to produce goods and services, in addition to other companies that employ such technologies, applications and products in their own business. This study focuses on small biotechnology companies.

By the 20th century, the formerly separate worlds of science and business had begun to converge (Pisano 2010). In 1980, the United States passed the Bayh-Dole Act, which has been regarded as the catalyst for the growth of the biotechnology industry because it allowed universities to retain the rights to the research conducted in their labs and provided such academic facilities with the incentive to commercialise research knowledge. Since then, it has been possible for academics to establish companies while retaining their academic positions, and interaction and information flows between academic research and business development have grown (Prevezer 1997). During the 1990s, Europe grew to accept spinning off new ventures from academic labs as a valid method of technology transfer (Degroof & Roberts 2004). University spin-offs and licensing are the most common means of commercialising the results from research conducted in university
laboratories (Wood 2009, Wright et al. 2009, Pirnay et al. 2003). This development resulted in new organisational forms, science-based companies that create and apply basic science for financial profit (Pisano 2010). The majority of biotechnology companies are small companies, established and led by scientist-entrepreneurs to commercialise their academic work (Tahvanainen 2004, Lehrer & Asakawa 2004, Jonsson 2007, Cetindamar & Laage-Hellman 2003, Nicolau & Birley 2003). These small biotechnology firms have played an important role in developing bio-pharmaceuticals and have served as intermediaries for information to flow between the basic research conducted at universities and commercial exploitation by large pharmaceutical firms (Rojakkers & Hagedoorn 2006).

Biotechnology includes business sectors such as the pharmaceutical, agriculture, chemical and medical device industries (Hall & Bagchi-Sen 2007). In Europe, dedicated biotechnology companies, i.e., companies that produce products or services using biotechnology techniques (OECD 2005), employ approximately 96,000 individuals; the impact of these companies spans several industrial boundaries because biotechnology companies collaborate with other industries, such as the pharmaceutical and chemical industries, that utilise biotechnological applications (Jonsson 2007).

The majoritiy of companies in the biotechnology industry are young and small (Critical I). According to the EuroBiotechMonitor Survey, 86% of European biotechnology companies have 1-5 employees (EuroBiotechMonitor 2012). The small size of new technology-intensive companies, such as biotechnology companies, increases uncertainty with respect to commercial success. In the early phases of the industry life cycle, smaller companies fail more often than larger companies (Agrawal & Audretsch 2001). Many of these young and small companies face challenges accessing financial and human resources (Delorme et al. 2005) that are necessary to run their operations efficiently. Despite these challenges, most biotechnology companies generate, and operate on, their own revenues. By the end of 2004 in Europe, there were 2163 biotechnology companies that generated €21.5 billion in revenue. By contrast, the US biotechnology sector has 1991 companies but generated €41.5 billion in revenue (Critical I).

Small science-based biotechnology companies and larger incumbents have different but complementary capabilities, which may explain why the biotechnology industry is highly networked (Madhok & Osegowitch 2000). Small biotechnology companies tend to focus on upstream capabilities: they focus on meeting the milestones specified in licensing deals and leave marketing and commercialisation issues to their downstream partners (Renko 2006). Moreover, they are much more cost efficient in, for example, the production of new medical entities than large pharmaceutical companies (Munos 2009). Small biotechnology companies collaborate with incumbent companies (Madhok & Osegowitch 2000, Niosi 2003), university technology transfer offices and government-funded commercialisation programmes (Debackere & Veugelers 2005, Siegel et al. 2004). These collaborations help these smaller companies overcome their lack of downstream capabilities (such as resources and capabilities in manufacturing, clinical testing, regulatory
approval), access marketing and distribution channels (Bagchi-Sen 2007, Madhok & Osegowitch 2000), gather knowledge from foreign markets through their partners (Yu et al. 2011, Wuyts & Dutta 2008), develop their businesses and acquire market knowledge (Renko 2006).

Another feature that distinguishes biotechnology from other industries is the profound technological uncertainty that is currently even greater than in the early days of the industry. The pioneering biotechnology companies relied on new production methods that were based on molecules, the functions and mechanisms of which were already known well (Prevezer 1997, Pisano 2006). The novelty of these innovations was that they altered the patterns of production, for example, by using recombinant DNA technology and other biotechnological manufacturing technologies (Robertson & Gatignon 1986, Fazeli 2005). Therefore, such early pioneers were not subject to risks as substantial as those that biotechnology companies face today (Fazeli 2005). In today’s market, companies pursuing new product innovations face considerably higher risks: approximately one out of 6000 newly synthesised compounds makes it to the market. Nonetheless, scientists must make decisions regarding the pipeline optimisation period before there is any certainty with respect to how a particular molecule will work (Stemersch & Van Dyck 2009, Pisano 2006).

The rapid pace of technological development and the industry’s technological origins in complex science make company networks in biotechnology differ from those in other industries (Powell et al. 1996). The first difference is that biotechnology companies tend to source new knowledge from a greater variety of sources than companies operating in other industries (Plum & Hassink 2011). Second, biotechnology companies are more likely to cooperate in R&D than other companies or government institutions, and such partners are more likely to be international than those in other industries (Holl & Rama 2012, Hopkins et al. 2007). Biotechnology companies are also more likely to engage in open innovation (Holl & Rama 2012). These characteristics demonstrate that the industry’s origins in science affect both knowledge acquisition and the nature of their networking efforts.

2.2 SMALL BIOTECHNOLOGY COMPANIES AND ENTREPRENEURS

Although the emergence and characteristics of the biotechnology industry have been well researched, prior studies have exhibited less interest in the company-level characteristics of firms operating in the industry. Thus, little is known about the factors related to academics founding start-ups, not only in biotechnology but also in general (Shane 2004, Lockett & Wright 2005). Academics are not particularly entrepreneurial in nature (Rodgers et al. 2002) and are not particularly eager to establish a rapidly growing business (Meyer 2003).

For academics, a new venture may not necessarily be established on entrepreneurial aspirations; it may simply represent another way to continue academic
research and enhance their academic careers (Fini et al. 2009, Lehrer & Asakawa 2004). In their study of Italian academics, Fini et al. (2009, 398) found that the motivation to found a company was related to the expected academic (rather than economic) outcomes, i.e., “the generation of further stimuli for research activities, the gain of prestige and reputation as leading academics, the creation of funding opportunities (grants) for students or research assistants, or the possibility to get new infrastructure and facilities for academic research activities”. Therefore, it is not surprising that when scientists become entrepreneurs, they mainly continue in the role of scientist, and commercial activities have lower priority (George et al. 2005), which creates problems when academic goals conflict with the economic goals of their parent organisations, venture capitalists and/or other stakeholders (Vohora et al. 2004, Samson & Gurdon 1993) who may demand a more market-oriented focus (Hermans et al. 2004). In addition, academics’ strong self-belief and self-centred personalities, which may be an advantage in the academic context, make it challenging for academics to work with venture capitalists or understand customer needs (Yim & Weston 2007). The problem with studies that present scientist-entrepreneurs as inferior and in some way lacking is that they are based on a predefined theoretical conception that depends on the notion that ideal entrepreneurs are similar across industries. Previous studies do not consider the specific features of the biotechnology business or the settings in which companies operate, although such features may affect the type of personalities and motivation that are appropriate for the biotechnology business.

2.3 BIOTECHNOLOGY MARKETING

Because many biotechnology companies are small and operated by scientist-entrepreneurs, they face challenges in accessing financial and human resources (Delorme et al. 2005). These challenges naturally affect several areas of operations, including marketing.

Although scientist-managers are experts in academic research, they may be less knowledgeable and experienced in business matters and lack the skills required to operate a business (Samson & Gurdon 1993, Kinsella & McBrierty 1997, Franklin et al. 2001, Hermans et al. 2004, Hermans & Luukkonen 2002). For example, studies by Hermans et al. (2004) and Hermans & Luukkonen (2002) reveal that biotechnology companies have low shares of full-time or part-time marketing personnel. These same studies also demonstrate that the typical Finnish small biotechnology company’s chief executive officer has 10 years of experience in business, and some of the company’s personnel possess marketing expertise. Moreover, a small number of companies had no marketing experience. Based on these results, these studies concluded that biotechnology companies in general lack marketing expertise. The problem with these studies is that they are based on traditional concepts of marketing and do not consider the possibility that marketing functions may not be organised separately in the biotechnology business. As Hagberg & Kjellberg
(2010) note, the general assumption that there would be a distinct marketing professional has proven questionable. Moreover, Yim & Weston (2007) use a generalised conception of the entrepreneurial personality type as a starting point in their study of the personal characteristics of scientist-entrepreneurs. Without considering industry-specific factors, these authors conclude that the biotech industry requires personality types that are highly customer-oriented, sociable and eager to understand customer needs and find ways to meet them.

In addition to research on marketing competence, the literature has focused on the alliances and social networks of biotechnology companies and their founders. To compensate for their lack of marketing resources and skills, many biotechnology companies form alliances with established companies in the industry (Bas & Niosi 2007). Small biotechnology companies use alliances to access marketing and distribution channels (Bagchi-Sen 2007) and to gather market intelligence about foreign markets through their partners (Yu et al. 2011, Wuyts & Dutta 2008). The evidence reveals that alliances are related to higher rates of growth and revenue (Baum et al. 2000) and foreign sales (Yu et al. 2011). Such alliances are frequently based on the social networks of the founders, who channel knowledge, expertise and information between the firm and their social network; thus, the founders connect the firm to a wider range of expertise (Grandi and Grimaldi 2003, 2005, Murray 2004, Shane and Stuart 2002).

Prior research further indicates that the majority of academics have contacts only within the academic community; therefore, the founding teams complement academics with associates and assistants with connections in the business world and with the customer base (Clarysse and Moray 2004, Grandi & Grimaldi 2003, Vohora et al. 2004). Apart from Clarysse and Moray (2004), these studies are either survey-based or rely on quantitative, archival statistical data. Consequently, the aim of these studies is to investigate the relationships between quantitative facts. For example, studies on alliances simply record whether alliances exist but do not indicate how they come into existence, how they evolve and the content of those alliances. In addition, those studies do not account for the science-business linkage in biotechnology and therefore may focus on business customers and fail to appreciate the importance of broad contacts in academia.

Third, recent research touches on issues related to strategy. By contrast to Hermans et al. (2004) and Hermans & Luukkonen (2002), Hall et al. (2007) consider the percentage of marketing personnel to indicate a firm’s strategic choice rather than marketing skills and find that biotechnology firms with relatively higher levels of R&D intensity employ strategies that can be summarised as an alignment with industry. Firms with relatively lower R&D intensities employ strategies that focus on competitiveness, marketing and distribution channels. These findings are compatible with studies by Chakrabarti & Wiesenfeld (1989, 1991), who conclude that biotechnology companies reduce risk by focusing on either technology or marketing. Companies that are highly R&D intensive and possess radical technological innovations follow conservative marketing strategies and vice versa. Importantly, these studies are based on counting quantifiable observa-
tions and the notion that companies consist of separate functionalities. Personnel who participate in both R&D and marketing may go unnoticed or be mistakenly classified in one function only.

Few studies in the biotechnology marketing literature focus on how companies actually engage in marketing. Costa et al. (2004) investigate the marketing processes of Portuguese biotechnology companies and explored whether these companies follow the basic procedures that theory suggests are involved in an appropriate marketing process: the definition of strategic marketing, marketing implementation and the evolution of strategy and implementation. Their study reveals that companies in which the entrepreneurs or directors had a research background experienced difficulties in marketing, in particular, which were related to a lack of both managerial and marketing capabilities, and the main problem concerned defining the scope of the business. Furthermore, this study finds deficiencies in strategic marketing and marketing implementation in areas such as market research, identification of competitors and specific customer needs and product differentiation and positioning. The study concludes that marketing-related deficiencies, in particular, might explain the lack of commercial success in the biotechnology sector and further asserts that biotechnology companies face serious difficulties in the marketing process because they lack a clear market-oriented focus and the commercial sense and skill necessary to orient the company toward the market. These authors compare their study’s findings to information from other industries and the generic concept of marketing and find that biotechnology companies do not seem to follow generic marketing procedures and concluded that their efforts were inadequate.

Renko (2006) accounts for the specific features of the biotechnology business and their bearing on biotechnology marketing. When assessing the marketing orientation of biotechnology entrepreneurs in the US, she finds that although biotechnology firms may exhibit market-oriented behaviours, these behaviours are not similar to the types of market-oriented behaviours suggested in the marketing literature. She suggests, in particular, that young and small biotechnology companies may differ from other companies that are otherwise similar because they are not ‘naturally’ exposed to market knowledge during their first years of operation. She provides two reasons for this phenomenon: first, young and small biotechnology companies may focus exclusively on science-driven R&D activities, and second, such companies do not have any products on the market during their first years of operation. For example, market intelligence in biotechnology SMEs often emerges as a ‘by-product’ of other information exchanged within a network of companies. It is not considered a high priority and is pursued less formally than traditional means of gathering market intelligence through customer surveys and meetings with trade partners and customers, among other means. However, companies assess their potential markets through various informal means by consulting opinion leaders, peers and universities (Renko et al. 2005). The findings of Renko et al. 2005 and Renko 2006 raise questions regarding whether there are deficiencies in the marketing competence of biotechnology companies or whether
biotechnology marketing remains unidentified by the research approaches, methodologies and data used in earlier studies.

In conclusion, previous research on biotechnology marketing is largely based on a traditional, general concept of marketing. In this study, I argue that the specific characteristics of different businesses create unique challenges for marketers and must be accounted for (Stemersch & Van Dyck 2009) to obtain a more comprehensive picture of biotechnology marketing. In particular, the dual context of science and business requires exploration. I further argue that the approaches that compare quantifiable observations to the a priori truths of marketing theory are not able to provide a comprehensible and accurate picture of biotechnology marketing. Instead of theory, approaches that focus on how marketing is actually conducted in these companies and appreciate the practitioners’ perspective are necessary to provide a richer understanding of this phenomenon.
While conducting this study, I attended several conferences to present my preliminary findings and unfinished ideas. An interesting incident transpired when I wanted to find a way to present my ethnographic research results—which eventually became the article “The Bridge – connecting science and business”—in a way that would make my experience easily accessible to the audience. I presented my results as a brief animated film that I made on a computer. After the final credits and music had faded, the room erupted in chaos. Many of the more reputable academics were extremely agitated. Some of the young entrepreneurs attempted to say that the film realistically described issues that they had experienced when founding a company. Nevertheless, those of us who had direct experiences with entrepreneurship were harshly silenced. “You do not know anything about entrepreneurship”, one of the professors in the audience roared at me. Such excessive reactions made me wonder why these academics were not interested in what occurs in real life. Why would they privilege theories that may have only little to do with reality?

### 3.1 MARKETING AS PRACTICE

It is worth noting that many authors publishing in marketing journals in the 1950s and 1960s were practitioners (McKenzie et al. 2002). However, recent research reveals that the majority of contemporary practitioners are unaware of academic journals, let alone read them (Reed et al. 2004, McKenzie et al. 2002). Moreover, the gap between marketing theory and practice is actually much wider: practitioners regard marketing research as inappropriate or unusable (Reed et al. 2004, Tapp & Hughes 2008); practitioners believe that the constructs that academics theorise about cannot be found in real life (Ardley 2008b, Edwards 2005, Hackley 2001), and researchers are unaware of what marketing practitioners actually do (Easton 2000). This clearly indicates that a new approach is required to refocus marketing research and make it more relevant to the organisational reality faced by practitioners (Brennan & Ankers 2004, Robson & Rowe 1997). As McCole (2004, 531) notes: “It is high time that academic community adopts an inductive approach so as to understand how marketing is carried out in practice.”

In social sciences, interest in studying working practices, the "practice turn", began to gain momentum in the 1980s in organisation studies (Corradi et al. 2010, Whittington 2006). The roots of the practice turn, however, can be traced to the previous decades in the studies of theorists such as Pierre Bourdieu, Michel de
Certeau, Michael Foucault and Antholy Giddens, who share an interest in the cultural rules and norms that guide human activity, the detailed exploration of how activities are performed and an appreciation of practitioners as “artful interpreters of practices” (Whittington 2006, 615). The practice turn is also indebted to Alfred Schutz and Harold Garfinkel and their notion of an intersubjective world, which means that although each individual has a different perception of reality, those individuals interact and share meanings that, in turn, give rise to a shared understanding of how to perform certain tasks or how to interpret the world (Gherardi 2008).

The practice turn includes a wide range of diverse streams of literature. Orlikowski (2010) classified these streams by their conception of practice as one of the following: a) phenomenon, b) perspective or c) philosophy. Corradi et al. (2010) classified the streams of research by whether the practice is treated as an “empirical object” or as a “way of seeing”. Moreover, Geiger (2009) classified the literature into two groups, one focusing on routines and the other using practice as an “epistemic-normative” perspective. Nicolini et al. (2003) distinguish four practice-based approaches: the interpretive-cultural approach, the community of practice approach, the cultural and historical activity theory approach and actor network theory. This multiplicity of practice-based approaches indicates that the practice turn consists of a remarkable variety of ways of understanding action. These typologies demonstrate how the practice turn actually consists of a remarkable variety of different research streams. Accordingly, the concept of practice varies from common-sense conceptions of practice to rigorous formulations (Corradi et al. 2010).

Studies focusing on what marketing practitioners do in practice may or may not employ the theoretical concept of practice, but such studies nevertheless focus on the activities of marketing practitioners. These include studies by Feldman & McNeilly 2003, Gilmore et al. 2001, Eriksson & Rajamäki 2010, Brodie et al. 1997, Lien 1997, Prus 1989, Brown 2005, Coviello et al. 2000, von Koskull & Foughere 2011 and Järventie-Thesleff et al. 2011. In these studies, the focus is not on what the organisation possesses (skills, experience, etc.) but on what the members of that organisation do and how they engage in marketing. Another stream of practice studies on marketing have focused on market practice. These studies posit that markets are not self-contained static entities but are instead constructed through the various and frequently conflicting practices of different actors. These studies include articles by Callon 1998, Finch & Acha 2008, Andersson et al. 2008 and Kjellberg & Helgesson (2006, 2007). The practice-oriented literature on consumer research has studied consumption practices and how consumers realise or create value through various practices. Practice-oriented consumer studies include Warde 2005, Holt 1995, Cochoy 2008, Korkman 2006, Brownlie & Hewer 2011, Fellesson 2011 and Schau et al. 2009.

In this study, I employ the concept of practice in a variety of modes. In the following, I will discuss treating practice as phenomena and practice as a theoretical framework because that division is the most helpful in illustrating the theoretical commitments contained in the articles in this study.
3.2 PRACTICE AS PHENOMENA

Many authors believe that the origin of the gap between marketing researchers and practitioners is found in the positivistic or logical empiricist approach (Tapp & Hughes 2008, Ardley 2008, Arndt 1985). In mainstream marketing research, complex and continuously evolving phenomena have been abstracted into universal theories and a priori truths that are then measured with simplified statements (Tapp & Hughes 2008, Ardley 2008). Marketing actions in organisations are then examined to determine whether they conform to or deviate from theory (Ardley 2008). This approach does not appreciate practitioners’ perspectives on their own work; instead, it treats practitioners as subjective and biased, although researchers are considered unbiased and capable of producing validated knowledge (Sandberg & Tsoukas 2011). The problem with this approach is that it removes knowledge from its social context and generates highly simplistic propositional statements that are not valid in any particular context (Sandberg & Tsoukas 2011, Svensson 2007). Theories generated in this manner have little to do with what practitioners experience in reality, as Arndt (1985) posited: “Overemphasis on formal representations of knowledge may result in empirically empty formal structures irrelevant to the problems” (Arndt 1985, 13).

The practice-based approach builds on the belief that theories of organisations do not reflect what actually occurs in organisations and clearly distinguishes between “what actually happens and what researchers claim to happen through their representations, frameworks, narratives, models, propositions and theories” (Orlikowski 2010, 24). Nicolini (2013) calls this approach the weak practice-based programme because it stresses devoting attention to everyday work without adopting a specific theoretical conceptualisation of practice. The weak programme includes various conceptualisations of practice that include practice as “what actors do” (Geiger 2009), “practice as phenomena” (Orlikowski 2010) or “practice as empirical object” (Corradi et al. 2010). The conception of practice entails all types of activities, routine and non-routine, formal and informal, central and peripheral (Whittington 2006).

The theoretical bases for studies adopting the weak programme may vary, but they all share “a specific commitment to understand what practitioners do ‘in practice’, with practice here signifying practical activity and direct experience” (Orlikowski 2010, 23-24). The majority of practice-based marketing research focuses on practice as phenomena and is thus interested in the activities of marketing practitioners. The aim of these studies is to more closely approximate the practitioners’ lived experience and explore what practitioners actually do in their particular field of practice (Corradi et al. 2010, Orlikowski 2010). In so doing, research can produce knowledge that more accurately reflects the lived reality of practitioners in a given field and is thus also more relevant for different practical situations (Geiger 2009). Therefore, I believe that adopting a practice-oriented research approach and focusing on what actors do is a fruitful solution to the problem of relevance in marketing research.
3.3 PRACTICE PERSPECTIVE OF THIS STUDY

The practice-as-phenomena approach is interested in identifying and recording individuals’ various routines and activities (Nicolini 2013, Geiger 2009), and the conceptualisation of practice encompasses all types of activities, both routine and non-routine (Whittington 2006). By contrast, the practice-as-theoretical-framework approach treats practice as an analytical concept “through which to understand organizations, examining the recurrent doings and saying of actors and how those are shaped by and shape structural conditions and consequences” (Orlikowski 2010, 29) Thus, under the latter approach, the concept of practice is used not only to describe working life but also as a theoretical lens to explain organisational matters (Nicolini 2013). Although “practice as theory” is not a unified theoretical framework, the different streams of literature share certain principles.

Practices are molar units, which means that they are constellations of smaller elements, such as actions, objects, knowledge and bodily motions (Nicolini 2013, Schatzki et al. 2001, Schatzki 2006, Reckwitz 2002). However, there are various opinions about which elements constitute practice. According to Schatzki (2006), the basic components of practice are action and structure. Structure consists of several interconnected elements, including knowing how to perform certain tasks, explicit rules and directions, affective structuring, and a general understanding of the nature of the work and how it should be performed. Alternatively, according to Reckwitz (2002), the elements of practice include bodies, minds, objects, knowledge and discourse. In the following, I will describe the main elements that I believe constitute a practice.

Practice theory accords a central position to the human body (Reckwitz 2002). A practice is a routinised and skilful way of using the body (Reckwitz 2002, Nicolini 2013). The knowledge required to learn to use the body in a skilful way (e.g., to participate in a practice or further refine a certain practice) is sensory and kinaesthetic knowledge (Amin & Roberts 2008, Gherardi 2008) that is acquired when novice practitioners employ their senses by watching, listening and touching while learning the practice (Gherardi 2012, Strati 2007). Gherardi (2012, 74) notes: “Not only people work through their bodies, they also know with their bodies, and the knowledge thus acquired is conserved in their bodies”. Thus, a practice recalls handiwork or a craftsman’s skills: the knowledge necessary to learn or to refine a certain practice is not acquired mentally but is acquired through the entire body by means of the five senses (Amin & Roberts 2008, Gherardi 2008). Novice practitioners learn by watching, listening and touching while learning the practice (Gherardi 2012, Strati 2007). Knowledge is not created by applying certain a priori truths; instead, knowledge is generated in the situations in which it will be used (Gherardi 2008). Therefore, practices are organised around shared practical knowledge regarding the tasks and activities at hand (Nicolini et al. 2003).

The second element is mind. In contrast with other cultural theories, when referring to the mind, Reckwitz (2002) does not refer to something deep inside an individual that dictates how the individual behaves (i.e., mentalism) or a mind that
has internalised rules imposed from outside (i.e., intersubjectivism). In practice theory, mind refers to a shared and routinised way of understanding the world (Reckwitz 2002, Nicolini 2013). Reckwitz (2002) calls these routinised understandings mental patterns that include rules about how to behave in certain situations, what is right and wrong and the accepted or desired emotions in certain situations (Reckwitz 2002, Nicolini 2013). To undertake a skilful bodily performance, one must have expertise on how to perform the practice and an understanding of what would be the successful or desired outcome. For example, flute makers share an understanding of how the perfect flute feels and sounds (Cook & Yanow 1993). That understanding is connected with the bodily performance of craftsmanship in making a perfect flute.

The third element is knowledge. According to Reckwitz (2002, 253), “in a practice the knowledge is a particular way of understanding the world”. Practices contain shared understandings of the world and how certain tasks should be performed (Gherardi 2012, Reckwitz 2002). When practitioners perform a practice in specific situations, they create collective and shared knowledge that is not easily understandable outside the particular situation in which the knowledge was originally created and employed (Reckwitz 2002, Gherardi 2008, 2009). Moreover, this knowledge includes the understanding to perform the practice and the ability to interpret the behaviours of others who are engaged in the same practice (Gherardi 2012, Reckwitz 2002). Knowledge, i.e., a shared understanding of how things should be done, is produced and reproduced when practices are performed in specific situations (Gherardi 2012, 2008, Reckwitz 2002).

The fourth element is objects. Reckwitz (2002) emphasises material objects, such as computers, files and phones, as essential components of practices. To play football, players require a ball. To conduct polymerase chain reaction amplification, the scientist needs, among other things, cylinders, pipettes and a microwave. Therefore, objects are “things to be handled and constitutive elements of forms of behaviour” (Reckwitz 2002, 253), which indicates that objects are the tools and appliances required to perform a certain routinised behaviour (Nicolini 2013, Reckwitz 2002). Gherardi (2012) uses the study of Grosjean & Bonneville (2009) to illustrate how objects anchor practices in time and incorporate representations of knowledge produced in the past. Handbooks, calendars and models that are part of a practice assist practitioners in remembering past decisions and events (Gherardi 2012). When performing tasks, practitioners need objects, various types of tools and appliances to complete a given routinised behaviour. When a scientist performs experiments in the laboratory, he may need pipettes, cylinders and various machines, depending on the task at hand. A marketer may need papers, computers and brochures. Thus, objects are “things to be handled and constitutive elements” of practice (Reckwitz 2002, 253). Highly project-specific objects can create boundaries, whereas certain objects can facilitate interaction between different practitioners (Swan et al. 2007). Objects also participate in reproducing the social order in a certain way, such as how classroom facilities produce order in the class (Nicolini 2013).
Individuals participating in the same practice constitute a community of practice (Lave & Wenger 1991) that creates and sustains the practice in the situations in which the practice is performed. All individuals are simultaneously members of several communities of practice. As Reckwitz (2002, 256) posits, “the individual is the unique crossing point of practices, of bodily-mental routines”. The body and the mind are equally necessary components of practices and together constitute individual agents (Reckwitz 2002). The knowledge required to perform the practice and the knowledge produced by the practice is essentially intertwined with both body and mind and cannot be treated separately when analysing practice. In practice theory, individuals are bodily and mental agents who act as carriers of a multitude of practices (Reckwitz 2002). The groups of individuals who participate in the same practice are termed communities of practice (Lave & Wenger 1991), which emphasises that routines are social and situated. Communities of practices share practical activities among the individuals in that community (Corradi et al. 2010).

Practice theory locates the structure of action in the routinised constellations of smaller elements that constitute a practice (Nicolini 2013, Reckwitz 2002). Reckwitz (2002) employs the concepts of “praxis” and “praktik” to illustrate the difference between routine and non-routine behaviour. Practice (praxis) in the singular form refers to various types of activities, both routine and non-routine (Whittington 2006). By contrast, practices (praktik) refer to shared and routinised behaviour and involve a shared conception of how things are done. Praxis entails individual, non-routine actions, whereas practices (praktik) are molar units (Nicolini 2013) that consist of several interconnected elements. These elements include understandings of how the activities in question are performed and how certain objects are handled (e.g., knowing how to do something or how to understand the world) (Reckwitz 2002). Practice (praxis) may also consist of a multitude of activities, but compared to practices (praktik), the constellations of non-routine activities are fragmented and inconsistent and thus lack a shared understanding of the world (Nicolini 2013). The social structure is sustained when performing a practice. Accordingly, social structures are changed when practices are refined and fine-tuned every time they are undertaken (Gherardi 2008) or when practices must be changed in response to a crisis (Reckwitz 2002).

Because practices contain specific, collective and shared knowledge, they are not completely understandable or easily transferable outside the context in which they were created and used (Reckwitz 2002, Gherardi 2008, 2009). Moreover, changing or transferring a practice is a complex process that consists of several stages (Szulanski 1996). According to Szulanski (1996), these stages are initiation, implementation, ramp-up and integration. The initiation stage includes all events that lead to the decision to transfer a practice or routine. Those events could be an unsatisfactory current situation or the discovery of superior way of doing things.

The implementation stage begins when the decision to transfer is being made (Szulanski 1996). In this phase, the information and resources flow across the boundaries of different communities of practitioners. Individuals acting as bound-
ary spanners or certain artefacts that act as boundary objects are essential at this stage. In their study of nanotechnology-related business, Casati & Genet (2013) describe the role of a specific type of individuals, principal investigators, in transferring practices. These authors explain how engaging in different practices in various contexts enable principal investigators to shape new trajectories by making sense of complex knowledge. These principal investigators also act as knowledge brokers among heterogeneous actors and networks. In addition to the individuals, the role of objects is important because of their capacity to traverse the boundaries of different communities (Gherardi 2012, Carlile 2002). Rajamäki (2010) show that the business plan of a biotechnology company acts as a boundary object because it contains shared language and facilitates the implementation process.

The ramp-up stage includes the initial attempts to use the new knowledge (Szulanski 1996). These attempts may be inefficient, and the practitioners may encounter unexpected problems. Routinisation occurs during the integration phase when the new knowledge is utilised in an effective and meaningful way. The routines that include the new knowledge become institutionalised and taken for granted in the organisation. In their study of medically assisted reproduction, Gherardi & Perrotta (2010) find that the stabilisation of a new practice includes mechanisms that limit what can and cannot be done, rhetorical closure and anchoring in technology.

The acknowledgement that practices, including marketing practices, have consequences is another aspect that has been missing from the mainstream marketing literature. As Svensson (2007, 273) note about mainstream marketing research: “A vast array of best-selling marketing devices are offered in this literature: marketing mix, promotion mix, Boston consulting group boxes, consumer behaviour models, positioning tricks, market segmentation bases, product life cycles and communication models, all of which are intended to contribute to the marketer’s toolbox. These tools are in the world of MMA as neutral as is a hammer or a screwdriver; they intervene silently upon the world, doing so without taking stand either for or against, only to vanish again without leaving behind any kind of moral judgements.” Practice theory holds that practices are situated in a context that is partly given but simultaneously (re)produced through the practices. Thus, the context has a dual nature: practices sustain and shape the organisational reality in which such practices are situated (Gherardi & Perrotta 2010, Nicolini 2013). Gherardi & Perrotta (2010) state that “at this analytical level the researcher asks: what is it that doing the practice does?” Therefore, the practice-based approach emphasises that marketing is not value-free or without conflict; instead, practices always bear implications and (re)produce inequalities and privileges (Nicolini 2013).

I believe that using practice as a theoretical framework provides a solution to the shortcomings of the research on biotechnology marketing that relies on the traditional marketing paradigm and offers a framework that can produce a richer understanding of—and a new way to conceptualise—marketing in small biotechnology companies.
4 Study design

“I would really like to work with this professor”, I thought to myself while we were chatting in a cafeteria in Finland on a cold winter day. I realised I had begun to think of these people as much more than the objects of my research; I considered them my friends. Would it be more important to help these people establish their companies and secure their employment—even at the expense of sabotaging my own study? (Rajamäki 2011, 206-207).

At times, it was difficult to balance my competing roles as researcher and member of the founding team, which meant being close while simultaneously attempting to distance myself and examine the process from further away. I wondered how to balance my roles as a mere observer and an active participant. How much should I influence the phenomena I was studying, including its grey areas and things that I would have not wanted to know but had to address nonetheless? I had not expected to face these types of profoundly ethical problems in a business study, and I had to make choices based on what felt right—not just as a researcher but also as a human being.

4.1 RESEARCH APPROACH AND METHODOLOGY

The conceptualisation of the nature of the elements that constitute practice is one respect in which approaches that apply practice as a theoretical framework are in striking contrast to mainstream marketing research. The positivist and logical empiricist roots of marketing entail the notion of representationalism (Tapp & Hughes 2008, Ardley 2008, Arndt 1985), which includes the belief that representations and entities to be represented are two ontologically distinct entities (Barad 2007). In a research setting, this belief means that the new knowledge (representation), the known (the entity that is being represented) and the knower (who is representing) are separate and distinct entities; in addition, the scientific representation mediates among these entities (Barad 2007). Practice theorists oppose representationalism, although the degree to which they do so varies with their onto-epistemological commitment. As Sandberg & Tsoukas (2011, 343) postulate: “we are never separated but always already entwined with others and things in specific sociomaterial practice worlds”. This position illustrates the notion of ontological entanglement, which means that the elements of practice are inherently inseparable but that we discursively establish different components of the entangled phenomenon (Nicolini 2013, Barad 2007). There are hybrid associations that are “enacted in practice as a fluid, ongoing and contingent coproduction of a shared sociomaterial world” (Suchman 2007, 23). The shift from a representational to a performative epistemology is of central importance: “knowing does not come from standing at a distance and representing, but rather from direct material engagement with the world” (Barad 2007, 49). This direct engagement requires
the researcher to observe and collaborate closely with the practitioners in action (Orlikowski 2010).

At the outset of my study, I realised that direct engagement with biotechnology marketing would not be a simple matter. I realised how extremely limited my understanding of biotechnology was and that this limited understanding was likely to hinder my communication with the scientists. I began to review the literature on the biotechnology industry; I read case studies and arranged several informal conversations with researchers involved in drug research, pharmaceutical chemistry and biochemistry to learn the basic vocabulary of the discipline. I also believed that I would need a context or form that would be more familiar to the scientists and me before I could continue my empirical explorations. Based on what I had learned from the case studies and articles, I wrote a conceptual article about biotechnology marketing. I emailed the published article to a pharmaceutical chemistry professor, who I understood to be contemplating founding a biotechnology spin-off. I believed that the format of an article would be more neutral and easily accessible for both of us. I did not propose any collaboration and simply sent the article with a brief message that the article might interest the professor. Shortly thereafter, the professor sent me a message asking if I would assist with the creation of the new venture. We agreed that I would assist them, and in turn, they agreed that I could use this case in my doctoral dissertation. This was the beginning of my journey toward collaborating with practitioners.

This notion of “the direct material engagement” (Barad 2007) is also reflected in my writing. I have written my results in a form that attempts to communicate the feelings I experienced to the reader directly such that the reader might experience personal involvement in the situation. Writing about research results must also be considered an ethical practice in the sense that researchers are responsible for the images they create through their writing (Rhodes 2009, Rhodes & Brown 2005, Richardson 2000, Van Maanen 1988). The focus then shifts from representational accuracy to how the researcher constructs meaning, which is why writing must also be considered an ethical practice in the sense that researchers are responsible for the images they create (Rhodes 2009, Rhodes & Brown 2005, Van Maanen 1988). Constructing meaning also involves writing about the contexts, experiences, emotions, disciplinary constraints and power structures that shape the writing process (Denzin 2002, Rhodes 2009), which I have attempted to reveal in this introductory essay by writing about the research process and the meaningful incidents that occurred in that process.

4.2 DATA COLLECTION

The first, third and fourth articles in my dissertation are based on empirical material that I collected from several sources. In these articles, I use the data in different combinations that I explain in detail below. The second article in my dissertation is based on previous research and case studies, and I thus did not use any empirical data in that piece.
Table 1 presents an overview of my data. Because research should never be harmful to its participants (Ellis 2007, Eriksson & Kovalainen 2008), I have opted to remove all information that might compromise the anonymity of the participants from the articles and this introductory essay. Therefore, I have changed all company names and have not described the country or university in which the ethnographic data were collected.

I began the data collection process by conducting telephone interviews. I chose five young companies from the Finnish biotechnology industry association’s member list. These were all small or micro (Commission recommendation 2003/361/EC) companies with fewer than 50 employees. I chose young companies because I expected them to be at the point in their life cycle during which they must actively consider marketing activities but have not yet committed to any certain type of marketing. The interviews followed the model of narrative and open interviews; thus, the interviewees were encouraged to speak freely and with as little guidance from the interviewer as possible (Eriksson & Kovalainen 2008). I telephoned the companies and asked scientists to recount a story regarding how marketing had evolved in their company. I asked additional questions to clarify certain aspects of their stories. During the interviews, I did not propose any definitions of marketing because my aim was to determine what ‘marketing’ meant to the interviewees. The interviews were recorded and transcribed. I asked for permission to record at the beginning of the interview, and all the respondents agreed. Interviews were conducted in Finnish or English based on the respondent’s first language.

**Table 1: Empirical data**

<table>
<thead>
<tr>
<th>Data</th>
<th>Description</th>
<th>Used in articles:</th>
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<tbody>
<tr>
<td>Interviews (2007)</td>
<td>Narrative and open interviews of the scientist-managers of five small Finnish biotechnology companies in the fields of microbiology, drug discovery, production of genetic tools and analysis.</td>
<td>x</td>
</tr>
<tr>
<td>Documents (2007-2008)</td>
<td>Web pages and media articles featuring the five companies that were interviewed.</td>
<td>x</td>
</tr>
<tr>
<td>Ethnographic data 2009-2011</td>
<td>An intensive, 24-month ethnographic data collection process in which I acted as member of the university spin-off founding team under study. In total, these data include approximately 400 pages of notes, transcripts and documents.</td>
<td>x</td>
</tr>
<tr>
<td>Focus group (2010)</td>
<td>Group discussion with a university technology transfer officer, a manager of a small biotechnology company and a biotechnology business consultant.</td>
<td>x</td>
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</tbody>
</table>
After the interviews were transcribed, I began to analyse them but soon realised that I required a more complete picture of the companies. In addition to the interviews, I searched for media articles about the selected companies. I conducted searches using the company names and the names of the interviewees. I also studied the web pages of the companies involved in the study and press releases about their operations. All of the selected companies had web pages from which I was able to download press releases and white papers.

The ethnographic data were collected from a team of researchers aspiring to establish a university spin-off in the field of drug discovery. Before I became involved, the entrepreneurial team consisted of the professor, members of his research group at the pharmaceutical chemistry department, and a university technology transfer officer. I was initially asked to assist in writing the business plan. I began the project as more of an outside observer or mentor, but over time I assumed a more active role in negotiating the shared understanding of the business opportunity. After the business plan that we had written together won a regional venture cup competition, they asked me to become a member of the founding team. I agreed, and we began to work toward securing funding and starting the business. At that stage, the team and I interacted with several interest groups, such as technology transfer officers at my university and various government agencies. The ethnographic data were collected from interactions that occurred within the entrepreneurial team and with third parties. My field notes are transcriptions of informal discussions. Telephone discussions were transcribed as accurately as possible after every call, as were the contents of personal, one-on-one discussions after every encounter. Skype chats and e-mails were saved as text files. In total, the data consist of approximately 400 pages of notes, transcripts and documents.

While collecting the ethnographic data, I wanted to assess how my interpretation of the biotechnology marketing and business resonated with different interest groups. Thus, I arranged a focus group discussion with a university technology transfer officer, a manager of a small biotechnology company and a biotechnology business consultant. This discussion was held in a restaurant over dinner in casual atmosphere and was recorded and transcribed.

Below, I will explain how I used and analysed the data in the articles.

4.3 METHODOLOGICAL CHOICES IN THE ARTICLES

Essay 1: The bridge: Connecting science and business

In this article, I focused on practices that were used to achieve a shared understanding of how science and business are combined in a biotechnology company. The article is based on the ethnographic data.

In this article, I used my ethnographic data and employed Georg Simmel’s (1997) concepts of the bridge and the door as the theoretical framework to analyse the connections between science and business. The concept of the bridge (Simmel 1997) emphasises the practical task of connecting objects, phenomena or ideas.
In Simmel’s cultural theory, there are three distinct entities: form, content and individuals. When humans must perform a practical task, the interactions then shape the content into forms, such as practices, which in turn constitute social reality. As in practice philosophy, Simmel (1997) regards the world as inherently entangled: “We [human beings] are at any moment those who separate the connected or connect the separate”.

I began this analysis by reading the notes line-by-line and coding the elements related to separation and connection. Although I was interested in connections, I also coded the elements related to separation because, as Simmel (1997, 174) argues: “The human being is the connecting creature and cannot connect without separating – that is why we must first conceive intellectually of the merely indifferent existence of two river banks as something separated in order to connect them by means of a bridge.” This coding generated a list of themes, issues, categories, activities and patterns related to connection and separation. During the initial stage, I performed the coding with one of the researchers to incorporate his/her view into the analysis.

In the next stage, I began organising the codes into categories. The codes that were similar in some respect or “felt alike” (Saldaña 2009) were grouped together to form a category. I grouped and regrouped the codes several times until I began to compare the categories using the concepts of the bridge and the door. The data contained there were several indications of socially constructed boundaries that defined certain individuals as insiders or outsiders; these boundaries included, for example, institutional, disciplinary and national boundaries. Only one category related metaphorically to the notion of a bridge: “the business plan”. It connected naturally separate objects and had a distinctive form and an individual existence with an aesthetic value and a history that developed over time. Thus, I placed that category under closer examination.

From the data coded in the bridge category, I created a narrative that incorporates ethno-dramatic vignettes into my autobiographical experience of those 24 months. Ethno-drama is the union of performance and ethnography, a genre of performance used for the interpretation and transfer of research (Alexander 2005, Rossiter et al. 2008). The concept is to transform ethnographically derived notes into theatrical scripts or performance pieces that are highly evocative (Smith & Sparkes 2009, Mienczakowski 2001). The intent of an ethno-drama is to allow both the participants and the audience an opportunity to develop an aesthetic understanding of the lived experience through a staged re-enactment (Alexander 2005, Mienczakowski 2001).

**Essay 2: Anticipating and managing the challenges of biotechnology marketing**

This essay is conceptual and does not employ empirical material. The material for the essay consists of the patents and case studies presented in the previous literature on the biotechnology industry. Because the research on small biotechnology companies was limited when the article was written, this essay also addresses cases concerning larger pharmaceutical companies. Although the focus of my
dissertation is small biotechnology companies, I believe that it was appropriate to also discuss issues regarding larger companies because both types of companies face identical technological challenges, operate in identical markets and frequently form alliances with one another. In this article, I employ the framework for marketing in technology-intensive industries developed by Moriarty and Kosnik (1989) as a starting point; I discuss this framework and relate it to the case studies and the previous literature on the biotechnology industry to examine how the distinct features of biotechnology affect the applicability of this generalised model to the biotechnology industry.

**Essay 3: Biotechnology marketing: Insider and outsider views**

In this article, written with Päivi Eriksson, we used the telephone interviews and documentary data collected from the companies selected for interviews, and we focused on the marketing activities performed by these young biotechnology companies. The analysis is based on the novel concept that combining the practitioners’ view (the emic perspective) with those of outsiders or researchers (the etic perspective) provides a fruitful starting point for a study on the topic (Agar 2007, Douglas & Craig 2006). This combination of outsider and insider perspectives not only considers meanings in the socio-cultural context of the biotechnology business but also considers the practitioners’ vantage points relative to theoretical knowledge more broadly.

We began the analysis from the insider’s perspective. When studying biotechnology marketing from an insider’s perspective, the research interest lies in the following question: how do actors in the biotechnology sector explain what marketing means for biotechnology companies? We first wrote case descriptions for each company, using the definitions of marketing that the scientist-managers provided in the interviews as the central theme for each case. The scientist-managers cited certain traditional marketing activities such as advertising, brand-building and mailing campaigns. In addition, they described activities that are highly context specific and not typically described in traditional marketing textbooks, including presenting at scientific conferences and publishing articles in academic journals.

After addressing the insider’s perspective, we analysed the case descriptions further by adding the outsider’s perspective. The aim of this approach is to understand the world of marketing in scientific terms and assumes that theory and constructs are universal and applicable across countries, industries and companies. When studying biotechnology marketing from an outsider’s perspective, the research interest lies in the following question: how do researchers as outside observers explain what marketing is in biotechnology companies? Therefore, we began to analyse both the interview and documentary data and identified marketing activities that were not necessarily cited by the interviewees.

Finally, we performed a cross-case analysis that focused on the differences and similarities among the cases.
In this unpublished manuscript, written with Päivi Eriksson, we consider all the empirical data I collected for my dissertation. However, the primary data source remains the ethnographic data.

In our previous study (Eriksson & Rajamäki 2010) we found a variety of activities that we divided into two categories. The first, ‘generic marketing’, included activities typically described in the marketing literature and included sales, advertising and brand building. The second, ‘science marketing’, consisted of activities that were originally strictly science-related activities but have been adopted by companies as part of their marketing activities (Eriksson & Rajamäki 2010). In our analysis, we utilised the concepts of generic marketing and science marketing as sensitising concepts.

We began the analysis by reading the data carefully and attempting to identify activities that were related to both generic and science marketing. Whereas our interest in the previous article was marketing activities, in this article, we commit to the strong practice-based programme by using the practice theoretical framework (Nicolini 2013, Gherardi 2012, Reckwitz 2002). Accordingly, we began with marketing actions to recognise the related agents, objects, knowledge and routines that form the basic elements of practice (Reckwitz 2002). These activities included sales, advertising, writing articles and speaking at conferences. Practice theory stipulates that practice is a constellation of smaller elements that are enacted in action (Nicolini 2013, Reckwitz 2002). Therefore, we began to search for the various elements of practice that were part of the identified activities. We noticed, for example, that when giving lectures, the body travelled to the conference location and objects such as PowerPoint slides were used in that action. Thus, we were able to map out constellations of actions, bodies, minds, individual agents, communities, knowledge and objects to grasp the practices that hold those constellations together. At that point, we had not yet drawn a distinction between routine and non-routine activities; as in the transfer of practice, activities are only routinised during the final stage when the practice is institutionalised (Gherardi & Perrotta 2010, Szulanski 1996). During the final stage of the analysis, we focused on whether and how routinisation occurred when the constellations evolved over time.

Working in this manner, we sorted and organised our data and developed a story to describe the practice of biotechnology marketing. The story is written in the form of ethnographic fiction (Richardson & St.Pierre 2008, Rhodes & Brown 2005) on the subject of Professor Jackson and his team. All characters in the story are composites (Ellis 2004) such that Professor Jackson is an imaginary character in whom we included the characteristics, opinions and quotes of several different professors found in our data. Composite characters are a useful way of presenting key ideas in the data more concisely than introducing all informants as different characters in the story (Ellis 2004). Importantly, using composite characters also provides a means to protect the real identities of the informants (Richardson & St.Pierre 2008, Rhodes & Brown 2005). To ensure the credibility of the story, we
allowed two biotechnology practitioners to read and comment on it (Van Maanen 1988, Riessmann 1993, Fini et al. 2009). Based on the comments of these reviewers, we made a few minor revisions to render the story more plausible.

After the story, we present our analysis of the agents, objects, knowledge and routines and how these elements are interlinked and organised. During the analysis, we identified activities first because actions are always part of a practice (Corradi et al. 2010, Reckwitz 2002). Thereafter, we began to identify the different elements of practice described by Reckwitz (2002) and were able to map out constellations of actions, bodies, minds, individual agents, knowledge and objects.
“How we are expected to write affects what we can write about” (Richardson 2000, 7).

I was ecstatic when one of my articles passed the first review at a journal that I respected highly. In all honesty, passing this review was beyond my greatest expectations. The unfortunate news was that the reviewers insisted on major revisions. For example, one of them required me to conduct the literature review again and position my study in an entirely different field. My fellow doctoral students were horrified when I told them about this development: “Oh no, how are you going to reply to that?” In reality, I had only one choice: “I am going to do exactly what they are asking me to do”.

The reason I inserted these brief excerpts that describe the making of my dissertation is to acknowledge that “…knowledge and its writing are actively produced by particular decisions and actions taken” (Rhodes 2009, 666). Therefore, in an attempt to make my representations more honest and truthful, I have written straightforwardly about the context of this study: my personal background, experiences, emotions, conflicting world views, academic conventions and the institutional power structures I confronted to demonstrate how they have shaped my scholarship (Denzin 1997, Motzafi-Haller 1997) and the rendering of reality in my scholarship (Denzin 2002, Rhodes 2009). These considerations shaped the entire process of developing my study: how I embarked on this journey, how I collected my empirical material and how and what I have written about it. As Laurel Richardson (2001, 879) has written: “Writing is never innocent”. I think a sterile, neatly organised and polished text is rather suspicious (Pullen & Rhodes 2008).

My dissertation consists of three published articles and one unpublished manuscript. I described above the theoretical underpinnings of these articles and the empirical data analysis. Below, I will briefly introduce the studies to discuss their findings and how they contribute to my main research question.

5.1 THE BRIDGE: CONNECTING SCIENCE AND BUSINESS


In this article, I explore the practices that create the shared conception of a business opportunity. This article focuses on the feature that is uniquely distinctive of the biotechnology business: working at the intersection of scientific knowledge production and commercial gain. The literature has treated boundary spanning as unproblematic, when, in fact, it requires competence; otherwise, agents would simply reproduce boundaries instead of translating knowledge across boundaries.
This article attempts to fill this gap by exploring how it is possible to connect science and business, i.e., how certain groups of individuals are able to jointly connect and create new ventures. To study this combination of science and business, I use Simmel’s (1997) concept of the bridge, as expressed in his essay ‘Bridge and Door’, as the theoretical framework that hones the focus of my investigation. The bridge emphasises the practical task of connecting objects, phenomena and/or ideas (Kern 1994) that are naturally separated but that can be connected by an act of human will.

During the fieldwork for this study, I became increasingly uncomfortable reading research from the perspective of an outsider (Eriksson and Rajamäki 2010) on an institutional level (Djockovic & Souitaris 2008) who is reporting on the conflicts, problems and incompetence of scientist-entrepreneurs. After examining the phenomena as an insider, I realised, as Shane & Khurana (2003) have underscored, that this type of research is a ‘little bit like a murder mystery in which the victim is killed for no reason at all. That is to say, one doesn’t get any sense of the reasons or individual motives that account for the existence of a particular organisation and the characteristics it has’ (Olson 1986, 178–179). I recognised that there was a need for research that would generate an empathetic understanding of the business of biotechnology and its marketing and that would thereby provide a sense of why individuals do certain things—what their motives are and, more importantly, what the nature of their experiences is.

Based on the ethnographic data, I created a layered narrative (Denzin 2002, Rambo 2007) to illustrate how the bridge was built and how it facilitated shared interpretations. I chose to use performance-based writing because it has the potential to create change by helping the audience, participants, and researchers to think critically about their worlds (Alexander 2005). A well-written, performance-based narrative affects the audience emotionally and evokes empathy and a new understanding of characters’ lives; it persuades the audience to think critically about the social and personal realities involved in the situation represented (Morgan et al. 2001).

In the study, I described how the genesis of the spin-off was not a quest for profit. Instead, its origins began as a response to the threat of unemployment because of diminishing or discontinued funding for the group. The company had to secure employment for its members and allow them to continue their scientific work. Therefore, it is understandable that the researchers did not have any specific aspirations to become entrepreneurs; these researchers still wished to be scientists first and foremost. A business scholar might wonder whether the company that these scientists sought to establish would truly be a for-profit business or whether it would instead become a non-profit organisation. I believe that these were the first signs that the business of biotechnology, and therefore biotechnology marketing, is based on a different logic than that described in the traditional business and marketing literature.

The business plan was created as a bridge between science and business, which helped connect two different social worlds and created a shared understanding.
between these worlds. The “bridge building” was not without conflict; in the article, I illustrate how the business consultants and I were able to act as mediators to help individuals from different contexts to (first) communicate and (second) create a shared understanding. Thus, the shared understanding of the marketing philosophy and strategy was created in writing the business plan.

Simmel (1997) noted that crystallised forms occasionally become detached from their original purpose and that cultivating those forms can become an end in itself. This phenomenon occurred in our case; writing and re-writing the plan nearly became the sole purpose for interaction among the different interest groups.

**5.2 ANTICIPATING AND MANAGING THE CHALLENGES OF BIOTECHNOLOGY MARKETING**


This article is a theoretical review of the literature on the biotechnology business, the diffusion of technology and the marketing efforts of technology-intensive companies. When this article was published, there were no articles that presented frameworks or conceptualisations of the specific characteristics of the biotechnology industry and how these characteristics might affect marketing. In addition, the previous biotechnology business literature primarily addressed large biotechnology or pharmaceutical companies. Nonetheless, these large companies operate in the same markets as smaller biotechnology companies.

The article addresses the practice-theory gap by examining features that are distinctively important in biotechnology marketing. I discuss the features that distinguish biotechnology marketing from that found in more established industries and the key challenges for biotechnology marketing arising from those differences.

The biotechnology industry and high technology industries in general are characterised by involving emergent technologies. Therefore, and because of the lack of any biotechnology-specific framework, I apply the concepts that Moriarty & Kosnik (1989) develop about the particular characteristics of high-technology industries and the framework of high-technology marketing as a starting point. Moriarty & Kosnik (1989) present this framework to explain why high-technology marketing differs from marketing for a traditional product or service and contend that there are two dimensions that distinguish high-technology from low-technology marketing situations. First, there is market uncertainty, which refers to the uncertainty regarding the extent and type of customer needs that a given technology can satisfy. Market uncertainty originates from the market: its structure, changes and dynamics. Second, there is technological uncertainty regarding the technology’s ability to satisfy customer needs. This type of uncertainty has a purely technological origin.

In the article, I take market and technological uncertainty as starting points and, using previous studies of the biotechnology industry, discuss how some of
the features that are typical of technology-intensive companies are not typical of biotechnology companies. Based on this discussion, I present six key challenges that biotechnology marketers face. These challenges are the unique decision areas for biotechnology. First, profound technological uncertainty is a key characteristic of biotechnology. Second, side effects emerging after the product has been in the market can cause the discontinuation of entire product lines or reduced estimated market potential. Third, a biotechnology product’s lifecycle can also face premature death because of challenges originating from market uncertainties. A fourth issue is the threat of obsolescence, which is high in a market in which new innovations are introduced at a rapid rate. The fifth issue is the ability to protect intellectual property rights. Ultimately, these challenges make it difficult to estimate the size of a potential market.

As previous research has indicated, instead of being pre-defined structures, markets are constructed and shaped by multiple practices performed by different actors, including companies and customers (Slater 2002, Araujo et al. 2008, Kjellberg & Helgesson 2006). These actors always undertake their actions within a constantly evolving historical-cultural setting (Corradi et al. 2010) that takes highly distinctive forms, each with its own challenges (Peñaloza & Venkatesh 2006). The biotechnology industry has emerged in a novel setting compared to more traditional industries (Pisano 2010). The six challenge areas that I present in the article reveal how its basis in science makes biotechnology markets and businesses special in a way that makes general marketing concepts inapplicable.

5.3 BIOTECHNOLOGY MARKETING: INSIDER AND OUTSIDER VIEWS


In this article, we employ the concepts of science marketing and generic marketing.

This article, written with Päivi Eriksson, explores the activities of biotechnology marketers. We address this issue by focusing on marketing as defined, performed and organised in small biotechnology companies.

Prior research has argued that, on the one hand, marketing-related deficiencies might explain the lack of commercial success in biotechnology. On the other hand, it has been suggested that biotechnology marketing might differ from what is considered marketing in other industries and has thus remained unexplored by the survey-based research designs used in prior studies. Our article builds on this interesting contradiction in the literature.

The previous literature has demonstrated little interest in how biotechnology companies operate and the types of managerial activities they perform. Although the definitions managers gave of their marketing activities were not extensive,
we were able to identify a rich variety of marketing activities that these small companies perform. Combining insider and outsider perspectives, we identified two types of marketing: generic and science marketing. We use the term “generic marketing” to refer to the type of marketing found in textbooks and the mainstream marketing literature, including the sales, advertising, business-to-business communication, sponsoring and brand building literatures.

Biotechnology companies also engage in science-related activities that are typical found in the academic world that target scientists working in academia and in private industry. The key activities of science marketing include publishing in academic journals, presenting at scientific and professional conferences, compiling reference lists, being cited, and providing information on all these activities on company web pages and printed brochures.

On the basis of our findings, we argue that science marketing is a relevant aspect of biotechnology marketing and should be studied in greater detail. This finding does not suggest that there is a substantial lack of marketing effort and competence in biotechnology companies. Instead, the findings offer new insights about the specific nature of biotechnology marketing that is produced by a combination of insider and outsider views.

5.4 THE SCIENCE MARKETING PRACTICE OF A BIOTECHNOLOGY START UP

Rajamäki H. & Eriksson, P., unpublished manuscript

In this article, we argue that a practice-based approach is necessary to comprehensively understand biotechnology companies’ marketing efforts. The gap between marketing theory and practice is a recurring theme, particularly in the context of small businesses (Reijonen 2010, Coviello et al. 2000) and/or new ventures (Stasch 1999). In contrast with theory, the marketing planning process employed by small companies is less formal (Gilmore et al. 2001, Coviello et al. 2000) and includes different types of techniques (Zontanos & Anderson 2004, Stasch 1999, Eriksson & Rajamäki 2010). Small companies do not have specific marketing departments or personnel dedicated to marketing (Hagberg & Kjellberg 2010, Simpson et al. 2006); instead, their marketing tasks are the responsibility of generalists or part-time marketers (Gilmore et al. 2001, Hogarth-Scott et al. 1996). Therefore, we require a more contextualised understanding of marketing. As a reaction to the practice-theory debate, the marketing-as-practice approach attempts to account for how marketing is actually performed in organisations (Araujo 2007, Kjellberg & Helgesson 2007, Schau et al. 2009).

In this article, we use the practice theoretical framework (Nicolini 2013, Gherardi 2012, Reckwitz 2002) to analyse marketing practices in biotechnology companies. With a particular emphasis on activities related to bodies, we demonstrate that science work and science marketing are different practices in nature.
Furthermore, we reveal that biotechnology marketing and sales are built on a foundation of “science marketing” that was originally constructed to promote the academic expertise of scholars or research groups. Scientific work is marketed to other academics to promote citations and to funding organisations to support grant applications. Research groups also actively sell their services to companies by conducting collaborative projects, which makes it possible for research groups to fund their operations and laboratories.

Once a company is founded, the practice is fine-tuned to fit the business environment. In addition, elements that are considered relevant may be added to the practice. One example is a website originally developed for a research group that is then made more business-like. Another example involves academic conference presentations that include a company advertisement as the final presentation slide. Our analysis indicates that science marketing practice, as introduced in this article, is based on well-known routines utilised to promote research results and the academic expertise of scientists and their research groups. Once scientists establish a biotechnology company, their embodied competence and well-refined routines are transferred and fine-tuned to fit their businesses. Based on these findings, we suggest that what such science-based, biotechnology start-up companies understand as marketing differs considerably from the meaning of the term in other small companies that do not have a strong science background.
6 Conclusion

Returning to the beginning of my story, sitting in my car in a university parking lot in the middle of night, I believed that I could see what was inside, in a metaphorical sense. I was thrilled to find marketing activities in the place I least expected them. It came in the form of science marketing, a carefully thought-out and planned set of activities performed to promote the research group. Spending time “inside”, I learned to appreciate the particular features of the context in which biotechnology companies are created, and it began to make sense to me that combining science marketing with more traditional techniques was a natural response in this context. I believe that adopting an open-minded perspective about practitioners’ actual activities—rather than focusing on how things “should” be done—offers an opportunity to learn something new and even unexpected.

6.1 FINDINGS

At the nexus of science and business, the essence of biotechnology has certain unique characteristics that distinguish it from other industries. Acknowledging this background is of paramount importance because the particular characteristics of the industry and its evolution affect marketing decision areas and the activities performed by marketing practitioners. Although the knowledge of this specific type of marketing may seem narrow and local, it involves marketing work and may affect the survival of over 2000 biotechnology companies that employ 100,000 individuals in Europe alone.

An approach that appreciates the practitioners’ view accounts for the particular characteristics of the industry and thus is capable of acquiring a more contextualised picture of marketing in the biotechnology industry. This study has revealed a new type of marketing that is distinctively different from that presented in the literature. Identifying new types of marketing has great significance for marketing theory in general. As Geertz (2000, 138) has written: “Theory…grows out of particular circumstances”. Comparing marketing practices in different and specific contexts, such as biotechnology, allows us to recognise the diversity and richness of marketing practices and thus broadens the concept of marketing in general. The results of this study suggest that insights generated from this line of inquiry have the potential to broaden marketing concepts in this context and thus provide relevant and valuable insights for both marketing practice and academic research (Srinivasan 2008, Stemersch & Van Dyck 2009).
6.2 THEORETICAL AND METHODOLOGICAL CONTRIBUTION

This study contributes to the areas of biotechnology marketing and the more general discussion of the concepts of marketing and small business marketing by offering a novel perspective on marketing in small biotechnology companies. By accounting for the contextual nature of the marketing concept and appreciating the practitioners’ perspective, this study reveals a new type of marketing, science marketing, which has not yet been identified by the methodologies utilised in the extant literature.

The concept of science marketing permits a new interpretation of issues presented in the previous literature. For example, the application of the traditional process model of marketing to certain contexts has resulted in perceptions of incompetence in marketing (see, e.g., Costa et al. 2004). The practice framework questions such conclusions. The marketing process is essentially different in biotechnology companies, and practices in this industry are built on solid existing skills. By adopting this new approach, the entire phenomenon of biotechnology marketing is more understandable. Other examples include science marketing activities that are specific to a field, such as publishing articles or giving conference presentations, which the literature has regarded as a myopic preoccupation with technology (Levitt 1975); however, the practice approach reveals these functions to be understandable aspects of marketing practice.

The results of this study indicate that biotechnology marketing is based on routines that were originally developed to promote the academic expertise of scholars and/or research groups. Once the company is established, these practices are then fine-tuned to fit the business environment. In addition, elements and routines from more general marketing practices that are considered relevant are added. As a result, a biotechnology marketing practice consists of intertwined elements of scientific work and generic marketing, which distinguishes it from the traditional marketing concepts and processes presented in the literature.

This study also contributes to the growing body of marketing-as-practice research and demonstrates how the framework can be applied to generate new understanding. Thus, this study reveals a new approach to examining and acquiring new types of knowledge about marketing in specific contexts. This study demonstrates how the practice-oriented approach has the potential to provide new insights about what is considered relevant by practitioners.

By adopting the practice approach, this study shows that it is possible to broaden and understand biotechnology marketing more comprehensively. The insider view allows scholars to understand biotechnology practitioners’ activities: what their motives are and, more importantly, what their experiences are. However, the researcher’s view is equally important; for example, taken-for-granted assumptions must be studied by an outsider because unconscious assumptions may not be visible to the practitioners themselves.
6.3 PRACTICAL IMPLICATIONS

The message for managers of biotechnology companies is that it is both relevant and legitimate to acknowledge the role of science marketing in the operations of biotechnology companies; it is also relevant to consider how science marketing can be combined with generic marketing in a fruitful way.

Acknowledging the existence of the two forms of marketing should also be useful when considering how marketing can be organised and how marketing competences can be further developed. This study suggests that studying the relationship between, and the dynamics of, these two types of marketing in greater detail would generate improved knowledge about biotechnology marketing both for researchers and practitioners.

6.4 LIMITATIONS AND FURTHER RESEARCH

The results of this study present interesting avenues for further study. This study identified a new type of marketing, science marketing, that is essentially different from traditional concepts of marketing. A more detailed study of the concept of science marketing might yield valuable insights on how the historical, cultural and institutional context affects the multiplicity of shapes that marketing can take in specific situations.

The ethnographic data in this study were collected from a single company in its early stages of operation. They provide a valuable picture of the bases of marketing practice, i.e., scientific work and traditional marketing, and how these aspects can begin to intertwine during the early years of business operations. Moreover, the interview data in this study were collected from small and young biotechnology companies. Continuing to follow these companies and adding data from more established biotechnology companies might produce insights on how marketing practice continues to evolve as companies grow.

Using the practice approach, this study depicts marketing in a way that makes certain activities such as publishing articles an understandable and logical component of marketing practice. However, because of this study’s scope, the concept of science marketing continues to be presented at a general level. A more fine-grained analysis of the various aspects of practice might provide a more comprehensive view of the concept. First, an interesting avenue for closer study would be the patterns of the doings, sayings and interactions among various interest groups such as scientists, technology transfer officers and financiers. Small biotechnology companies operate at the intersection of different cultural and institutional boundaries. Therefore, the second interesting area for future research concerns these very tensions, rules and power structures that shape science marketing practice. Third, focusing on the artefacts and how they are used by and simultaneously shape science marketing practice might provide interesting insights into the largely ignored research area of artefacts in everyday marketing work. I suggest that these avenues of research might broaden the concept of marketing and recognise the myriad shapes of marketing practice.
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PART II

1 Research essays

ESSAY 1:
THE BRIDGE: CONNECTING SCIENCE AND BUSINESS

ESSAY 2:
ANTICIPATING AND MANAGING THE CHALLENGES OF BIOTECHNOLOGY MARKETING

ESSAY 3:
BIOTECHNOLOGY MARKETING: INSIDER AND OUTSIDER VIEWS

ESSAY 4:
SCIENCE MARKETING PRACTICE OF A BIOTECHNOLOGY START-UP
Rajamäki H. & Eriksson, P., unpublished manuscript.

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This study explores the marketing practices of small biotechnology companies. It contributes to the small business marketing literature by examining how marketing practice emerges and evolves in biotechnology start-ups. This study introduces a new type of marketing practice called science marketing, which has not yet been identified in previous studies.

Heidi Rajamäki-Partanen

Science Marketing: A Study on Marketing Practice in Small Biotechnology Companies