

Whether to Integrate R&D and Marketing: The Effect of Firm Competence

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Integration of research and development (R&D) with marketing remains a frequent topic in the new product development (NPD) literature, largely because it represents a critical antecedent of new product performance (NPP). Two divergent opinions about this integration exist, such that those who contend that firms should pursue high levels of integration in every case provoke criticisms from those who propose that various NPD processes require different levels of integration. This paper proposes that the two perspectives can be reconciled by taking into account the fact that R&D and marketing are integrated mainly to combine critical knowledge (technological and market) that otherwise would be separate to achieve market success. Following Danneels's approach, we investigate how the effect of R&D–marketing integration on performance change across four types of NPD processes: pure exploitation, pure exploration, technological competence exploitation, and market competence exploitation.

Data derived from a deep study of 11 NPD projects by five firms, analyzed through qualitative methods, highlight the necessity to vary the level of integration according to the type of competence to be developed during the NPD process. Our analysis suggests two main conclusions. First, the effect of integration depends strictly on the type of competence that the firm uses to develop and launch a new product. Second, integration does not have a unique effect on performance, but it is necessary to distinguish between market performance (e.g., sales and market share) and process performance (e.g., meeting the planned budget and time to market). In some projects, the effect of integration on the two types of performance is diametrically opposite. In particular, we propose that (1) higher performance will be associated with lower integration in pure exploitative projects; (2) in projects that exploit existing market knowledge, higher market performance will be associated with a higher integration, although these projects tend to offer poor process performance regardless of integration level; (3) in projects that exploit technical knowledge, higher performance will be associated with higher integration; and (4) higher integration will be associated with higher market performance but poorer process performance in pure explorative projects.

More integration between marketing and R&D leads to better new product performance.

—Leenders and Wierenga (2002, p. 306)

Not all projects within a company need to achieve equal level of integration for successful development.

—Griffin and Hauser (1996, p. 197)

Integration of research and development (R&D) with marketing remains a frequent topic in the new product development (NPD) literature, largely because it represents a critical antecedent of new product performance (NPP; Song and Xie, 2000). Two divergent opinions about this integration exist, such that those who contend that firms should pursue high levels of integra-

tion in every case (e.g., Jassawalla and Sashittal, 1998; Song and Parry, 1997) provoke criticisms from those who propose that various NPD processes require different levels of integration (e.g., Griffin and Hauser, 1996; Gupta, Raj, and Wilemon, 1986). The latter group highlights negative effects of too much integration on NPP, although efforts to bound and define the optimal level of integration (i.e., maximize NPP) have failed. Thus, the NPD manager's dilemma—to integrate and how much to integrate—remains unanswered.

The answer may derive from a further investigation of the main goal associated with integrating R&D with marketing, that is, the combination of critical knowledge (technological and market) that otherwise would be separate to achieve market success (Danneels, 2002; Li and Calantone, 1998). During the NPD process, firms can develop new technological/market competence or exploit existing competencies (Danneels, 2002). This paper considers how the effect of integration on NPP may change,

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depending on the nature of the competencies that the firm develops and combines during the NPD process. Our analysis suggests that the type of product innovation, in terms of its reliance on exploration versus exploitation of market and technological competences, moderates the relationship between R&D–marketing integration and the process and market dimensions of NPP.

Background Literature

R&D–Marketing Integration: Conceptualization

The concept of integration is a much debated theme in the NPD literature, and the term “integration” has been used as an umbrella term to describe a variety of concepts, including cooperation (e.g., Olson, Orville, Ruekert, and Bonner, 2001), interaction and communication (Perks, Kahn, and Zhang, 2009), and collaboration (e.g., Jassawalla and Sashittal, 1998). Kahn (1996) proposed a view of integration that comprises interaction—namely, the simple exchange of information—and collaboration—namely, the development of collective goals and resource sharing. At low degrees of integration, departments adopt an interaction perspective, which may lead the departments to act independently and to share updates on projects’ progress at fixed contact points (e.g., monthly meetings). As integration intensifies, departments start developing collaboration in addition to simple interaction. Collaboration requires a unity of effort to achieve common goals through a unique strategy (Kahn and Mentzer, 1998).

Embracing this perspective, integration is defined as “the magnitude of interaction and communication, the level of information sharing, the degree of coordination, and the extent to which marketing and R&D have a common vision and collective goals during a NPD project” (Song and Montoya-Weiss, 2001). This definition implies that integration occurs at the project level and conceptualizes integration as having different degrees, ranging from mere interaction (low integration) to a common vision about the project’s goals (high integration). Further, different projects can be managed with different degrees of integration (Griffin and Hauser, 1996; Olson et al., 2001; Ruekert and Walker, 1987). The previous literature showed that the organizational mechanisms in place to link the departments play a critical role in affecting the degree of integration achieved (e.g., Griffin and Hauser, 1996; Leenders and Wierenga, 2002; Maltz and Kohli, 2000).

R&D–Marketing Integration: More Is Better

Innovation literature identifies two principal sources of new product success: market competence, which mainly resides with the marketing department, and technology competence, which mainly derives from the R&D department (Danneels, 2002). Market knowledge is defined as knowledge of customer needs and preferences. Technological knowledge is defined as the technical knowledge to design, engineer, and manufacture a product (Danneels, 2002). Unfortunately, R&D personnel and marketers constitute different worlds of thought, “a community of persons engaged in certain domain of activity who have a shared understanding about that activity” (Dougherty, 1992, p. 182). Each community develops its own interpretative schemes and likely understands certain issues better while ignoring others. Due to cultural discrepancies, dissonance between R&D and marketing departments tends to be the rule rather than the exception (Moenaert, Souder, Demeyer, and Deschoolmeester, 1994). The traditional solution has been to create integration between marketing and R&D to produce and share both marketing and R&D competencies.

Firms with higher levels of R&D–marketing integration outperform their rivals because they can exploit their technological capabilities in a way that is more consistent with the market’s requirements (Li and Calantone, 1998; Song and Parry, 1997). Higher integration may lead to shorter development processes, cost reductions, joint contributions to overall organizational goals, improved quality, faster time to market, and eventual commercial success (e.g., Song, Montoya-Weiss, and Schmidt, 1997;

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Tessarolo, 2007). This position is well summarized by Leenders and Wierenga's (2002, p. 306) contention: *More integration between marketing and R&D leads to better NPP.*

The Negative Consequences of an Excess of Integration: More Is Not Always Better

Some scholars contend that integration is not uniformly positive but offers benefits only when it is coherent with the real integration needs within an organization (Griffin and Hauser, 1996; Gupta et al., 1986). These scholars pinpoint negative effects due to an excess of integration. Many interaction activities do not promote performance success but instead overburden personnel with too many meetings and stress (Kahn and Mentzer, 1998). When it comes to common goals and cohesion, too much cohesion may lead to agreement about a group decision, regardless of its correctness (Sethi, Smith, and Park, 2001), limit objective criticism (Troy, Hirunyawipada, and Paswan, 2008), or generate myopia and premature elimination of options (Swink, 2000). Griffin and Hauser (1996, p. 197) thus warn: "The need for integration is situational. Not all projects within a company need to achieve equal level of cooperation for successful development."

Reconciling Competing Perspectives: Type of Product Innovation

A few studies attempt to identify contingencies that may define the optimal integration, mainly focusing on "external" factors that do not relate directly to the NPD process, such as demand uncertainty and the rate of technological drive (Parry and Song, 1993), environmental uncertainty and the organization's innovation strategy (Gupta et al., 1986), the business unit strategy (Ruekert and Walker, 1987), and so forth. One study analyzes how integration might vary across different phases of the NPD process (Song, Thieme, and Xie, 1998), while two studies analyzed the moderating effect of innovativeness on the integration–performance relationship. Song and Xie (2000) found that product innovativeness moderates the effect of integration on NPP only in technical activities and only for Japanese firms, but not for U.S. firms. On the contrary, Souder and Song (1998) found that the moderation effect of integration is higher for U.S. than for Japanese firms. Contradicting results might be due to the fact that Song and Xie (2000) analyze the moderating effect of overall innovativeness on the relationship between integration and performance, while Souder and Song

(1998) analyze the moderating effect of market familiarity, namely a specific type of innovativeness.

To date, no research directly investigates how the optimal level of integration might depend on the competencies necessary to obtain good NPP. This represents a serious gap in the existing literature because the main benefit of integrating R&D and marketing is the generation of the competencies needed to develop and launch a new product successfully (Li and Calantone, 1998). A closer look at the factors that influence competence needs may help clarify whether firms should pursue the highest level of integration in every case or should switch from higher to lower levels, depending on their situation.

Product innovation involves two key tasks: to physically develop a product (which requires technological competence) and to sell the product (which requires market competence) (Calantone and Rubera, 2012; Danneels, 2002). Firms may decide to exploit their existing competencies or to explore and build new ones (March, 1991). Danneels (2002) notes four types of NPD projects that reflect these variations. On one extreme, firms adopt a pure exploitation logic and combine their existing technological and market competencies to develop an incremental product for existing customers. At the other extreme, when they use pure exploration logic, firms develop both new technological and market competencies to offer breakthrough innovations to new markets. Alternatively, firms can exploit technological competence while exploring new markets, in an effort to serve additional customers with incremental products, or they might explore new technological competence but exploit existing market competence in an effort to offer a radical new product to existing customers.

According to the traditional learning literature, both exploration and exploitation are essential for organizations, but they compete for scarce resources so that firms must make choices between the two (March, 1991). On the contrary, the ambidexterity literature sustains that pursuing both exploration and exploitation leads to superior performance than emphasizing one at the expense of the other. While the ambidexterity hypothesis gained consensus among scholars, it is still not clear under what conditions firms can really pursue both exploration and exploitation. In particular, the debate revolves around the differentiation–integration issue (Raisch, Birkinshaw, Probst, and Tushman, 2009). Supporters of the differentiation perspective argue that the units in charge of exploration should be kept separate from the rest of the organization in an effort to guarantee them the freedom to develop new competencies (Benner and Tushman, 2003; Levinthal and March, 1993). Supporters of the

integration perspective maintain that only when the different departments are integrated, the firm is able to achieve ambidexterity (Gibson and Birkinshaw, 2004; Lubatkin, Simsek, Ling, and Veiga, 2006). Gulati and Puranam (2009) suggest that no perspective is better than the other, but firms need to switch from differentiation to integration (and vice versa) depending on the relative importance of exploitation and exploration activities.

This paper moves in this direction and investigates if the optimal level of integration might depend on the types of competencies a firm decides to explore and exploit. This paper thus aims to answer the following research question:

Research Question: How does the type of product innovation (i.e., technological or market competence exploration/exploitation) influence the effect of R&D–marketing integration on NPP?

Research Design and Method

Sample

Because little is known about the effect of exploration/exploitation activities on the relationship between R&D–marketing integration and NPP, we utilize a qualitative approach to answer our research question. Therefore, we avoid developing any model a priori and instead allow the theoretical framework to emerge from our empirical observations.

To define our sample, two industries are selected—food and shoes—characterized by intensive new product launches, in which both technology and marketing knowledge may play relevant roles. Even though these industries are not traditionally considered high-tech industry, innovation in both industries requires the development of new technological knowledge. For instance, innovation in the food industry has always required technological knowledge (Earle, 1997), but in the last years, the rising trend of functional food requires more and more advanced technical know-how (Lee and Chen, 2009). Indeed, the food industry has been recently used to study innovations (e.g., Faems, Van Looy, and Debackere, 2005; Knudsen, 2007; Salomo, Talke, and Strecker, 2008). Similarly, technology is a critical key driver of success in the shoe industry, where firms compete on finding new materials and ways to make footwear more comfortable while walking or running. Nike probably represents the most famous case of a shoe company that relies on technological knowledge to develop new products. Also, as shown in Appendix A,

firms in our sample invest a consistent amount of their yearly turnover (5–6%) in R&D to develop new technological knowledge to develop new products.

A two-stage approach was adopted to select our specific case studies. In the first stage, the president of each appropriate industry association was contacted, presented the purpose of the research, and asked to indicate the most relevant firms for such a study. We also asked for a list of medium- to large-sized firms that were well known for their frequent innovations. At the end of this first phase, a list of 18 firms was obtained. In the second stage, the heads of R&D and marketing for each firm were contacted, presented the research objectives, and asked to participate in the study. Only when both managers accepted were the firms included in the sample. Detailed data about each firm are reported in Appendix A. To obtain multiple perspectives, both R&D and marketing managers in each firm were interviewed; in one firm, the manager responsible for the NPD projects was also interviewed, and in another firm, two marketing managers were interviewed, one responsible for NPD and another in charge of communications with the market. Thus, a total of 12 top managers were interviewed.

A theory-based sampling approach is adopted (Miles and Huberman, 1994), with examples of each of the four types of product innovation described by Danneels (2002). Our sampling scheme requires scrutinizing at least eight projects: four types according to the competence mix involved (pure exploration, exploiting technological knowledge, exploiting market knowledge, and pure exploitation) \times two types according to the level of integration (i.e., high versus low). We thus attempt to contrast projects that differ in terms of the marketing and technological competencies developed to introduce the new product to the market. To control for the different effects of integration on performance, managers were asked to select one success and one failure during a preliminary phase. Success and failure are defined according to Griffin and Hauser's (1996) recommendations, along customer, financial, and process dimensions. For one firm, three different projects are discussed. We go on adding firms until we access the eight projects with the characteristics described above. After interviewing five firms, all eight cells of the sampling scheme are covered, and there is also some data redundancy. The NPD projects represent our unit of analysis, such that our sample consists of 11 NPD projects: five successful cases and six failed cases. Three projects involve pure exploitation, three projects consist of pure exploration, three projects entail a firm's exploitation of its technological competence, and two projects reflect a firm exploiting its

		PURE EXPLORATION	EXPLOITING TECH KNOWLEDGE
Marketing competence	New	Cases 7–11 Low integration Case 9 High integration	Case 6 Low integration Cases 2–3 High integration
	Existing	EXPLOITING MARKET KNOWLEDGE	PURE EXPLOITATION
		Case 4 High integration Case 10 Low integration	Case 5 Low integration Case 1–8 High integration
		New	Existing
		Technological competence	

Figure 1. Sampling Frame

market competence. These 11 cases reveal clear evidence of data saturation, such that the managers reinforce the patterns identified without adding significantly to the breadth of the findings. The final sampling frame is presented in Figure 1.

Data Collection

Two authors conducted semi-structured interviews with each specific firm and took careful notes. The interviews also were audio recorded to compare with the notes taken during the interview (Eisenhardt, 1989). The interviews lasted 150–180 minutes.

The interview protocol consists of two parts. In the introductory part, interviewees describe the role and relevance of the marketing and R&D functions within the organization, the amount of interaction between the two functions, and the quality of the relationship. Typical questions are: To what extent do the two functions share common goals? Can you describe the relationship with R&D (marketing) people? What is the role of your department within the firm? At the project level, interviewees describe the characteristics of the product and assess the extent to which it differs from existing products, in terms of its technological novelty and consumer

benefits. Next interviewees describe how the idea emerged and the steps that led to the launch of the product in the market, with particular attention to the type of competencies they had to develop. Examples of these questions include: Where did the idea of the new product come from? To what extent did the competencies you used to develop this product differ from those that you had before starting?

Subsequently, the respondents describe the nature and quality of interfunctional relationships for the specific NPD project. In our original intentions, questions about integration were at the firm and at the project level because we were open to the possibility that firms might develop different degrees of integration in each project (Griffin and Hauser, 1996). However, firms do not change the level of integration across projects; managers told us that they prefer to maintain the same level of integration across all the projects.

Finally, managers describe the performance of each project in their own words. Based on our coding of responses, managers tend to assess the performance of a new product along two dimensions. The first dimension refers to an internal measure of success, such as whether the product fulfilled the firm’s initial budget and time to market. Thus, they indicate “we needed

more money than the amount initially planned,” “we respected the scheduled plan,” or “it took more time to come out with the final product” to describe this dimension, which we label process performance. The second dimension refers to market performance (i.e., sales and market share). Functional belonging does not influence their performance assessments, such that marketing managers also talked in terms of process performance, and R&D managers also talked in terms of market performance. We defined a project as being a process success when managers told us that the project met its objectives in terms of speed, costs, and was launched in budget. A project is defined as a market success when it met managers’ expectations in terms of sales and market share.

Analysis Procedure

For each NPD project, we conduct a within-case analysis and classify the cases according to the following criteria: the nature of the relationships between the two functions, the type of technological competence developed and used during the project, the type of marketing competence developed and used during the project, and the process and market performance. A case is defined as exploring market competence when the firm developed a new product with the specific intent of enlarging its customer base and of reaching new consumers. A case is defined as exploring technological competence when the firm had to develop additional technological competences to appeal to a greater share of existing consumers. These definitions are based on Danneels (2002). We assess the level of exploitation/exploration of the competences required to develop the product according to how new the managers say that the competence is for the company. There is total agreement between the R&D and marketing managers in assessing the level of exploration/exploitation of the competences.

In a second step, we search for cross-case patterns. Because our data include both successes and failures, we compare cases of the same product innovation type and consider the relationship between NPP and integration. During this highly iterative process, the emergent frame is systematically compared with evidence from each case comparison. A replication logic is adopted in which each case either confirms or disproves our emerging propositions. The internal validity of this multiple case study is significant because all the individual case studies present consistent patterns that support the causality between the key constructs (Eisenhardt, 1989).

Conceptual Framework

For each NPD project, Table 1 reports a list of the relevant variables and an explanation of its success or failure. The characteristics of each new product are described in Appendix B.

Integration

The firms in our sample do not vary their integrative mechanisms across NPD projects, nor do they regard innovativeness as a key variable that influences the optimal level of integration. Instead, they maintain the need for a standardized approach to cross-functional relationships. Firms C and E enlist a single person in a sort of “liaison” role to facilitate contacts between the functions. This role provides an informal means of communication that exists irregularly, such as when new ideas need to be developed. Collaboration and coordination are limited, and information sharing is incomplete. The two functions operate relatively autonomously until (usually) marketing forces R&D to develop some new products, although the communications remain difficult because the personnel have different perspectives.

Firms A and D have instituted cross-functional teams with R&D and marketing personnel (as well as employees from other functions), which meet periodically to discuss progress on NPD projects and future opportunities for each function. In both firms, these meetings occur about twice a month, and the two functions are jointly responsible for the development of new products. Periodically (i.e., every four months in one firm, every three months in the other firm), the two functions jointly present new ideas to the rest of the firm. Managers describe their relationships as “peer relationships,” in which the members share a common language.

Firm B employs a product manager to manage cross-functional relationships, whose self-described role is “the bridge between functions.” Integration starts usually about 18 months before the new product launch. Communication and information sharing occurs throughout the NPD project. Marketing and R&D personnel cooperate and share common goals. The R&D and marketing managers also describe their counterparts as fundamental partners who are crucial to gain a clear idea of what the market wants and of new opportunities for the firm.

Pure Exploitation

In three projects, the firms exploited their technical competence to serve existing customers. Two cases feature

Table 1. NPD Projects

NPD Project	Level of Integration during the Project	Technological Knowledge Created	Marketing Knowledge Created	Performance	Reasons for Success/Failure
<i>Pure Exploitation</i>					
Project 1 (firm A)	<ul style="list-style-type: none"> Meetings twice a month Shared responsibility for NPD project 	Exploited existing technologies to develop a yogurt drink	Exploited existing market knowledge in the soft drink segment	Poor market performance	<ul style="list-style-type: none"> Too much communication and interaction Overly long NPD process
Project 5 (firm C)	<ul style="list-style-type: none"> R&D-marketing communication through one person Focus on functional goals 	Exploited existing knowledge to allow the use of a wider set of colors in shoes	Exploited existing knowledge in existing segments	Process failure	<ul style="list-style-type: none"> Poor interaction Overly long NPD process
Project 8 (firm D)	<ul style="list-style-type: none"> Meetings every two weeks R&D and marketing conceive of the other as a valuable partner 	Exploited existing knowledge to increase the percentage of milk in a soft drink	Exploited existing market knowledge in the soft drink segment	Market and process failure	<ul style="list-style-type: none"> Too much bureaucracy
<i>Exploiting Market Knowledge</i>					
Project 4 (firm B)	<ul style="list-style-type: none"> Project manager coordinates Frequent joint meetings Communication during the whole process Cooperation and common goals 	Explored new technologies to develop a new material that guarantees more protection and transpiration to feet	Exploited existing market knowledge of customer needs	Market success	<ul style="list-style-type: none"> Too much information exchange and joint responsibility at the beginning (poor process performance) Codevelopment of knowledge about what market wants (good market performance)
Project 10 (firm E)	<ul style="list-style-type: none"> Marketing employee visits R&D every time a new idea is developed Focus on functional goals 	<ul style="list-style-type: none"> Explored new technologies to produce a mini-candy Explored new technologies to reduce the amount of calories in a candy 	Exploited market knowledge to attract calorie-conscious consumers	Market and process failure	<ul style="list-style-type: none"> R&D spent a lot of time trying to create something new. Because of poor communication, it misunderstood marketing suggestions, and the product did not satisfy consumers
<i>Exploiting Technological Knowledge</i>					
Project 2 (firm A)	<ul style="list-style-type: none"> Meetings twice a month Shared responsibility for NPD project 	Exploited existing technological knowledge from the soft drink business to produce long-lasting milk	Explored market knowledge about how to convince customers that long-lasting milk is healthy (in Italy, regarded as unhealthy because of its lack of freshness); generated a new need	Market and process success	<ul style="list-style-type: none"> Ongoing information exchange Joint involvement to realize a successful product
Project 3 (firm B)	<ul style="list-style-type: none"> Project manager coordinates Frequent joint meetings Communication during the whole project Cooperation and common goals 	Exploited existing technological knowledge to produce comfortable shoes	Explored market knowledge to serve a new (fashion) segment	Market and process success	<ul style="list-style-type: none"> Close collaboration between R&D and marketing Reciprocal trust
Project 6 (firm C)	<ul style="list-style-type: none"> R&D-marketing communication through one person Focus on functional goals 	Exploited existing technological knowledge to produce long-lasting shoes for the fashion segment. The firm was active in the sportswear segment	Explored market knowledge to serve a new (fashion) segment. Firms tried to learn how to convince new customers to buy shoes that they could use for more than one year	Market and process failure	<ul style="list-style-type: none"> Because marketing did not share its knowledge, R&D developed a product not consistent with market needs R&D wasted a lot of time developing prototypes
<i>Pure Exploration</i>					
Project 7 (firm C)	<ul style="list-style-type: none"> R&D-marketing communication through one person Focus on functional goals 	Explored technological knowledge to produce shoes for babies	Created new marketing knowledge about parents' needs for their babies' shoes	Market failure	<ul style="list-style-type: none"> R&D did not realize that baby shoes needed different characteristics from normal shoes, because marketing did not communicate that requirement
Project 11 (firm E)	<ul style="list-style-type: none"> Marketing employee visits R&D every time a new idea is developed Focus on functional goals 	Explored technological knowledge to create a new yogurt that could reduce cholesterol	Created new marketing knowledge about consumer trends in the food industry and learned consumers are currently very interested in functional food	Market failure	<ul style="list-style-type: none"> No communication Marketing did not monitor what R&D was doing, which generated a fast NPD process but a product inconsistent with consumer tastes
Project 9 (firm D)	<ul style="list-style-type: none"> Meetings every two weeks R&D and marketing conceive of each other as valuable a partner 	Explored new technologies to develop low-calorie food with high nutrient properties	Learned how to reach new customers with diet problems, which was a new segment for the firm.	Market success	

NPD, new product development; R&D, research development.

high integration, whereas one case indicates low integration. The NPD process is much faster when the project entails low integration because the two departments are not forced to share each step and decision. For example, in project 8, the R&D department wanted to create a new drink with a higher percentage of milk to add to the firm's existing line of chocolate milk drinks. However, because the two functions must meet every two weeks to share each step in the NPD process, the development of this idea was pretty slow. The new drink was ready after several months; in the meantime, two other companies launched similar products. Because of the extended time to market, the product arrived late and never reached the breakeven point. It was withdrawn from the market eight months later.

In contrast, the pure exploitation project with low integration was a success. During the project, only two interactions occurred between the functions. The new product, a slight improvement in material, allowed for new colors for shoes. The R&D managers charged one person with communicating this capability to marketing. Marketing managers perceived it a good opportunity; the same person returned to R&D and suggested that it pursue the project. The new material was ready in time for use in the newest collection, consumers liked the new colors, and the sneakers achieved optimal sales.

Our analysis suggests two explanations for the improved performance with low integration in pure exploitative projects. First, market competence about existing customers, built up over time, is not confined in the marketing department. As the following quote shows, marketing competence tends to spill over to R&D when firms serve the same group of consumers for a long time:

Our firm has a well-established tradition in the soft drink segment. We have been active in this business for decades. Even though we are not in direct contact with the clients, we have a good understanding of what features they look for when they buy a bottle of juice. They want something refreshing that can help them feel better. You can add a new flavor; add more fruits, create a more ergonomic bottle . . . but at the end everything boils down to that. (R&D manager, project 1, firm A)

Thus, when the firm offers new products repeatedly to the same base of customers, marketing is no longer the sole repository of consumer competence; the entire organization develops such competence. Some managers suggest that this competence derives from observing the sales of previous products offered to the same groups of clients:

We have a good knowledge of our customers. Every year when we launch a new collection we get feedback from them. Some products sell, and they sell a lot; some other products simply remain in the shelf. Over time it becomes clearer what our clients like. (R&D manager, project 5, firm C)

The success, or failure, of products among a specific set of consumers thus increases R&D's market competence, and the need to exchange competence about customer needs with the marketing department declines significantly. The R&D department simply can assess the market potential of new products relatively easily by itself.

Second, when firms build on their existing technological competence, marketing's task is easier. In this case, R&D does not need to communicate critical technical competence to the marketing department. For example, in project 5, R&D upgraded an old material with some new chemical properties that made the use of a wider range of colors possible. This incremental technical information was simple to communicate and easy to understand. The new products represented a minor modification from previous products, so marketing could expend minimal effort and still educate customers.

The existence of diffuse market competence, coupled with the limited necessity for marketing to educate consumers, thus greatly reduces the amount of competence that must be transferred between departments. Therefore, the main rationale for integration—that is, combining technological and market competence—disappears for these purely explorative projects. Thus, from our analysis, we propose that:

P1: Lower integration will be associated with higher (a) market and (b) process performance for pure exploitative projects.

Exploiting Market Competence (Exploring Technical Competence)

Two projects explore new technical competence to develop a new product for its existing customers, but the firms do not develop new market competence because they already are aware of their customers' needs. One case relies on high integration, and the other entails low integration. For product 4, the marketing department observed that the current trend in the shoe market was "improved wellness for feet," then transferred this information to R&D with a request to develop a new type of shoes that could satisfy this customer need. Similarly, for product 10, marketing became aware of consumers'

desire for low-calorie foods and wanted a new product that could “visually” communicate the idea of low calories.

In these cases, R&D managers appeared highly uncertain about the appropriate direction for exploring new technological competence. In the words of the two R&D managers:

A long time ago, we had this discussion with someone from the marketing area. They told us that consumers were getting more and more attracted by low calorie food. Well, you do not need marketing guys to know that, right? They asked us to develop a candy that could stand out in this crowded segment. What does that mean? Is it the color? Is it the taste? (R&D manager, project 10, firm E)

We had many ideas about how to increase the feeling of wellness. There are many things that you can do: create micro-holes in the sole; increase the porosity of the leather; put a membrane between the sole and the foot . . . In what direction do we have to experiment? I was quite confused at the beginning. (R&D manager, project 4, firm B)

For such projects, integration has two beneficial effects. First, marketing can use its accumulated customer competence to establish the direction of the technological exploration. In firm B, which developed new shoes, R&D and marketing are both strongly committed to the overall organizational goals and collaborate for the success of new products. The project was managed by a project manager, but joint meetings and communication exchanges were very frequent. Because of this strong integration, marketing’s influence extended beyond contributing to the idea generation, to include monitoring each step in the development of the new material. The R&D department developed many prototypes for discussion with the marketing. At the end, both departments decided to adopt a new material that would guarantee higher transpiration and better protection to avoid micro-trauma. High integration thus allowed the marketing department to transfer part of its competence to R&D, which then could recognize the trajectory it should follow, among the many alternatives, to explore a product that would best satisfy consumers.

In firm E, however, the relationship between R&D and marketing depends on a liaison—a person from the marketing department who visits R&D each time her department develops a new idea. Occasionally, R&D managers contact her if they have something to communicate to marketing (e.g., a new technology development). The departments’ roles are neatly defined and distinct: Mar-

keting develops ideas to satisfy consumers, R&D focuses on improving technologies. In this case, marketing could not set the direction for the technological explorations; R&D was left alone to decide what characteristics might help a candy stand out in the crowded, low-calorie food segment. The marketing managers in firm E thus complained:

They sent us a sample of colorful candies. Each color had a different amount of calories, and consumers could select the amount of calories that they wanted. Maybe this is a nice engineering solution, but it is terrible marketing solution. Can you imagine how guilty consumers feel when they eat the orange candies with 20 calories and not the green one with 10? Everyone would rather eat the green one. (marketing manager, project 10, firm E)

Second, integration helps marketing managers understand the benefits of the technologies and turn them into selling points. In the case of the shoes with improved wellness, the R&D manager recognized:

Marketing was really important in launching a product that consumers appreciated very quickly; it knew perfectly what we were selling and had no difficulty in convincing our customers that it was a worthwhile product to buy. (R&D manager, project 4, firm B)

Due to close integration, marketing codeveloped new technological competence with R&D:

Weekly meetings helped us gradually build our understanding of the product. When it was ready, we too were ready with our marketing strategy. We knew everything about the product’s benefits. (marketing manager, project 4, firm B)

On the contrary, marketing managers for project 10 just saw the final version. After the failed effort to develop differently colored candies, R&D pursued a mini candy with just 1 calorie. Marketing believed it could succeed, although the question of how was a challenge:

They sent us this sample of mini candies, which we thought that were cute: they could stay on your finger. We started wondering: How can we convince customers to buy this product? (marketing manager, project 10, firm E)

In this case, marketing experienced pressure to introduce the product because its development had taken a long time, and had no time to develop a good strategy to convey the benefits of small candies. Consumers did not

appreciate the new candies that did not provide the pleasure of eating something sweet. This big failure was withdrawn after six months.

With regard to process performance, the managers responsible for both cases considered the process a failure, regardless of the level of integration. The project manager from firm B who managed the shoe project declared: “We had to spend hours and hours describing each single step to the marketing guys, and I was overloaded by their information.” This requirement slowed the process so much that it cost more time (and resources) than expected. The low-calorie candies project also was a process failure because R&D initially developed another product that the marketing department found inappropriate.

Projects in which a firm builds on its market competence to explore new technologies thus appear to be perceived as failures from a process perspective, regardless of the level of integration. (This point is further clarified in the Discussion section.) However, the two cases exhibit a clear differential effect of integration on market performance: High integration seems more beneficial than low integration, for two main reasons. First, R&D has many possible alternative spaces in which to explore new technologies. Without high levels of integration, it could pursue a technological trajectory that diverges from the market needs. Second, close integration enables the marketing department to learn about the added value and benefits of the new technology. Only in this situation can marketing properly convince customers to buy the new product. Thus, from our analysis, we propose that:

P2a: Higher integration will be associated with higher market performance for market exploitative projects.

P2b: Market exploitative projects will be associated with poor process performance, regardless of the level of integration.

Exploiting Technological Competence (and Exploring Marketing Competence)

In the three projects, the firm exploited its existing technical competence to enter new market segments. One case (project 6) features low integration, whereas the other two cases (projects 2 and 3) rely on high integration. High integration appears beneficial for two reasons. First, marketing must decide whether the new product meets latent consumer needs or if refinements are necessary before introducing the new product. In firm A, R&D and marketing share the responsibility for the success of new products and participate in twice-monthly meetings, during which they discuss products under development

and new ideas. During one of these meetings, R&D proposed project 2, which used the firm’s existing technology to develop a long-lasting milk product. The company was already well known in the fresh milk segment and enjoyed a strong image related to the freshness of its product. The long-lasting milk would involve a totally new market segment, and the marketing department initially resisted the idea because of its lack of experience in this market. Additional marketing research indicated that Italian consumers perceived long-lasting milk as an unhealthy product, which suggested a risk of damaging the firm’s image. Marketing communicated its newly acquired knowledge to R&D, and the departments worked together to find a solution. After a couple of meetings, one marketing person asked if it were possible to find a way to make the product more similar to fresh milk.

Second, marketing managers involved in exploiting existing technologies to enter new segments tend to be skeptical about the project, perhaps because they lack the market competence for evaluating the new product concept. This tendency appears even when the marketing department generates the new idea:

We thought that, yes, maybe we could exploit our big tradition in creating comfortable shoes and expand our market. . . . When you think of the most uncomfortable shoes, the first thing that comes to your mind is fashion shoes. How can they wear those high heels for an entire day? We thought that maybe we could introduce a new concept: comfort fashion. Is it a good idea? We were not very sure. (marketing manager, firm B, project 3)

In the case of the long-lasting milk, marketing did not completely discard R&D’s idea because it believed that R&D was able to produce a potentially good idea, although marketing needed more time to understand consumers’ potential reactions. Reciprocal trust and shared responsibility during the NPD project thus is essential in keeping both R&D and marketing committed to the project. In contrast, low trust and poor communication prompted marketing to ignore R&D’s idea in firm C, lose the faith in the project, and never develop the necessary competence to redirect existing technological competence in a direction that would be consistent with the needs of the new market.

In summary, the market performance of technological explorative projects benefits from high integration for two reasons. First, the marketing department needs to develop and then communicate to R&D the market knowledge necessary to explore existing technologies in a way that make sense for the R&D and can add value for

new customers. Second, marketing perceives an incentive to develop new competence and believe in the project only when it enjoys reciprocal trust with R&D and fully understands the potential of the new project. Thus:

P3a: Higher integration will be associated with higher market performance for technology-exploitative projects.

For these projects, the concept generation and evaluation stages tend to be longer for projects managed with high integration because marketing and R&D engage in many discussions about how to exploit technological competence to serve new segments. Our analysis reveals that in the case of technology exploitative projects, concept generation stages are critical. The physical development of the new product should begin only after marketing has developed sufficient knowledge about new consumers to clarify how existing technological competences might be adapted to the new market. For example, before starting to develop comfortable shoes for the fashion segment, the marketing department in firm B confirmed that such a concept might appeal to the fashion segment. After conducting market research, it clarified to R&D that the comfort feature should pertain to the use of new materials, such as those traditionally used for the sportswear segment, but not different ergonomics, which would have a direct impact on the aesthetic appearance of the shoes.

In contrast, when firm C developed product 6 with low integration, the infrequent contacts between marketing and R&D gave R&D little knowledge of the market: R&D wanted to create a new boot made of a new material that would allow the boots to survive more than one year, but in this target market, consumers usually buy new boots every year to match fashion trends. When R&D contacted the liaison and asked her to suggest this new product to marketing:

We did not pay so much attention to their project, we received informal information from our person, but we had thousands of other things to do . . . after a week I almost forgot what they were doing. (marketing manager, firm C, project 6)

The concept generation phase therefore was very short; marketing provided no feedback about how to tweak existing technological competence to satisfy new consumers. Therefore, R&D was left to assume that fashion consumers would be interested in boots that could last more than one year and applied a robust material, used for outdoor shoes, to develop fashion boots. This physical characteristic limited the use of colors common in the fashion segment, and the product emerged as one of the firm's biggest failures ever. That is, without collaboration

with marketing, R&D managers lacked two relevant pieces of market knowledge: Fashion consumers do not want boots that last longer than a season because they will change them to keep up with fashion anyway, and color is a critical criterion. The low levels of integration thus led R&D to exploit the wrong technological competence—long-lasting materials—to enter a clearly uninterested segment.

As for the remainder of the development process, it tends to be pretty smooth when R&D and marketing work together to gain a clear, shared idea of how to enter a new segment with existing technologies. Without such a clear understanding of what new consumers might desire, the process tends to be very long and frustrating. This lengthened process results from the lack of diffusion of market competence across departments, which contrasts directly with pure exploitative projects. We thus propose:

P3b: Higher integration will be associated with higher process performance for technology-exploitative projects.

Pure Exploration

Three projects explored new technological competence to enter new segments. Explorative projects require the firm to develop brand new market and technological competencies and then combine them. Project 9 entails low integration, whereas projects 7 and 11 feature high levels of integration.

We have described how marketing has to determine the direction for exploration when firms explore new technological competence; this finding also holds true in purely explorative projects. In contrast to market exploitation projects though, pure exploration projects feature significant uncertainty for marketing too. In project 9, firm D developed its first snack for diet-conscious consumers, which meant marketing had to develop new knowledge related to the needs of these buyers:

[The diet market] looked like a strange world to us. There were a few competitors, but many options. We could have done many things: a protein snack to provide your body with good nutrients with low calories; a no-fat snack; or a package with many smaller portions. . . . We saw that there were many different opportunities there, but we were not very sure what the best one was. (marketing manager, project 9, firm D)

With low integration, marketing let R&D decide the technological competence to explore. In project 11:

They gave us a few pieces of information. We met with their guy, who told us that we had to develop a product to reduce cholesterol. In our language, this can mean several things. . . . Only in a second meeting did we understand that they were referring to yogurt. (R&D manager, project 11, firm E)

However, when technological and market competence are codeveloped, the chances of market success improve. As marketing gains new knowledge about consumer needs, it shares it immediately with R&D; if their integration is poor, such competence never would get incorporated into the product. In the case of the cholesterol-reducing yogurt, its terrible taste made consumers reject it. As one R&D manager confirmed: “We focused on healthy characteristics and left the taste alone.” This decision represented an outcome of poor communication with marketing because no one told R&D to worry about taste, “we simply did not care about it. They should have told us, if they wanted us to focus on taste as well.”

In the high-integration project 9 though, marketing kept R&D updated during biweekly meetings that featured discussions about the latest trends in the dietetic food segment. As soon as marketing became aware that consumers were interested in food with the same taste as normal food but fewer calories, it called a meeting with R&D to discuss the point. Marketing and R&D then brainstormed together to determine what kind of technology to develop so that they could produce such a food. Members from both departments tasted all samples of possible snack bars and jointly decided which to launch.

As R&D develops new technological competence, it also needs to transfer it to the marketing department. As marketing develops the initial launch campaign, it must understand the differences between the company’s and its competitors’ offerings. This issue clearly emerged in project 7 (low integration), when the firm decided to enter the baby shoe segment. The R&D department used a particular kind of material that made the sole very soft—an important characteristics for baby shoes. However, the liaison person did not communicate this critical piece of information properly, and without any meetings between the two departments, marketing literally lost this information and never mentioned it during the marketing campaign. The R&D managers then complained vehemently and asserted that the failure to mention the feature was a main reason the company failed in its effort to enter that segment.

These cases show that low integration leads to a sequential NPD project, in which the two departments independently develop their own pieces of competence

and transfer only some information to their counterparts. When the physical development of the product finishes, R&D cannot express the benefits of the new technologies to marketing or, thus, to consumers. These two elements have negative consequences on the market performance, and we propose:

P4a: Higher integration will be associated with higher market performance for pure explorative projects.

However, managers describe explorative projects managed with low integration as successful from a process perspective. That is, the two departments could specialize in developing a single competence rather than being worried about both. This limitation had consequences that appeared positive for project performance:

Marketing put a lot of pressure over us, but fortunately, they did not bother us too much. . . . We saw their man a couple of times, and we dedicated all our efforts to develop the new product. (R&D manager, project 11, firm E)

Project 11 indeed enjoyed a shorter time to market, and the same pattern occurs in project 7 (both are managed with low integration). On the contrary, when integration is high, the codevelopment of new technological and market competencies requires more time, so managers perceive the process as unsuccessful. On the basis of our analysis, we propose:

P4b: Higher integration will be associated with lower process performance for pure explorative projects.

Discussion

Our analysis suggests two main conclusions (the performance of each type of new product innovation, classified according to its level of integration, is depicted in Figure 2).

First, the effect of integration depends strictly on the type of competence that the firm uses to develop and launch a new product. Second, integration does not have a unique effect on performance, but it is necessary to distinguish between market and process performance. In some projects, the effect of integration on the two types of performance is diametrically opposite. The effects of integration on process and market performance across the four types of product innovation are summarized in Figure 3.

Effect on Market Performance

Over time, market competence tends to spill over to R&D, especially when the firm serves the same custom-

Marketing competence	New	PURE EXPLORATION	EXPLOITING TECH COMPETENCE (EXPLORING MARKET COMPETENCE)
		Low integration Process success, market failure	Low integration Process and market failure
	Existing	High integration Process failure, market success	High integration Process and market success
		EXPLOITING MARKET COMPETENCE (EXPLORING TECH COMPETENCE)	PURE EXPLOITATION
		Low integration Process and market failure	Low integration Process and market success
		High integration Process failure, market success	High integration Process and market failure
		New	Existing
		Technological competence	

Figure 2. Performance Outcomes

Marketing competence	New	<i>Process performance</i>	<i>Market performance</i>	<i>Process performance</i>	<i>Market performance</i>
		High Integration: Parallel process. Many interactions between the two departments	High Integration: Market and technological knowledge codevelopment	High Integration: Market knowledge acquired at the very beginning.	High Integration: R&D uses marketing for tuning technological competencies
	Low integration: Sequential, fast process	Low integration: Marketing lets R&D decide the technological competencies to explore	Low integration: Market knowledge acquired toward the end. Process has to start over	Low integration: Tech knowledge exploited in a manner not consistent with market needs	
	Existing	<i>Process performance</i>	<i>Market performance</i>	<i>Process performance</i>	<i>Market performance</i>
High Integration: Long ideation stage. Long development stage.		High Integration: Marketing sets the direction for technological exploration	High Integration: Redundant knowledge transferred	High Integration: Competitors enter the market before the company	
	Low integration: Marketing has the knowledge to understand that the product is not consistent with market needs. Process has to start over	Low integration: Marketing cannot turn new tech competencies into selling points	Low integration: Fast process	Low integration: No need to transfer knowledge across departments (knowledge already diffused)	
	New	Technical competence	Existing		

Figure 3. The Reasons behind the Effects of Integration on Process and Market Performance

ers repeatedly. This effect can reduce the need to integrate marketing and R&D when the firm exploits existing market competence. However, when the firm enters a new segment, marketing gains a privileged role with regard to understanding new consumers, so higher integration enhances market performance by facilitating the transfer of newly acquired competence to R&D.

A similar pattern holds for technological competence: When the firm offers the same technology repeatedly, marketing develops an excellent understanding of its benefits for customers. Again, this scenario may reduce the need to integrate R&D and marketing closely.

We note here that this finding might be due to the fact that we analyzed low-tech industries, in which technological competencies might potentially be less complex and easier to transfer in high-tech industries. It might be that, in high-tech industries, the marketing department would still need some guidance from the R&D department because marketing is not able to fully grasp the technological competence. Thus, the need for integration could potentially be higher in high-tech industries than in low-tech industries.

However, when the firm explores new technological opportunities, marketing plays a critical role: as firms have so many different routes to explore, marketing needs to set a direction that will be consistent with market needs. Without integration at the beginning of the NPD process, the firm bears the risk of exploring alternatives that will not really generate benefits for customers. Furthermore, high integration throughout the NPD project appears to benefit market performance because marketing mediates between R&D and consumers. Through higher levels of integration, R&D can transfer newly developed technological competence to marketing, which then communicates the new product benefits to consumers for their evaluation. Due to the higher complexity, this need for integration could be even higher in high-tech industries.

Effect on Process Performance

Our analysis reveals that process and market performance may diverge, in the sense that what is beneficial for the former is not always beneficial for the latter. Low integration has a positive effect on process performance for the two extreme types of innovation projects, pure exploration and pure exploitation. When firms must develop new technological *and* new market competencies, low integration increases the speed of the NPD process because the two departments sequentially and independently develop their own competence. High integration slows the NPD process and demands more resources than expected. A

similar pattern occurs when firms explore no new competence, but not when the firm develops either new technological *or* new market competence. For such projects, low integration has a negative effect on process performance.

For exploitative projects, the firm must update existing market (technological) competence and combine it with newly developed technological (market) competence. For market-exploitative projects, the marketing department possesses the competence necessary to understand that a product proposed by R&D might not succeed. However, when integration is low, the marketing department does not set the direction for technological exploration so that there are higher chances that R&D will develop an inappropriate prototype (e.g., the mini candy in project 10). Therefore, R&D turns to other alternatives, and the NPD process continues, requiring more time and money than might initially have been budgeted.

In technology-exploitative projects, firms need to develop new market competence to reuse or reapply technological competence. The process tends to achieve greater success when market competence exists in very early stages, which allows for the exploitation of existing technological competence in ways that are consistent with the needs of new consumers. Thus, the final product can be introduced to the market more quickly. However, early competence development occurs only when high integration marks the marketing–R&D relationship. In the absence of high integration, marketing begins to acquire consumer knowledge only when the project is near to completion. Because R&D is left alone to develop market knowledge for virtually the entire process, the firm wastes time and resources trying to determine what consumers might want. Technology-exploitative projects managed with low integration therefore tend to represent failures from a process perspective.

As the effect of integration on market and process performance changes across the different type of innovation projects, the observation reveals that:

In the case of pure exploitation and technological exploitation projects, integration has a consistent effect on both market and process performance, such that low and high levels of integration, respectively, benefit the two types of performance.

In the case of pure exploration and market exploitation projects, there is trade-off; high levels of integration have a positive effect on market performance but a negative influence on process performance.

The existence of a trade-off between reduced time to market and post-launch performance for radical new

products is known in the literature (Calantone and Di Benedetto 2000). This research adds to the notion that this trade-off exists when the firm has to develop new market competence (i.e., market exploitation projects) or when it has to develop both market and technological competence; however, there is no trade-off when the product is radical in terms of technological competence (i.e., technological exploitation projects).

Conclusions

The literature offers contradictory perspectives regarding the effect of R&D–marketing integration on NPP. Some researchers posit that more integration is better; others contend that the ideal level of integration depends on the context. Because a principal goal of integration is to combine critical competencies, investigating the role of the type of competence developed to introduce a new product could resolve this apparent contradiction. We find that R&D–marketing integration has varying effects on NPP, depending on the competence critical to introduce a successful new product. This important expansion and contribution to theory reveals that the beneficial effects of integration are contextual rather than universal. These findings are in line with Hansen (2009), who reports that in some instances, collaboration is detrimental more than beneficial for firm performance. Also, inasmuch as Hansen (2009) suggests, our analysis reveals that the optimal level of integration has to be determined at the project level before the new project starts. While Hansen (2009) proposes to determine the level of integration according to (1) the return from collaboration, (2) the opportunity cost, and (3) the collaboration cost, our work suggests that the type of competencies to be developed in the project is another relevant element to account for. Further, the analysis reveals the need to assess performance along two dimensions: process performance and market performance. The effect of integration varies across the two types of performance. Only when we disaggregate NPP into its sub-dimensions it is possible to fully appreciate the moderating role of the type of product innovation.

This paper also contributes to the much debated topic of the role of marketing in the development of disruptive technologies. Christensen (1997) argues that firms fail to develop disruptive technologies when they listen too carefully to their customers. The author argues that incumbents initially refuse to develop disruptive technologies not because they do not have the competence to develop them but because the mass market is not initially able to perceive the value of a disruptive

technology (Christensen and Bower, 1996). Our analysis reveals that for projects that explore new technological competence, the added value of R&D–marketing integration relies on marketing’s capability to understand the value of the new technology and to communicate it to customers. Hence, our work contributes to this debate, by showing that close integration between R&D and marketing is critical for firms that want to develop disruptive technologies to communicate the benefits to consumers and, hence, have an incentive to develop these types of technologies.

These results also contribute to the current debate on how firms can pursue both exploration and exploitation. Some scholars suggested that ambidextrous organizations should use lower level integration mechanisms to stimulate the knowledge flow across units (Gilbert, 2006). Our findings reveal that low integration is helpful for exploitative projects, and—in the case of explorative projects—it improves the process performance but has a negative effect on the market performance. Hence, these projects should be managed with high integration, provided that the ultimate goal is to gain market acceptance. Our findings provide strong support for that stream of literature that argues that the optimal level of integration is strictly dependent on the extent to which a project involves exploitative and explorative activities (Gulati and Puranam, 2009). Managers’ capability to recreate every time the optimal level of integration in each project can hence be considered as a dynamic capability that sustains firm’s ambidexterity (Raisch et al., 2009).

Managerial Implications

Explanations provided by managers to justify project failures point to the inappropriate level of integration as a main cause. When discussing product failures, we never asked the managers to explain what went wrong in their relationships with the other unit; the managers themselves spontaneously and explicitly referred to something wrong with the level of integration. In the past decade, managers repeatedly have heard about the importance of cross-functional teams and joint participation in NPD processes. However, excessive integration may be harmful in projects with minimal newness. Therefore, when planning relationships with other departments, managers should carefully evaluate the type of competence they need to develop and launch their product successfully. When the new product does not require new competence, it is preferable not to employ a process in which R&D wastes time discussing nothing of apparent value and each function interferes with the other’s goals.

The firms in our sample managed NPD projects with a constant level of integration, such that they did not consider the type of product innovation to be a relevant condition when deciding how to manage R&D–marketing relationships. Data do not provide a strong evidence that managers are reluctant to change their level of integration: it seems that managers do not tend to vary it at the beginning of each project because they do not think that this might change the fate of the project. It is our belief that managers implement the same level of integration not because they are not able to change it but because little research so far has showed the value of a contingent approach to integration. Our findings directly contradict this managerial perspective: By analyzing two projects for each firm, one success and one failure, our analysis clearly shows that integration must change across projects depending on the type of new product being developed. Our study makes an important contribution to managers by providing empirical evidence that they should (1) provide more attention to integration in each project; and (2) change it across projects. Our framework has value because it clearly suggests a flexible, project-specific approach to integration that is overlooked by interviewed firms.

Managers can manipulate the level of integration in a project by adopting different organizational mechanisms to link R&D and marketing. As our cases show, different mechanisms lead to different levels of integration: for instance, the liaison role adopted in firm C generates lower integration between departments than the project managers employed in firm B. These findings are consistent with Galbraith's (1977) hierarchy, in which organizational mechanisms are classified according to the level of integration that they are able to create between departments. Organizational mechanisms such as direct contacts across managers who share a problem, liaison roles, and temporary task forces create low levels of integration. Organizational mechanisms such as cross-functional teams and integrating roles (e.g., product managers or brand managers) produce moderate integration. Linking managerial roles generates the highest level of integration. This hierarchy provides managers with a working tool to influence the level of integration in each project. The key suggestion from this study is to adopt the organizational mechanisms according to the level of integration needed, rather than always adopting the same mechanism. For instance, firm B adopts a project manager for each project. This study suggests that direct contacts between the R&D and marketing head of department can be used for pure exploitative projects, while the project manager should be used only for projects that explore new technological/market competence.

Our analysis also reveals that exploring new technological competence is a problematic process because integration may have an opposite effect, depending on the type of performance being assessed. Too much integration slows the process, mainly because R&D must consider marketing's insights and cannot focus solely on product development. However, repeated interactions result in the development of a product that better meets consumer needs. That is, managers face a trade-off in NPD involving new technological competence: They can either focus on the efficiency of the process or sacrifice process performance for market success. The latter seems more important overall, so we suggest that managers of these projects emphasize strong integration but prepare for some inefficiency during the process.

Limitations and Further Research

Some limitations of this work should stimulate further research. First, the paper investigates competence as a single factor that influences the ideal level of integration. Other factors also could influence this optimum level; for example, product complexity, another variable related to competence needs, could be worthy of investigation. Second, our study centers on the interface between marketing and R&D, but other functions also provide relevant contributions during the NPD process (Song et al., 1998). Production capabilities are critical during the NPD process to ensure efficiency, and their relevance may vary according to the type of product innovation. Additional research into these issues would be particularly relevant, given the current tendency to include virtually all corporate functions in the NPD process. Perhaps different levels of integration would be appropriate, even within the same project, to manage functional interfaces. Third, the paper analyzes projects in two industries. Although there is no prior or posterior reason to suspect sector-biased results, we cannot confirm that NPD works the same way in other industries, especially services. Further research therefore should investigate these issues in other contexts, such as business-to-business markets in which marketing and R&D may have different relevance, which would affect their reciprocal relationships and perhaps lead to different outcomes. Also, our sample is in low-tech industries. While special care was paid to include in our sample companies that invest a significant amount of their resources in R&D and are involved in the development of new technological knowledge, it might be necessary to investigate the same relationships in high-tech industries.

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Appendix A. Firm Characteristics

	Firm A	Firm B	Firm C	Firm D	Firm E
Employees	2008	2220	1455	1051	10,255
Turnover in 2005	890 million €	96 million €	146 million €	700 million €	1435 billion €
Investments in R&D	6% revenues	5% revenues	8 million €/year	45 million €/year	75 million €/year
Investments in marketing	11% revenues	9% revenues	15 million €/year	110 million €/year	120 million €/year
New products per year	40–50	15–20	30–35	30–35	15–20
Competition areas	Europe, Asia	Europe, China	Europe, Far East	Europe, Americas, Asia	Europe, United States

R&D, research and development.

Appendix B. Brief Description of Project Characteristics (Project Presented by Innovation Type)

Project	Description	Product Innovation Type
Project 1 (firm A)	Yogurt drinks. Two other competitors also were producing them. Firm had the competence to produce too. R&D proposed the idea but spent a lot of time discussing with marketing if it was a good idea. When eventually launched, consumer preferences for this type of beverage had dropped dramatically.	Pure exploitation
Project 5 (firm C)	New sneakers with a slightly improved material over that used the year before. The product rapidly achieved market share and was widely appreciated by consumers	Pure exploitation
Project 8 (firm D)	A new beverage with a relevant percentage of milk. Similar beverages already existed in the market. The firm did not require new competencies. Because of a slow NPD process, the product launched when the market was already saturated.	Pure exploitation
Project 10 (firm E)	A mini-candy with only 1 kcal; thus, consumers may have many “sweet” moments during a day, because of the low calories of each candy. It was the first time this idea was introduced in the market. The product failed because the candies were too small. Consumers felt they were consuming calories without the pleasure of eating candies.	Exploiting market knowledge
Project 4 (firm B)	New shoes made of a material that guarantees more protection and higher transpiration to feet. The material is new for the firm, developed by R&D.	Exploiting market knowledge
Project 2 (firm A)	A bottle of long-lasting milk that maintains all the properties of fresh milk. It is an interesting innovation for the Italian market, in which such milk is regarded as a unhealthy product because of its lack of freshness.	Exploiting technological knowledge
Project 3 (firm B)	Wedge that offers comfort and wellness. A new product in the fashion market, combining design with comfort. Patents and technologies developed by the firm for other segments were tailored to the new target.	Exploiting technological knowledge
Project 6 (firm C)	New boots with materials traditionally used for other types of shoes that would allow the boots to survive more than one year. The new marketing concept contrasted with previous usage, because boot consumers traditionally buy new boots every year to follow fashion trends. The product failed because consumers in this segment did not want to keep the same boot for more than one year.	Exploiting technological knowledge
Project 9 (firm D)	Snacks to substitute for meals.	Pure exploration
Project 7 (firm C)	A series of new shoes for babies. The firm usually targeted other segments and therefore had to develop new competencies: technological, related to the characteristics of the shoes for babies, and marketing, related to the promotion of the product’s benefits in a brand new segments. Roughly speaking, R&D simply reduced the size of the shoes. The product failed because it lacked the usual characteristics (e.g., softness) of baby shoes	Pure exploration
Project 11 (firm E)	Yogurt that helps reduce cholesterol.	Pure exploration

R&D, research and development.