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ORIGINAL EMPIRICAL RESEARCH

Strategic fit to resources versus NPD execution proficiencies: what are their roles in determining success?

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Abstract This research examines the roles of strategic 'fit' versus execution proficiency in creating superior performance for new products. Specifically, we compare main effects versus moderation effects models of execution proficiency within a resource-based view (RBV) framework. Four new product success dimensions are outcomes. Marketing 'fit' and technological 'fit' are viewed as *resource fit advantages* and are antecedents in the model; marketing versus technical *execution proficiencies* relate to the project's execution. The results show that the proficiencies-as-moderators model is the better fitting one; marketing but not technical proficiency is the key moderator. The results regarding resource fit advantage show that (1) both marketing fit and technological fit were positively related directly to profitability and to new product advantage; (2) marketing fit had direct positive effects on customer need met; and (3) neither marketing fit nor technological fit predicted speed. Concerning execution proficiencies: (1) technical execution proficiencies led to higher profitability and customer needs met, as well as speed; and (2) marketing execution proficiency was the *only* construct that led directly to increased success on all four dimensions examined in this research. Overall, support was found for the general premise that *both* marketing and technological resource fit advantages *and* marketing and technical execution proficiencies are significant predictors of new product success factors, with marketing proficiencies having additional moderating effects on the relationship of resource fit to performance.

Keywords Strategic resource fit · Execution proficiencies · New product success factors · New product development

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Introduction

The path to achieving positional advantages in today's marketplace is through developing and commercializing value generating innovations (Chandy and Tellis 1998; Griffin and Page 1996; Hamel and Getz 2004). However, due primarily to cost escalation in R&D (research and development), rapid technological developments, the shortening of product life cycles, and intensified international competition, returns on new product development (NPD) investments are often not satisfactory (De Brentani 2001; Griffin 1997). The failure rate can be 50% or more (Schmidt and Calantone 2002; Wind and Mahajan 1997).

Controllable reasons for failure include the poor execution of NPD technical and marketing activities (Atuahene-Gima and Ko 2001; Cooper and Kleinschmidt 1987; Di Benedetto 1999), and thus there has recently been increasing emphasis on execution issues (rather than on the generation of ideas and/or strategies; Olson et al. 1995).

Strategy begins with the evaluation of resources that exert leverage on competitive advantage and with the identification of sources of synergy or "fit" (Day and Wensley 1988; Mahoney and Pandian 1992; Vorhies and Morgan 2003; Walker and Ruekert 1987). Research on NPD project success has focused on available firm resources and has linked these positional advantages and performance outcomes (Di Benedetto 1999; Montoya-Weiss and Calantone 1994). This research is largely consistent with the resource-based view (RBV), which explains the achievement of sustainable competitive advantage by uniqueness in resources, including unique assets, proprietary know-how, and differential core abilities (Penrose 1959; Peteraf 1993; Prahalad and Hamel 1990; Wernerfelt 1984). However, NPD execution issues have been comparatively neglected (Noble and Mokwa 1999), and thus our goal is to incorporate execution proficiency constructs into models anchored in the RBV.

Our review of the literature revealed two views: (1) resources and execution proficiency *together* engender competitive advantage (Barney 1991; Madhok 2002); and (2) advantages accrue from better deployment of resources, rather than better resources per se (Day and Wensley 1988; Mahoney and Pandian 1992; Penrose 1959). Accordingly, we address the following questions that are of interest to both researchers and practitioners. First, is the NPD project's *fit with existing resources* a guarantee for market success (or do execution proficiencies play an additional main effects role)? This first question addresses the main effects of resource "fit" advantage versus proficiency in NPD execution (i.e., deployment of resources through execution). Second, is NPD execution proficiency a moderator of the fit-performance relationship? We thus develop and test models of new product success that investigate whether project fit (marketing fit versus technological fit): (a) is sufficient to directly engender success, with execution proficiency explaining no additional variance or (b) engenders success in combination with execution proficiency (moderation model). Four new product success outcomes are considered: new product profitability, product advantage, speed, and customer needs met. The results have implications for the marketing, strategy and innovation literatures.

We begin by defining model constructs and presenting an overview of the models. Hypotheses for both direct and interaction effects are then developed and tested. The results are followed by a discussion of managerial and theoretical implications.

Theoretical background and model overview

The meaning of new product success

Firms creating superior, unique and novel products should enjoy success (Atuahene-Gima and Ko 2001; Day and Wensley 1988; Gatignon and Xuereb 1997). New product 'success' can have many meanings however. We include four success constructs to capture both efficiency and effectiveness in attaining the competing NPD goals such as providing value-generating innovations, ensuring speed to market, and obtaining profits (Bayus 1997; Crawford 1992; Millson et al. 1992). It is important to examine each of these four success constructs separately because managers in general have limited resources and are challenged to make trade-offs in emphasizing either efficiency or effectiveness (Morgan et al. 2002; Walker and Ruekert 1987). For example, the pressures to quickly develop new products at the lowest possible cost and/or risk have often led to poor execution and/or a preference for incremental actions (Calantone et al. 1997; Olson et al. 1995). In such cases, projects that 'fit' existing resources are developed to the exclusion of more profitable radical innovations (Smith and Andrews 1994; see also the meta-analysis by Szymanski et al. 2007); this results in an unwarranted focus on speedily 'doable,' incremental projects. Our four success constructs are described next.

First, many researchers in the RBV, innovation and marketing literatures focus on financial outcomes such as the extent to which the new product achieved its sales and profit objectives (Atuahene-Gima 1996, 2005; Cooper and Kleinschmidt 1995; Gatignon and Xuereb 1997; Griffin and Page 1996; Montoya-Weiss and Calantone 1994). Thus our first dependent construct is *new product profitability* (i.e., the sales and profit impact and the degree to which product profitability goals are met).

Second, NPD speed (or NPD cycle time) is a critical competitive variable because rapid product obsolescence, especially in turbulent environments, necessitates timely introduction of new products. Firms can reap pioneering advantages through speed; however, speed could be even more important for second-mover rather than first-mover advantages (Ali et al. 1995; Cooper and Kleinschmidt 1994; Filippini et al. 2004; Kessler and Chakrabarti 1999). Hence our second dependent construct is *new product speed* (in development and commercialization).

Third, some researchers have emphasized comparative *product advantage*, which refers to the product's superiority to competitive products. Montoya-Weiss and Calantone (1994), Langerak et al.'s (2004) and Henard and Szymanski's (2001) meta-analyses identified *product advantage* as the most important success dimension. Thus we include *new product advantage*, the degree to which the product has

unique attributes, and is superior in quality and technical performance compared to rival products (Calantone and Di Benedetto 1988; Cooper and Kleinschmidt 1987; Song and Parry 1996, 1997).

Fourth, it is important that products provide advantages in the eyes of the customer (Cooper and Kleinschmidt 1987, 1995; Montoya-Weiss and Calantone 1994; Souder et al. 1997). Products that better match needs, reduce costs and/or expand consumer abilities *in clearly communicable ways* are more likely to succeed (Hultink and Robben 1999). Thus our last construct, *customer needs met,* concerns the consequences of the consumer's use of the product (i.e., a product's utilitarian and hedonic functions for the consumer; Hirschman and Holbrook 1982; Michael et al. 2003). More specifically, we tap managers' evaluations of customer needs met.

Together, *new product advantage* and the degree of *customer needs met* indicate the NPD project's effectiveness goals have been met. Rijsdijk et al. (2009) differentiate between the extent to which a new product *is superior to competing offerings* versus the degree to which a new product offers *consumer benefits*. In a similar fashion, the "new product advantage" construct reflects the extent to which a new product is superior over competing offerings (Cooper 1979; Day and Wensley 1988), whereas the "customer needs met" construct reflects benefits that are perceived to be meaningful to the customer (i.e., important, easy-to-communicate, useful, and visible; Firth and Narayanan 1996).

Theoretical background: resource fit and NPD execution proficiency

In this study, the resource-based view (RBV) of the firm is used to frame the roles of resource 'fit' and execution proficiency in predicting the four success dimensions previously defined. Marketing 'fit' and technological 'fit' are viewed as indicators of *resource fit advantages*, while marketing versus technical *execution proficiencies* relate to the proficiency of implementation of NPD strategy for a particular project.

Resources can be tangible or intangible (Day 1994; Peteraf 1993; Prahalad and Hamel 1990). Resources that are valuable, rare, imperfectly imitable and not substitutable can lead to persistent advantage due to the isolating mechanisms and causal ambiguity faced by competitors (Barney 1991; Mahoney and Pandian 1992; Peteraf 1993). Firms that conceive of and implement strategies to exploit such resources outperform rivals in competitive markets (Barney 1991; Penrose 1959). In general, RBV research identifies resources as underlying competitive advantage (Day and Wensley 1988; Madhok 2002): (1) firm are idiosyncratic bundles of resources, and (2) differential market performance is due to this heterogeneity (Menguc et al. 2007; Peteraf 1993; Thorpe and Morgan 2007; Wernerfelt 1984). In short, heterogeneous, immobile resources that are superior will result in success (Teece et al. 1997).

In the NPD literature, some research focuses on the roles of resources in determining success (Barczak 1995; Gatignon and Xuereb 1997). Studies have reported that the success of a new product project depends on: (1) *marketing* resources (e.g., sufficient marketing budget, sales force and personnel training, marketing intelligence, access to distribution channels); and (2) *technological* resources (e.g., R&D budget, personnel and expertise, manufacturing technology) (see Calantone and Di Benedetto 1988; Cooper 1979; Montoya-Weiss and Calantone 1994). Our focus is on the strategic 'fit' of the new product project to available resources, specifically in terms of 'fit' with marketing resources and/or technological resources (Cooper and Kleinschmidt 1987; Song and Parry 1996). Fit is fundamental to sustainable competitive advantage because fit is firm-specific and difficult for competitors to imitate (Cooper, Edgett and Kleinschmidt 1997; Olson et al. 1995). Furthermore, fit can imply resource efficiency through a more focused scope of attention, the applicability of standard firm practices, and the existence of relevant knowledge bases (Mahoney and Pandian 1992; McKee, Varadarajan and Pride 1989; Wernerfelt 1984).

Other NPD research identifies execution proficiencies associated with different NPD stages as important determinants of success (Di Benedetto 1999; Griffiths-Hemans and Grover 2006; Kleinschmidt and Cooper 1991; Schmidt and Calantone 2002; Song and Parry 1997; Troy et al. 2001). Our focus is on execution proficiencies in marketing versus technical NPD activities (Calantone and Di Benedetto 1988; Noble and Mokwa 1999; Song and Parry 1997); these two proficiency constructs mirror the two resource fit constructs. In relation to a particular new product project, we define: (1) *marketing execution proficiency* as competence in initial screening, preliminary market assessment, detailed market study, customer tests of the product, and market launch; and (2) *technical execution proficiency* as competence in preliminary technical assessment, prototype development, pilot production and production start-up. Thus the domain of the two execution proficiency constructs spans development activities as well as launch activities.

Overall, NPD resource fit and execution proficiencies enable businesses to formulate and implement new product strategies that improve market performance, exploit market opportunities, or eliminate future competitive threats (Barney 1991; Day and Wensley 1988; Verona 1999). However, key questions are left unanswered. Are resource fit advantages sufficient for success? If the answer is "yes," then the impli-

cation is that firms may be better off focusing on incremental NPD projects for which they already have the relevant available resources; perhaps radical NPD projects should be outsourced or jointly developed with other firms. However, execution proficiencies may affect outcomes even when the effects of resource fit advantages are accounted for: (1) resource fit and execution proficiencies may each engender sustainable competitive advantage (Barney 1991; Madhok 2002), or (2) distinctive execution proficiencies, through which the value of resources is realized, may be the real sources of advantage (Day and Wensley 1988; Penrose 1959). These issues are of interest to marketing, strategy and innovation researchers, as well as to practitioners.

Overview of the main effects and moderation models

One goal of this research is to incorporate "fit" to resources and NPD execution proficiencies into one model predicting new product success. Accordingly, model constructs include (Fig. 1): (1) *strategic resource fit,* comprising marketing and technological fit as exogenous constructs; (2) *proficiencies in NPD execution*, again both marketing and technical; and (3) four *new product success factors*. We develop below *a baseline Fit&Proficiency model* which models all four main effects and *a moderation (interaction) effects model*, which also includes the interaction effects of fit and proficiencies (Fig. 1). The next sections develop model hypotheses.

Development of research hypotheses

The main effects of fit and proficiency (baseline fit&proficiency model)

Uncertainties in the market environment create impetus for firms to implement changes and invest in internal NPD resources (Calantone et al. 1997; Calantone et al. 2003). RBV posits that resources are heterogeneous across firms (Barney 1991; Mahoney and Pandian 1992), and that resources (1) defy imitation as they are causally ambiguous and tacitly complex, and (2) are idiosyncratic as they develop and accumulate within the firm, and thus are immobile and bound to the firm. A project's fit to NPD resources should provide a competitive advantage to the project's resultant product.

Adequate marketing and technological resources have been shown to increase market success of new product projects (Atuahene-Gima 1996; Barczak 1995; Calantone et

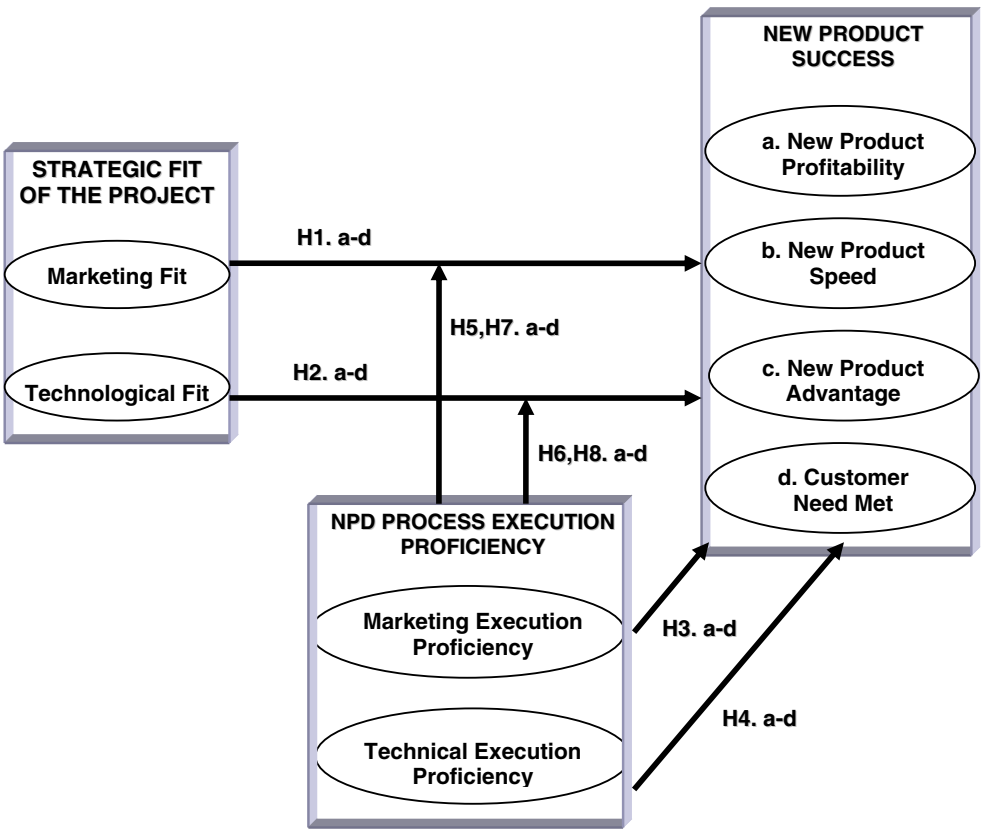

Fig. 1 Hypothesized model of fit and proficiency. Note: In the text: the baseline "Fit&Proficiency" main effects model has only the main effects as specified in H1, H2, H3, and H4 (a–d). The "Moderation" model has these main effects, as well as the interaction effects as specified in H5, H6, H7, and H8.

al. 1997). Projects considered successful entailed higher synergy (Cooper 1979; Di Benedetto 1999; Lee and O'Connor 2003; Zirger and Maidique 1990) and the development of products that build on existing resources seem to engender higher success rates (Day and Wensley 1988; Song and Parry 1996, 1997). Song and Parry (1996; 1997) found that both technological and marketing synergy had positive effects on performance.

However, some researchers proposed but did not find a positive relationship between the project's resource fit and performance. For instance, Cooper and Kleinschmidt (1987) compared new products based on project fit and familiarity, and concluded that fit is not significant in success/failure prediction. However, they did not distinguish between different dimensions of fit. On the other hand, *lack of* fit may decrease performance on some performance dimensions. Ali et al. (1995) and Kessler and Chakrabarti (1999) found that firms pursuing unique and differentiated products – which presumably do not fit particularly well – took a longer time and entailed higher development costs; however, such radical NPD projects may be the most profitable (Szymanski et al. 2007).

A review of this literature shows that: (1) some of these studies did not differentiate marketing versus technological fit (e.g., Kleinschmidt and Cooper 1991; Zirger and Maidique 1990); (2) some did not examine various success dimensions and thus were unable to detect differences in relationships (e.g., Song and Parry (1996, 1997) focused only on financial performance); and (3) some employed imprecise measurement such as "having more than adequate resources" (e.g., Di Benedetto 1999; Song and Parry 1997; Souder et al. 1997). We address these shortcomings by including *both* marketing and technological fit (Barczak 1995), four performance dimensions, and direct measures of fit.

Our conceptualization and measurement of fit is consistent with the suggestions of Cooper et al. (1997) that businesses should concentrate on NPD projects that are consistent with strategic direction *and* resource boundaries. Strategic fit indicates the degree to which internal resources *match* the requirements of the new product project (Souder et al. 1997); good fit should lead to good performance on most performance dimensions, according to NPD research. Similarly, the RBV maintains that (1) resources provide both the basis and the direction for the growth (Mahoney and Pandian 1992; Peteraf 1993); and (2) related diversification (i.e., that "fit") as compared to unrelated diversification results in higher returns because of the greater likelihood of synergy (Barney 1991; Mahoney and Pandian 1992). Furthermore, strategic fit entails a focused scope of attention, with synergies from extant knowledge and standard practices; and hence fit may provide time and cost efficiencies as well as the ability to retain and satisfy existing customers (McKee et al. 1989; Wernerfelt 1984). Therefore, we propose:

H1. *Marketing fit is positively related to (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

H2. *Technological fit is positively related to (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

It should be noted that these hypotheses are not trivial. Poor NPD projects could nevertheless fit well: projects that "fit well" may be just marginally good projects, or they may be incrementally new projects having little distinct advantage. Marketing fit signifies the match to *existing* marketing resources, which may not be suited to radically new products. Technological fit taps the suitability of the project to the *existing* R&D and manufacturing expertise, but radically new products may demand new technologies and development requirements. Truly new, highly innovative products may require new resources, new processing abilities and new systems, and entail less synergy with prior technologies and marketing practices (Chandy and Tellis 2000; Danneels and Kleinschmidt 2001; McDermott and O'Connor 2002). Thus radically new, highly innovative products with high profit potential may fit poorly and take longer to develop, cost more, and do not meet customers' current needs (but rather, create entirely new needs). Finally, the resource base itself may not be superior in the RBV sense (e.g., resources may not be valuable or rare; there may be substitutes); it is possible that the NPD project fits well, but to an inferior or an easily duplicated resource base. Thus NP projects that fit existing resources may not lead to superiority on all performance metrics examined here; i.e., H1 and H2 are not trivial.

We also argue that proficient marketing and technical execution should enhance performance in the case of NPD projects (given that the fit constructs are in the model). More specifically, the early NPD stages give rise to new product ideas and detailed market analyses (Kleinschmidt and Cooper 1991), which specify how projects potentially benefit customers (McDermott and O'Connor 2002; Schmidt and Calantone 2002). In these earlier stages, proficiencies in marketing and technical appraisals reveal relevant information about the market and consumer preferences, as well as about competitive products, technologies and strategies. This information can be utilized in quicker, more adept decision-making about what product concepts to bring to prototype (Calantone and Di Benedetto 1988).

Prototype development and testing generally focuses on the technical attributes of the product (Griffin 1997) and involves turning a new product idea into an entity with high quality and minimal defects. Technical proficiency in these

early stages increases the likelihood that the product offering is relatively error-free and that the design meets customer expectations. Marketing skills in identifying the particulars of potential markets and technical skills in identifying and testing possible product prototypes may allow the building of consensus and the reduction of task uncertainties, which in turn may minimize market risks and maximize both sales/profit potential and competitive advantage (Johne and Snelson 1988; Kessler and Chakrabarti 1999). Time may be saved in these earlier stages, and the probability that the product ultimately provides unique customer value is enhanced.

In later NPD stages, proficient market testing can identify any difficulties customers face in adoption as well as difficulties in communicating product benefits, while proficient product testing under "real world" conditions may identify technical product improvements before commercialization. Responsiveness to these testing results can significantly increase quality, uniqueness and/or customer value (Di Benedetto 1999). Finally, proficiency in production start-up leads to fewer reviews and production delays, and thus commercialization time, costs and risks may be reduced (Calantone and Di Benedetto 1988; Cooper and De Brentani 1991). Overall, execution proficiencies enable firms to identify and exploit opportunities for positional advantages, while possibly reducing costs, risks, and time needed.

H3. *Marketing execution proficiency is positively related to (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

H4. *Technical proficiency is positively related to (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

The moderation effects of NPD execution proficiency

The moderation effects model (Fig. 1) examines whether marketing and technical execution proficiencies **moderate** the impact on performance of marketing and technological fit (viewed as resource fit). Overall, the idea that obtaining the performance impact from resource endowments is intertwined with proficiency in deploying and utilizing these endowments has some support: the attainment of competitive advantages may rest upon proficiency in *utilizing* distinctive and superior resources (Peteraf 1993; Prahalad and Hamel 1990; Walker and Ruekert 1987). Stating it differently, Peteraf says "the productivity of superior resources depends upon the nature of their employment and the skill with which a strategy based on resource superiority is implemented" (1993; p. 186).

The moderation model – if supported – implies first that the best (/worst) new product performance will occur when *both* resource fit *and* execution are superior (/inferior); i.e., the main effects are positive, as in H1 through H4. Second, it implies that the interaction of execution proficiency and resource fit is significant: below, we argue for H5 through H8 concerning these interactions.

First, consider how marketing execution proficiencies may impact the performance benefits accruable from resource fit. The early NPD stages focus on new product ideas and detailed market analyses (Kleinschmidt and Cooper 1991). Excellence in marketing execution will reveal all relevant information about market and consumer preferences, as well as about competitive products and strategies. This knowledge base may simplify future NPD stages by quickly and significantly narrowing the number of product-market combinations. Prototype development and testing will then be easier because fewer designs need to be considered and designs that meet customer expectations will be easier to identify. Thus marketing execution excellence in early stages may ameliorate the impact of an *a priori* lack of marketing or technological fit by reducing the number of possibilities, and hence task uncertainties; reduced uncertainties may minimize time spent and maximize both sales/profit potential (Johne and Snelson 1988; Kessler and Chakrabarti 1999).

In later NPD stages, proficient planning and market testing can identify customers' difficulties in adoption as well as other difficulties in the marketing launch plan (such as communication or pricing difficulties). Proficient testing produces product-market knowledge under "real world" conditions; such knowledge may identify both marketing and technical glitches that less-than-ideal resource fit may have engendered. Errors and omissions can be corrected and such responsiveness can significantly increase quality, uniqueness and/or customer value (Di Benedetto 1999). Proficiencies in market testing and subsequently promoting and commercializing the product may increase the likelihood that marketing and technological resources are actually transmuted into advantages such as meeting the market demand, reducing launch risks, and engendering market positional advantages (Kleinschmidt and Cooper 1991; Song and Parry 1997). In short, excellence in marketing execution produces superior product-market knowledge throughout the NPD process, and superior knowledge may ameliorate the impact of inferior fit to resource endowments. Therefore:

H5. *Marketing execution proficiency positively moderates the relationship between marketing fit and (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

H6. *Marketing execution proficiency positively moderates the relationship between technological fit and (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

Next, consider how technical execution proficiencies may impact the degree of performance benefits accrued from resource fit. Early in the NPD process, concepts are technically evaluated, and technologies and competitive products are analyzed. Excellence in these appraisals can substitute for fit to *a priori* endowments by revealing information quickly and of greater relevance both to "go/no go" decisions and product prototype specs. Better technical information can turn a new product idea into a higher quality product than initial technological resource fit might indicate. Technical proficiency also increases the likelihood that the product design meets customer expectations.

In later NPD stages, proficient product testing may identify technical glitches or product improvements before commercialization; again, superior testing means superior knowledge, market launch disasters can be avoided and responsiveness can increase quality, uniqueness and/or customer value (Di Benedetto 1999). Finally, excellence in production start-up means fewer reviews and delays, meaning that marketing dollars are not spent on unavailable products; thus time, costs and risks may be reduced (Calantone and Di Benedetto 1988; Cooper and De Brentani 1991). Overall, excellence in technical execution may produce knowledge that may ameliorate the impact of the lack of marketing and technological fit, thereby positively influencing the extent to which resource fit actually leads to new product success. Formally stated:

H7. *Technical execution proficiency positively moderates the relationship between marketing fit and (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

H8. *Technical execution proficiency positively moderates the relationship between technological fit and (a) new product profitability, (b) new product speed, (c) new product advantage, and (d) customer need met.*

Methodology

Sampling

The sampling frame, obtained from a commercially supplied list, comprised 600 North American firms operating in chemical, biochemical and pharmaceutical industries. Each firm was first contacted by phone to encourage the participation by the correct key informant. Respondents provided information about a recent new product (on the market five years or less) previously not produced or sold by their company. The respondents identified the specific product and whether it was a success or not (Cooper and Kleinschmidt 1987).

The data collection was done by a professional marketing research firm. Standard process guidelines were followed for data collection, questionnaire development and validation (Dillman 2000). The mailing of the surveys generated 306 usable questionnaires for a response rate of 51% ("Appendix A" has descriptive statistics). The majority of the respondents were in marketing (N=130), followed by R&D (N=110) and general management (N=18). Comparisons of firm characteristics (e.g., firm size, annual sales, export sales, percentage sales and profits generated by new products overall) identified only one difference between successful and failed projects: t-tests at the.05 level revealed significant differences only for R&D expenditure.

Measurement

Table 1 shows all items, which were specified as reflective indicators and had 11-point semantic differential scales. Referring to Cooper and Kleinschmidt (1987), Atuahene-Gima (1996) and Danneels and Kleinschmidt's (2001), fit was gauged using multiple item scales. The *marketing fit* construct consisted of three items encompassing fit with advertising, promotion, and market research resources. *Technological fit* had three items regarding existing technologies, R&D expertise and manufacturing skills.

NPD proficiencies were measured using multiple item scales adapted from Cooper and Kleinschmidt (1987, 1995) and Langerak et al.'s (2004). *Marketing execution proficiency* spanned initial screening, preliminary market assessment, detailed market study, customer tests of the product, and market launch. *Technical execution proficiency* included skills in preliminary technical assessment, prototype development, pilot production and production start-up skills.

Measurement items for the four new product success constructs were developed referring to Montoya-Weiss and Calantone (1994), Hultink and Robben (1995) and Calantone et al. (2003). *New product profitability* was assessed using two items: the extent to which the product was a financial success and the positive/negative impact its sales and profits had on the company. *Speed* was evaluated by time efficiency of the project execution and the team's adherence to the time schedule. *New product advantage* was measured by the degree to which the product was superior relative to other competitor products, had unique attributes, and high relative quality. Finally, the four '*customer need met*' items assessed the degree to which the benefits were important to the customer, were useful, and

were visible and easy to communicate. Customer need met was evaluated by managers, not by customers themselves.

Analyses

To examine the proposed model, partial least squares analysis (PLS) using PLS-Graph software 3.00 was performed (Chin 2001). PLS was selected since it is intended for causal-predictive analysis when explaining complex relationships (i.e., when the number of indicators is large, factors are collinear, and/or interaction effects exist; Fornell and Bookstein 1982; Hulland 1999). PLS tests measurement within the context of a structural path model (Sarkar et al. 2001), but requires minimal demands on scales, sample size, and residual distributions (as compared to other path-analytic techniques; Chin 1998). The PLS model was analyzed in two stages: (1) the assessment of measurement, followed by (2) the evaluations of the structural path models.

Results of measurement validation

Using Hulland's (1999) guidelines, the adequacy of the measurement model was tested. First, principle component analyses with varimax rotations demonstrated that only the first eigenvalue was greater than one; this supported the unidimensionality of each construct (Gerbing and Anderson 1988). Second, the scale reliabilities were evaluated by examining the loadings of the items on their corresponding factors (Hulland 1999). PLS revealed high loadings, which provided support for reliability (see Table 1) (Fornell and Bookstein 1982). Convergent validities were then assessed by calculating internal composite reliabilities (ICR) and average variance extracted (AVE) (see Table 2). ICRs ranged from 0.77 to 0.92 (Bagozzi and Yi 1988; Gerbing and Anderson 1988). The AVEs were acceptable (i.e., at least .49).

Finally, discriminant validity was evaluated by testing whether the AVE of each construct (the average variance shared between a construct and its measures) was greater than the shared variance between the construct and other constructs in the model (square of correlation between the two constructs) (Hulland 1999). The results supported discriminant validity. We also ran two-factor models and performed chi-square difference tests, following Anderson and Gerbing's (1988) guidelines. Comparing models with construct correlations set to one versus estimated freely yielded significant χ^2 differences and hence we concluded that discriminant validity was supported.

Common method variance

Since the data comprised responses from single informants, common method variance was addressed using two techniques (Podsakoff et al. 2003). First, Harman's one-factor test (involving principal components analysis without rotation) exhibited eight factors with eigenvalues greater than 1.0; these accounted for approximately 76% of the total variance. These results indicated that the variables did not form only a single higher-order factor. Second, following Podsakoff et al.'s (2003) and Netemeyer et al.'s guidelines (1997), a 'same-source' factor (i.e., a single common-method factor) was incorporated to the indicators of all constructs. This model, in which the same-source factor loadings were estimated freely, was compared to a constrained model in which the loadings to the same source were set to zero. A confirmatory factor analysis yielded a χ^2 difference of 355 (df=35, $p<.01$). Then a path analysis using PLS was conducted for the unconstrained model to investigate the potential effects of common-method variance on the indicator loadings and model paths. The indicator loadings on the theoretical factors (as well as the paths among the model constructs) all remained significant with trivial attenuation (or inflation). On the whole, considering the strengths/weaknesses of techniques to assess method biases (Podsakoff et al. 2003), it was concluded that there was *some* effect of common methods variance, but the main results remained consistent when this effect was controlled (cf. Netemeyer et al. 1997).

Results: structural model and hypotheses tests

Overall fit of the PLS models

Since PLS is designed to maximize prediction, emphasis is put on maximizing variance explained in the dependent variables. Consequently, PLS models are evaluated based on the prediction-oriented measures R^2 (instead of covariance fit as in SEM) (Fornell and Cha 1994; Hulland 1999; Sarkar et al. 2001). The variance explained (R^2 values) for the baseline 'Fit&Proficiency' main effects model *versus* the 'Moderation' model were: (a) 0.32 versus 0.36 for profitability; (b) 0.09 versus 0.10 for speed; (c) 0.24 versus 0.37 for product advantage; and (d) 0.33 versus 0.47 for customer need met.

Since the 'Fit&Proficiency' main effects model is nested within the 'Moderation' model, we conducted an F test of differences between the two models to determine whether the fits significantly differed (Cohen et al. 2003).[1] We found that the R^2 increments for new product profitability,

[1] $F = \left[\left(R_2^2 - R_1^2\right)/(k_2 - k_1)\right] / \left[\left(1 - R_2^2\right)/(n - k_2 - 1)\right]$

where R_1^2 = R-square for the baseline main effects model, R_2^2 = R-square for the interaction effects model, n = total sample size, k_1 = number of predictors in the baseline model, and k_2 = number of predictors in the interaction model. F has $(k_2 - k_1)$ and $(n - k_2 - 1)$ degrees of freedom.

Table 1 Measures and loadings

MARKETING FIT (11 point scale; 10 = very much so, very good fit, 0 = not at all, very poor fit)	ICR = .86; AVE=.67; sqrt AVE=.82
…did the types of advertising and promotion skills and resources needed for the new product fit closely with the skills/resources of the Company?	0.74
…did the marketing research and market intelligence skills/resources needed for this product fit closely with the skills/ resources available within the Company?	0.89
…did the selling skills/resources needed for this product fit closely with the skills/ resources of an existing salesforce in the Company?	0.82
TECHNOLOGICAL FIT (11 point scale; 10 = very much so, very good fit, 0 = not at all, very poor fit)	ICR=.80; AVE=.58; sqrt AVE=.76
…did the manufacturing skills and experience needed for this project fit closely with the manufacturing skills/ experience of the company?	0.81
…did the R&D (product development) skills and resources needed for this project fit closely with the existing R&D skills/ resources of the Company?	0.65
…was the type of product or manufacturing process a familiar/existing one for you?	0.80
MARKETING EXECUTION PROFICIENCY (11 point scale; 10 = excellently done, 0 = poorly done)	ICR=.85; AVE=.53; sqrt AVE=.73
Initial screening of the product idea - the first review of the venture.	0.79
Preliminary market assessment: An initial, preliminary, but non-scientific market assessment; a first and quick look at the market.	0.77
Detailed market study/ market research: market research, involving a reasonable sample of respondents, a formal design and consistent data collection.	0.72
Customer tests of the product: Testing the product under real-life conditions, e.g., with the customers and/ or in the field.	0.75
Market Launch: The launch of a product, on a full-scale and/or commercial basis; an identifiable set of marketing activities specific to the product.	0.59
TECHNICAL EXECUTION PROFICIENCY (11 point scale; 10 = excellently done, 0 = poorly done)	ICR=.79; AVE=.49; sqrt AVE=.70
Preliminary technical assessment: An initial, preliminary appraisal to identify the probable technical route or risks.	0.58
Product development: The actual development of the product resulting in a prototype or sample product.	0.60
Pilot production: A pilot product run to test the production route.	0.74
Production start-up: The 'elevation to plant' or start-up of full scale or commercial production.	0.84
NEW PRODUCT PROFITABILITY (11 point scale)	ICR=.92; AVE=.86; sqrt AVE=.93
To what extent would you rate the product a financial success? (+5 = profits exceeded the minimum acceptable return/ −5 = profits fell far short of the minimum acceptable return for projects like this in your Company)	0.93
What impact did the product's sales and profits have on the Company? (+5 = Large positive impact/ −5 = Large negative impact)	0.92
NEW PRODUCT SPEED	ICR = .85; AVE=.74; sqrt AVE = .86
…was the project undertaken quickly and in time efficient manner?	0.76
…did the project adhere to a time schedule?	0.96
NEW PRODUCT ADVANTAGE (11 point scale)	ICR = .77; AVE=.54; sqrt AVE = .74
…was the product superior to competing products in terms of meeting customers' needs? (10 = far superior, 0 = far inferior)	0.60
…was the product quality - however quality is defined by the user - superior to competing products? (10 = far superior, 0 = far inferior)	0.91
..did the product offer unique attributes or performance characteristics not available from competitive products? (10 = far more attributes or performance, 0 = far inferior)	0.65
CUSTOMER NEED MET (11 point scale)	ICR = .90; AVE=.70; sqrt AVE = .84
…was the benefit provided considered an important one by potential customers? (10 = very much so, 0 = not at all).	0.87
…were the benefits easy to explain and communicate by your salespeople? (10 = easy to explain, 0 = hard to explain)	0.78
…was the product's performance characteristics seen right away by the customer as useful in solving his problems? (10 = seen as very useful, 0 = not useful at all)	0.89
…were the benefits offered highly visible ones to the customer…they were apparent to users? (10 = highly visible, clear & obvious, 0 = not visible, well hidden)	0.82

Table 2 ICR, AVE, and correlation matrix

		ICR	*AVE*	1	2	3	4	5	6	7	8
1	New Product Profitability	0.92	0.86	**0.93**							
2	New Product Speed	0.85	0.74	0.33	**0.86**						
3	New Product Advantage	0.77	0.54	0.49	0.23	**0.74**					
4	Customer Need Met	0.90	0.70	0.47	0.44	−0.02	**0.84**				
5	Marketing Fit	0.86	0.67	0.33	0.26	0.01	0.47	**0.82**			
6	Technological Fit	0.80	0.58	0.35	0.31	0.06	0.14	0.36	**0.76**		
7	Marketing Execution Proficiency	0.85	0.53	0.44	0.38	0.29	0.28	0.13	0.29	**0.73**	
8	Technical Execution Proficiency	0.79	0.49	0.40	0.35	0.19	0.44	0.40	0.35	0.44	**0.70**

(1) *Internal Composite Reliability (ICR)* is similar to Cronbach's alpha, however, assumes all indicators are equally weighted. The ICR statistic represents a ratio consisting of the squared total of the variance explained for each manifest variable divided by the sum of the squared total of the variance explained plus the total of the unexplained variance. An ICR greater than .7 indicates sufficient reliability.
(2) Diagonal is the *square root of the Average Variance Extracted (AVE)*. *Average Variance Extracted (AVE)* assesses the amount of variance of a latent variable captured by its indicators relative to the amount due to measurement error. The ratio is the total of variance explained divided by the sum of variance explained and variance unexplained. An AVE greater than. 5 (thus, a square root AVE greater than .7) indicates that the indicators measure what is intended.
(3) Off diagonal entries are correlations among constructs.

new product advantage and customer needs met were significantly different from zero. Hence we concluded that comparing these models, the R^2 values from the moderation model were significantly higher. The results from the moderation model are thus presented below.

Table 3 shows the path estimate results (with t-values). The main effects for the fit constructs are discussed first. Marketing fit had a significant positive impact on profitability, new product advantage and customer need met, supporting H1a,c,d. Technological fit influenced profitability and new product advantage; H2a,c were supported. Note that neither 'fit' construct predicted speed, while both predicted profitability and new product advantage. Marketing fit but not technological fit was positively related to customer need met.

Next, the main effect results for the execution proficiency constructs show that marketing proficiency significantly enhanced all four success factors (supporting H3a–d). Technical proficiency increased profitability, speed and customer need met (H4a, b and d were supported), but was unrelated to new product advantage, failing to support H4c.

The moderating effects of "NPD Execution Proficiency" constructs were modeled as multiplicative mean-centered

Table 3 Results for the moderation model: main and interaction effects

New Product Success	(a) New Product Profitability $R^2 = 0.36$	(b) New Product Speed $R^2 = 0.10$	(c) New Product Advantage $R^2 = 0.37$	(d) Customer Need Met $R^2 = 0.47$
Antecedents				
(H1) Marketing Fit	0.199	−0.055	0.178	0.415
	(t=2.988)	n.s.	(t=2.635)	(t=7.159)
(H2) Technological Fit	0.190	−0.077	0.191	−0.057
	(t=3.178)	n.s.	(t=2.768)	n.s.
(H3) Marketing Execution Proficiency	0.323	0.207	0.345	0.211
	(t=5.045)	(t=2.476)	(t=7.727)	(t=3.469)
(H4) Technical Execution Proficiency	0.161	0.155	0.007	0.179
	(t=2.412)	(t=1.860)	n.s.	(t=3.112)
(H5) Marketing Fit * Marketing Execution Proficiency	−0.052	−0.010	−0.152	−0.236
	n.s.	n.s.	(t=−2.287)	(t=−4.556)
(H6) Technological Fit * Marketing Execution Proficiency	−0.064	0.103	−0.378	−0.113
	n.s.	n.s.	(t=−7.554)	(t=−2.505)
(H7) Marketing Fit * Technical Execution Proficiency	0.025	0.036	0.017	−0.058
	n.s.	n.s.	n.s.	n.s.
(H8) Technological Fit * Technical Execution Proficiency	0.058	0.007	−0.030	−0.035
	n.s.	n.s.	n.s.	n.s.

Estimates of main and interaction effects; with t-values or n.s. = nonsignificant.

interactions to reduce multicollinearity (Jaccard et al. 1990). Analysis of the interaction effects shows that four of the sixteen interactions were significant. The results show that regardless of which performance construct was examined, technical execution proficiency's interaction with either marketing or technological fit was nonsignificant (H7 and H8 were not supported, as the last two rows of Table 3 show). Thus technical execution proficiency is not a moderator in this model. All four of the significant interactions involved marketing proficiency, but these were significantly *negative*. Contrary to hypothesis, the *interaction* of marketing proficiency with marketing fit significantly *reduces* new product advantage (β_{1c}=−.152, p<.05) and *reduces* customer need met (β_{1d}=−.236, p<.01); similarly, the interaction of marketing proficiency with technological fit significantly *reduces* these performance constructs (respectively, β_{2c}=−.378, p<.01 and β_{2d}=−.113, p<.05). Thus marketing proficiency negatively moderates the effects of both fit constructs on new product advantage and customer need met.

Significant interaction effects should be interpreted as conditional effects on the main effects (Jaccard et al. 1990): i.e., the path coefficients represent the conditional impact of one effect when the other effect is at its mean (or other specific levels). Thus the conditional impact of *additional* marketing execution proficiency is negative when either marketing or technological fit is at a particular level: as marketing or technological fit increases, the (positive main effect) performance impact of additional marketing execution proficiency decreases. That is, the impact of high proficiency on performance becomes smaller and smaller as the level of fit increases.

To illustrate these negative interactions (and also the positive main effects), marketing execution proficiency was dichotomized high-low. Figs. 2a for marketing fit and 2b for technological fit show the interaction effects with marketing execution proficiency. First, note that the "high proficiency" line is above the "low proficiency" line *over the entire range* of either marketing or technological fit. This illustrates that the main effect of marketing proficiency overall is significantly *positive* (H3 tested positive). These lines do not cross: it is never true that high marketing proficiency (as compared to lower marketing proficiency) results in lower performance (i.e., there is never a negative impact of marketing proficiency on performance). Second, *the distance* between the "high proficiency" line and the

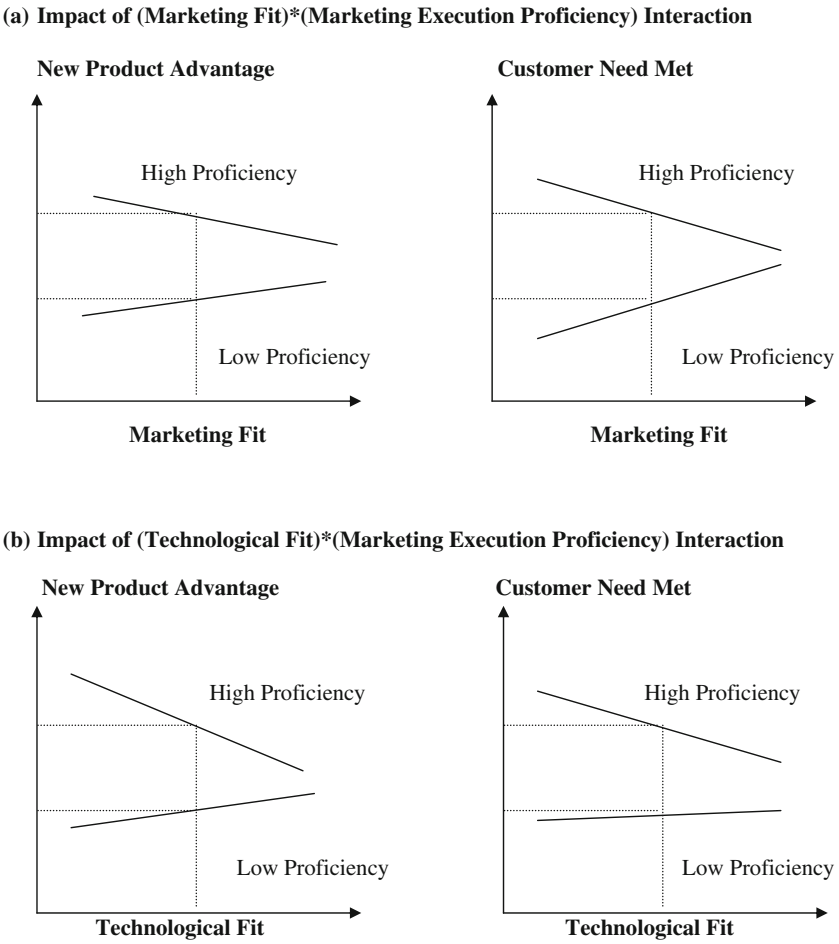

Fig. 2 Effects of the interaction of fit and marketing proficiency on product advantage and customer need met. **(a)** Impact of (Marketing Fit)*(Marketing Execution Proficiency) Interaction. **(b)** Impact of (Technological Fit)*(Marketing Execution Proficiency) Interaction. Note: "High proficiency" line is always above "low proficiency" line for all levels of fit, illustrating positive main effects; distance between lines dcreases as level of fit increases, illustrating negative interaction effect.

"low proficiency" line (dotted lines in the Figure) *decreases* as either marketing fit or technological fit increases along the X-axis. This second point illustrates the negative interaction: i.e., as the level of fit increases, the impact of *additional* marketing execution proficiency decreases. In other words, the (positive) impact of proficiency on performance becomes smaller and smaller as the level of fit increases.

Alternative models

We investigated an alternate moderation model that differed from Fig. 1 in that new product advantage, speed, and customer need met predicted new product profitability (instead of the four being modeled as separate dependent constructs). There are few changes in the variance explained for new product advantage (R^2 goes from 0.37 to 0.38), speed (R^2 goes from 0.10 to 0.09), and customer need met (R^2 goes from 0.47 to 0.45); however, profitability's R^2 goes from 0.36 to 0.50. Profitability R^2 increases since there are three new significant predictors: new product advantage (0.145; t=1.853); speed (0.267; t=4.668) and customer need met (0.324; t=4.645). Other results are similar to those obtained for the moderation model in Fig. 1. Significant predictors of profitability are technological fit, and both marketing and technical proficiencies, but no interaction effect predicts profitability in this alternate model.

To investigate whether our results were robust across successful and failed projects, we split the data on the classification the respondents gave us as per "overall, was this a success or failure?" We examined success versus failure subsamples separately and compared the relationship betas between the two samples.[2] The results show that the strengths of the model relationships (the betas) are not significantly different. Stating it differently, our findings are robust for both successful and failed projects.

Discussion

Drawing upon RBV, we examined the relationships to new product success of resource "fit" and proficiencies in NPD execution. Overall, RBV suggests that a firm is an idiosyncratic bundle of resources, and differential performance is due to firm heterogeneity in these respects (Barney 1991; Peteraf 1993; Wernerfelt 1984). "*Fit*" was viewed as an indication of resource fit advantage and encompassed both marketing fit and technological fit. *NPD execution proficiencies* in marketing and technical activities mirror the two specific resource fit advantages examined in this research. Finally, *new product success* encompassed profitability, speed, new product advantage, and customer need met. Thus overall, the major categories of interest to researchers and managers are represented in the two fit constructs, the corresponding two execution proficiencies, and the four performance outcomes (Griffin and Hauser 1996; Henard and Szymanski 2001; Montoya-Weiss and Calantone 1994).

Resource fit and execution proficiencies each engender competitive advantage, but execution proficiencies may also interact with resource fit to engender competitive advantage (Day and Wensley 1988; Penrose 1959). The major contributions of this study is to analyze: (1) whether marketing and technical execution proficiencies significantly predict new product performance, given that marketing and technological resource fit are already accounted for in the model; and (2) whether the role of execution proficiencies is moderating, in which case the interaction effects of proficiency with fit would be significant. We found overall that *execution proficiency has significant main effects (even if the significant resource 'fit' main effects are already in the model) and that the moderation model fits best, especially in explaining performance in new product advantage and customer need met.*

Before discussing the results in detail, some limitations should be noted. The measurements were primarily perceptual and collected from single respondents, all of whom were employed in the chemical, biochemical and pharmaceutical industries. Gonul et al. (2001, p.79) mention that marketing or NPD strategies employed in these particular industries may be different from those in other industries and thus generalizability may be limited. Also, the constructs were measured using a sample of managers, not customers. Thus, for example, the 'customer need met' construct reflects managers' perceptions of customer need met. However, managers may be biased (e.g., due to enhanced familiarity with the new product) and unable to accurately assess what consumer perceptions would actually be. This is of course a common problem for NPD managers as well: they must always assess what customer reactions are likely to be when the product is launched in the future.

The main effects of strategic resource fit on new product success

Note that resource fit is being examined, not the value of the resources themselves. For example, we did not evaluate

[2] We employed the procedure suggested by Wynne W. Chin (2000). The comparison test is based on the t-statistic calculated as:

$$t = \frac{\beta_1 - \beta_2}{\left[\sqrt{\frac{(m-1)^2}{(m+n-2)}} \times S.E_1^2 + \frac{(n-1)^2}{(m+n-2)} \times S.E_2^2\right] \times \left[\sqrt{\frac{1}{m} + \frac{1}{n}}\right]}$$

where df = m+n-2 [m is the sample size of the first (success) sample and n is the sample size of the second (failure) sample].

to what degree the resources were rare or difficult to imitate, but rather assumed that firms succeeding in the marketplace over time must have developed resource endowments that are valuable in some respects. Our interest lies not in the resource endowments themselves, but rather in the impact on performance of a particular NPD project's fit to these resources.

The first finding was that *both marketing fit and technological fit were positively related directly to profitability;* i.e., resource fit predicts profitability, a financial outcome. This result is generally supportive of a resource based view framework since (1) profitability is an important RBV construct; and (2) the more the project can tap existing marketing and technological resources, the more profitable the project is (Day and Wensley 1988; Peteraf 1993). Note that this result for profitability held when some main effects of execution proficiency and/or the interaction effects were also significant; i.e., *the inclusion of execution proficiency does not render fit to resource endowments irrelevant*.

Second, *neither marketing fit nor technological fit predict speed.* Speed is an important performance outcome in the NPD literature (Ali et al. 1995; Kessler and Chakrabarti 1999), but resource fit advantage does not seem to provide the time efficiency that many NPD managers crave.

Third, *both marketing fit and technological fit were positively related to new product advantage*. These resource fit advantages seem to encourage the new product's ultimate superiority, uniqueness and quality as compared to competitors' offerings. In the moderation model, *both* marketing fit and technological fit were positively related to *both* profitability and new product advantage—two new product performance constructs of key interest to managers and researchers alike. Profitability is a key financial outcome in the innovation and marketing literatures. New product advantage was identified as one of the most important success dimensions in meta-analyses (Henard and Szymanski 2001).

Finally, *marketing fit had direct positive effects on customer need met.* Hence, according to managers' evaluations, firms succeed in sustaining the value perceptions and satisfaction levels of their customers by focusing on new product projects that fit existing marketing resources.

The main effects of execution proficiencies on new product success

We examined the main effects of marketing versus technical execution proficiencies. First, *marketing execution proficiency was the only construct that led directly to increased success on all four success dimensions*; i.e., these marketing proficiencies led to both profitability and speed, *and* effectiveness in the form of increased product advantage and customer need met [as proposed but not tested by Day (1994) and Verona (1999)]. Second, *technical execution proficiency led to higher profitability and customer need met, and also predicted speed*. These results support the findings of Calantone and Di Benedetto (1988), Song and Parry (1997), but contradict those by Song et al. (1997). Note that only *execution* proficiencies – both marketing and technical – predicted speed.

Overall, execution proficiencies seem critical to success, even after resource fit has been accounted for in the model. We examined the main effects of fit in conjunction with the main effects of proficiency, and found that resource fit advantages are significant *but not sufficient* explanations for new product success. In particular, this means that *marketing* proficiencies have impact over and above the impact of fit to *marketing* resource endowments; and that *technical* proficiencies have impact over and above the impact of fit to *technological* resource endowments. The ability to manage for execution excellence is as important as 'fit' to resource endowment, which supports the claim that *deployment is as important as endowment* (Madhok 2002; Penrose 1959).

We found no support for the claim that resource fit advantages engender market success *only* through execution proficiencies (i.e., it is *not* true that resource fit becomes nonsignificant once execution proficiencies are also modeled). This means that new product success is enhanced by a managerial focus on improving proficiencies in NPD execution, as well as by the *a priori* marketing and/or technological fit to current resource endowment. *A priori* endowments and the fit of a particular new product project to these marketing and technological endowments remain critical for success, but may be more difficult for managers to change in the short run as compared to execution proficiencies.

The moderation model: main and interaction effects

Overall, the results demonstrate the pervasive (main effect) impact of fit and proficiency constructs on new product success dimensions. For profitability, *only* the four main effects were significant (marketing and technological 'fit,' marketing and technical proficiencies). Fit *and* execution proficiency determine profitability. Second, for speed, *only* marketing and technical execution proficiencies were significant predictors (i.e., execution but not fit impacts speed). Third, *new product advantage* was determined by both 'fit' constructs, marketing proficiency, and the (negative) interactions of marketing proficiency with both marketing and technological 'fit'. Finally, *customer need met* was predicted by marketing fit, both proficiency constructs, and the (negative) interactions of marketing

proficiency with both 'fit' constructs (shown in Fig. 2). Note that the interactions had no effects on profitability or speed, but did impact both new product advantage and customer need met (both of which tap NPD effectiveness).

The significantly negative interaction effects involving marketing proficiency were contrary to our expectations: marketing proficiency's interaction (*not* main effect) with either marketing or technological fit was negatively related to new product advantage and customer need met. This does *not* mean that the impact of marketing proficiency on these two performance outcomes is negative (just like the statement "marginal revenue is positive but decreasing" does *not* mean that revenue is decreasing). On the contrary, the results show and Fig. 2 illustrates that the impact of marketing proficiency on these two performance outcomes is *always* positive.

An interaction effect should be interpreted as a conditional effect on the main effects (Jaccard et al. 1990): the path coefficients represent the conditional impact of one main effect when the other main effect is at some specific level. In our case, the conditional impact of *additional* marketing execution proficiency is negative when either marketing or technological fit is at a particular level. This means that *additional* marketing execution proficiency cannot be used *with equal effect* to compensate for lack of resource fit over the entire range (low to high) of resource fit; i.e., the *relative* ability of marketing proficiency (a positive main effect) to compensate for a lack of resource fit (fit also having a positive main effect) *decreases* over the range of possible levels of resource fit. In short, the *always positive* effect of additional marketing proficiency on NPD performance outcomes becomes smaller and smaller as the level of fit increases.

New product managers should realize that *for projects that do not fit well* (for lower levels of fit in Fig. 2), the performance impact of additional marketing execution proficiency will be significantly *greater as compared to* the performance impact of additional marketing execution proficiency *for projects that fit well a priori* (i.e., for higher levels of fit in Fig. 2). This is encouraging for NPD managers who face poor resource fit because marketing excellence can to some degree compensate for poor fit (as the main effects show), and execution may be easier to improve than fit for a given NPD project. In particular, it is possible that the internal development of marketing excellence (and/or the external sourcing of marketing excellence) is a more viable performance enhancement strategy as compared to attempts to compensate for poor *technological* fit by outsourcing or alliance formation; both of the latter options risk future technological resource base depletion through appropriation. Furthermore, proficient execution and deployment of resources may over time further augment the resource base itself, an idea implicit in Prahalad and Hamel's (1990) "core competencies" concept. Thus a managerial focus on developing marketing and technical execution excellence may augment the corresponding resource bases over the longer run.

It is important to note that as the level of fit with resources increases, additional marketing execution proficiency has marginally less (positive) impact on performance. That is, the ability of marketing execution proficiency to positively impact performance (and compensate for lack of fit) becomes less as less as the *level* of fit increases. Alternatively stated, the negative interaction effects with positive main effects can be interpreted as follows: it takes more and more units of *additional* marketing execution proficiency to engender the *same* differential performance impact as the level of either marketing or technological fit increases. For NPD managers, this means that although improving marketing execution proficiencies will always have positive effects on new product advantage and customer need met, the marginal increase in total performance effects will be constrained by fit to existing marketing and technological resource endowments.

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Appendix A. Descriptive statistics for firms in the sample

	Annual Company Sales (millions)	Number of Employees	R&D Percent	% Sales by New Products	% Profits by New Products
Mean	380006	1468	3.92	18.93	22.18
Median	200000	400	3.10	15.00	18.28
Mode	100000	400	2.00	50.00	5.00
Std Deviation	627089	4216	2.83	16.63	20.27
Minimum	40	11	0.10	0.00	0.00
Maximum	3100000	30000	15.00	80.00	90.00

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