The Mediating Effect of NPD-Activities and NPD-Performance on the Relationship between Market Orientation and Organizational Performance

FRED LANGERAK, ERIK JAN HULTINK AND HENRY S.J. ROBBEN

ERIM REPORT SERIES *RESEARCH IN MANAGEMENT*	
ERIM Report Series reference number	ERS-2000-50-MKT
Publication	November 2000
Number of pages	46
Email address first author	f.langerak@fbk.eur.nl
Address	Erasmus Research Institute of Management (ERIM) Rotterdam School of Management / Faculteit Bedrijfskunde Erasmus Universiteit Rotterdam PoBox 1738 3000 DR Rotterdam, The Netherlands Phone: # 31-(0) 10-408 1182 Fax: # 31-(0) 10-408 9640 Email: info@erim.eur.nl Internet: www.erim.eur.nl

Bibliographic data and classifications of all the ERIM reports are also available on the ERIM website: www.erim.eur.nl

ERASMUS **R**ESEARCH **I**NSTITUTE OF **M**ANAGEMENT

REPORT SERIES

RESEARCH IN MANAGEMENT

BIBLIOGRAPHIC DATA AND CLASSIFICATIONS		
Abstract	Empirical research has demonstrated that a market orientation has in general a positive effect on organizational performance. The potential benefits of a market orientation have, however, not been realized because academics and practitioners do not yet understand the modus operandi that transform market orientation into superior organizational performance. Recent research has demonstrated that the proficiency in new product development (NPD) activities might be the key in the conversion of market orientation into superior NPD-performance, and hence, organizational performance. This study is designed to test a set of hypotheses related to the interrelationships among market orientation, the proficiency in NPD-activities, NPD-performance, and organizational performance. The results from a sample of 126 manufacturing firms in the Netherlands present evidence for the mediating role of the proficiency in several NPD-activities and NPD-performance in the relationship between market orientation and organizational performance. The fact that this mediating role has been found thus provides a better understanding of how market-oriented behaviors are transformed into superior value for customers.	
Library of Congress Classification (LCC)	5001-6182	Business
	5410-5417.5	Marketing
	HF 5415.153	Marketing: New products
Journal of Economic Literature (JEL)	M	Business Administration and Business Economics
	M 31 C 44	Marketing Statistical Decision Theory
	M 31	Marketing
European Business Schools Library Group (EBSLG)	85 A	Business General
	280 G 255 A	Managing the marketing function Decision theory (general)
	290 A	Product Policy- new product development
Gemeenschappelijke Onderwerpsontsluiting (GOO)		
Classification GOO	85.00	Bedrijfskunde, Organisatiekunde: algemeen
	85.40 85.03	Marketing Methoden en technieken, operations research
	85.40	Marketing
Keywords GOO	Bedrijfskunde / Bedrijfseconomie	
	Marketing / Besliskunde	
	Prestatiebeoordeling, Marktontwikkeling, Productontwikkeling	
Free keywords	Market orientation, innovation, performance evaluation, studies, statistical analysis	

The Mediating Effect of NPD-Activities and NPD-Performance on the Relationship between Market Orientation and Organizational Performance

Fred Langerak

Erasmus University Rotterdam, Department of Marketing Management, Office F1-46

P.O. Box 1738, NL-3000 DR Rotterdam, The Netherlands

Phone: +31.10.40.82.578

Fax: +31.10.40.89.011

E-mail: f.langerak@fac.fbk.eur.nl

Erik Jan Hultink

Delft University of Technology, Faculty of Design, Engineering and Production

Jaffalaan 9, NL-2628 BX Delft, The Netherlands

Phone: +31.15.27.83.032

Fax: +31.15.27.87.662

E-mail: E.J.Hultink@io.tudelft.nl

Henry S.J. Robben

Universiteit Nyenrode, Center for Supply Chain Management

Straatweg 25, NL-3621 BG Breukelen, The Netherlands

Phone: +31.34.62.91.211

Fax: +31.34.62.64.204

E-mail: Robben@nyenrode.nl

Key words: Market orientation, innovation, performance evaluation, studies, statistical analysis.

The Mediating Effect of NPD-Activities and NPD-Performance on the Relationship between Market Orientation and Organizational Performance

Abstract

Empirical research has demonstrated that a market orientation has in general a positive effect on organizational performance. The potential benefits of a market orientation have, however, not been realized because academics and practitioners do not yet understand the modus operandi that transform market orientation into superior organizational performance. Recent research has demonstrated that the proficiency in new product development (NPD) activities might be the key in the conversion of market orientation into superior NPD-performance, and hence, organizational performance. This study is designed to test a set of hypotheses related to the interrelationships among market orientation, the proficiency in NPD-activities, NPD-performance, and organizational performance. The results from a sample of 126 manufacturing firms in the Netherlands present evidence for the mediating role of the proficiency in several NPD-activities and NPD-performance in the relationship between market orientation and organizational performance. The fact that this mediating role has been found thus provides a better understanding of how market-oriented behaviors are transformed into superior value for customers.

Introduction

Market orientation is a business culture that fundamentally establishes tenets of organizational behavior with respect to the firm's stakeholders (e.g., customers, competitors, and internal functions). These behaviors are posited to be prerequisites if the firm is to create superior products that respond to customer needs (Jaworski and Kohli 1993; Slater and Narver 1994). Moreover, Hunt and Morgan (1995) state that market-oriented firms are more likely to enjoy a position of sustainable competitive advantage and superior long-run financial performance. Researchers have pursued an understanding of the link between market orientation and organizational performance investigating a direct link (e.g., Narver and Slater 1990; Ruekert 1992), a moderated relationship (e.g., Greenley 1995; Hart and Diamantopolous 1993; Pelham 1997; Slater and Narver 1994), and the roles of market orientation's antecedents (Jaworski and Kohli 1993). Despite some discordant findings these studies have, in general, demonstrated that market-oriented behaviors have, depending upon environmental conditions and firm factors, positive effects on organizational performance (Deshpandé and Farley 1998; Narver and Slater 1998). Not surprisingly, the interest in the relationship between market orientation and organizational performance has ostensibly remained steadfast for its apparent strategic importance (Narver, Slater and Tietje 1998).

It has been suggested that the market orientation of a firm leads to superior organizational performance, at least in part, because of the new products that are developed and brought to market (Gatignon and Xuereb 1997). Although being market-oriented may lead to general benefits in the firm's marketing activities, the ability to develop and bring to market new products, which present the characteristics necessary to be successful, may be critical (Hurley and Hult 1998). However, the effect of market orientation on the firm's ability to develop and market new products successfully has received little scholarly attention (Han, Kim and Srivastava 1998). An exception is Slater and Narver's (1995) conceptual study in which they

propose innovation as one of the core value-creating capabilities that drives the relationship between market orientation and organizational performance. Han, Kim and Srivastava (1998) provide the first empirical support for Slater and Narver's (1995) proposition that new product development assumes the mediator role in the relationship between market orientation and organizational performance. However, the process with respect to the manner in which market orientation affects the firm's ability to develop and market new products successfully remains unclear (Lukas and Ferrell 2000). Atuahene-Gima (1995, 1996) provides better insights into this process by demonstrating that market orientation positively influences the proficiency in some NPD-activities which are positively related to NPD-performance.

Together these findings suggest that the effect of market orientation on organizational performance may depend, at least partly, on the extent to which market orientation improves the proficiency in NPD-activities. Improving the proficiency in NPD-activities is important for organizations because of the positive link between the proficiency in NPD-activities and NPD-performance (Song and Montoya-Weiss 1998). Improving NPD-performance is also important because of its positive link to organizational performance, as is evidenced by reports of returns on NPD accounting for 50% or more of corporate revenues (Han, Kim and Srivastava 1998). The objective of this study is, therefore, to investigate whether the relationship between market orientation and organizational performance is mediated by the proficiency in NPD-activities and NPD-performance. To this end, this study simultaneously investigates the interrelationships among market orientation, the proficiency in NPD-activities, NPD-performance, and organizational performance.

The remainder of this article is structured as follows. First, we briefly review the literature on market orientation and new product development. Then, we present our conceptual framework and the hypothesized relationships. Next, we explain the research design and review the findings

from a sample of 126 manufacturing firms in the Netherlands. Finally, managerial implications and suggestions for further research are explored.

Market Orientation

Market orientation is a business culture that commits the organization to the continuous creation of superior value for customers (Baker and Sinkula 1999; Narver and Slater 1990). The creation of superior customer value entails an organization-wide commitment to continuous information gathering and coordination of customers' needs, competitors' capabilities and the provisions of other significant market agents and authorities (Kohli, Jaworski and Kumar 1993). This culture creates an environment that maximizes opportunities for learning about markets, for sharing information among functions in the organization so that common interpretations are reached, and for taking coordinated actions (Slater and Narver 1996). The result is an integrated effort on the part of employees and across departments in an organization to create superior value for customers, which in turn gives rise to superior organizational performance (Kohli and Jaworski 1990).

A closer look at the literature on market orientation reveals three dominant conceptualizations for creating and delivering superior value for customers. Kohli and Jaworski (1990) outline a conceptualization of market orientation that refers to the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of this intelligence across departments and organization-wide responsiveness to it. Key features in this view are a focus on markets, an emphasis on a specific form of inter-functional coordination and a focus on activities related to information processing. Narver and Slater (1990, p.21) complement Kohli and Jaworski's (1990) view by suggesting that market orientation consists of three behavioral components (i.e., customer orientation, competitor orientation and inter-functional coordination) that constitute "the activities of market information acquisition and dissemination and the

coordinated creation of customer value". Deshpandé, Farley and Webster (1993, p.27) define market orientation as "the set of beliefs that puts the customers' interest first, while not excluding that of all other stakeholders, in order to develop a long term profit". More recently, Deshpandé and Farley (1998) synthesized these three conceptualizations by defining market orientation as the set of cross-functional processes and activities directed at creating and satisfying customers through continuous needs-assessment. In summary, scholars designate a market-oriented culture as an important factor that creates a setting conducive for behaviors by employees throughout the organization. These congruent behaviors are directed at the continuous creation of superior value for customers and lead to superior organizational performance.

For the purpose of this research we adopt a balanced view of market orientation that features concepts that have been synthesized from the three dominant conceptualizations of market orientation. Thus, we define market orientation as the business culture that commits the organization to the continuous creation of superior value for customers by encouraging three behaviors related to market information processing throughout the organization: customer orientation, competitor orientation and inter-functional coordination. Customer orientation and competitor orientation include all activities involved in acquiring information about customers and competitors in the target market and disseminating it throughout the organization. Inter-functional coordination is based on the customer and competitor information and comprises the organization's coordinated efforts to create superior value for customers continuously.

Market Orientation and New Product Development

From a strategic standpoint a market orientation remains incomplete if academics and practitioners do not understand the behaviors through which market-oriented firms create superior value for customers (Gatignon and Xuereb 1997; Han, Kim and Srivastava 1998). With discordant findings emerging with respect to the effect of market orientation on organizational

performance (Deshpandé and Farley 1998), a closer inspection of the process through which market-oriented firms create superior value for customers becomes imperative (Greenley 1995). For example, Narver and Slater (1990), Ruekert (1992) and Slater and Narver (1994) find a positive (direct) relationship, Hart and Diamantopolous (1992), Kim, Han and Srivastava (1998) and Siguaw, Simpson and Baker (1998) report no significant (direct) relationship, while Greenley (1995) and Jaworski and Kohli (1993) report mixed results. In an effort to uncover how market-oriented firms achieve superior organizational performance, the process has thus far been probed primarily for the strength of the relationship between market orientation and organizational performance (Han, Kim and Srivastava 1998). For example, two conceptual studies have suggested that potential market-level (e.g., market growth, competitive intensity and market turbulence) and firm-specific (e.g., relative size, relative costs and firm effectiveness) factors *moderate* the strength of the relationship between market orientation and organizational performance (Day and Wensley 1988; Kohli and Jaworski 1990). Empirical research, however, provides inconclusive evidence on environmental conditions and firm characteristics moderating the relationship between market orientation and organizational performance (Greenley 1995; Jaworski and Kohli 1993; Pelham 1997; Slater and Narver 1994). For example, Greenley (1995) found market turbulence and technological change to moderate the relationship between market orientation and organizational performance. In contrast, Slater and Narver (1994) conclude that there is little support for the proposition that environmental and organizational characteristics have an effect on the strength and nature of the relationship between market orientation and performance. The actual *mediating* mechanism responsible for transforming market orientation into superior organizational performance has received scant scholarly consideration (Han, Kim and Srivastava 1998).

A noteworthy exception is Slater and Narver's (1995) conceptual study in which they propose that NPD-activities and NPD-outcomes drive the relationship between market orientation and

organizational performance. This proposition, NPD-activities and NPD-performance assuming the mediator role, is consistent with literature assuming that culture gives rise to organizational structures and processes (Cameron and Freeman 1991; Ruekert, Walker and Roering 1985; Quinn and Rohrbaugh 1983). These structures and processes in turn affect the nature and effectiveness of marketing activities and outcomes (Moorman 1995). Slater and Narver (1995) selected new products as the focal marketing outcome for three reasons. First, NPD and the success of new products have emerged as one of the critical strategic concerns of firms in the past decade (Moorman 1995). Second, prior research has indicated that NPD-activities and outcomes are likely to be influenced by the firm's market information systems and processes. Specifically, Clark and Fujimoto (1991) characterize NPD-processes as "total information systems" that are driven by firm level processes. In addition, Day (1994) suggests that various market sensing information processes are crucial inputs to NPD-activities in learning firms. Finally, Imai, Nonaka and Takeuchi (1985), Griffin and Hauser (1992) and Hutt, Reingen and Ronchetto (1988) find that effective NPD-processes involve continuous information acquisition, sharing and utilization. Third, prior research reveals that market orientation has a positive effect on new product success (Narver and Slater 1990; Slater and Narver 1994). The notion of NPD-activities and NPD-performance mediating the relationship between market orientation and organizational performance, though seemingly a rather novel concept in marketing, therefore has its original conceptual grounding in the organization and innovation literature.

Presently, the empirical support for the mediating role of NPD in the context of the relationship between market orientation and organizational performance is only piecemeal. Han, Kim and Srivastava (1998) show that market orientation facilitates both technical and administrative innovations, which, in turn, improve organizational performance. However, Han, Kim and Srivastava (1998, p.41) conclude that the results of their study "provide some support that innovations facilitate the conversion of market orientation into superior corporate performance",

but that “the manner in which to go about this process remains somewhat unclear”. Atuahene-Gima (1995) sheds more light on the process through which market-oriented firms create superior value for customers by demonstrating that market orientation positively influences the proficiency in three key NPD-activities (i.e., predevelopment activities, launch activities and inter-functional teamwork) and NPD-performance. Atuahene-Gima (1996) further shows that the proficiency in one NPD-activity (i.e., inter-functional teamwork) mediates the relationship between market orientation and NPD-performance. These results suggest that market orientation provides a unifying focus for the proficiency in NPD-activities of individuals and departments within the organization, thereby leading to superior NPD-performance.

Framework and Hypotheses

The conceptual and empirical work by Slater and Narver (1995), Kim, Han and Srivastava (1998) and Atuahene-Gima (1995, 1996) suggests that the effect of market orientation on organizational performance depends, at least partly, on the extent to which market orientation improves the proficiency in NPD-activities and NPD-performance. To investigate whether the relationship between market orientation and organizational performance is indeed mediated by the proficiency in NPD-activities and NPD-performance this study draws on five streams of previous research that have mostly focused on a single relationship within the framework shown in figure 1. The empirical evidence that each research stream has provided will be discussed henceforth.

<< Figure 1 here >>

Market Orientation and Organizational Performance

The first research stream addresses the association between market orientation and organizational performance. Despite some discordant findings, empirical results to date have

generally found a positive relationship between market orientation and organizational performance (e.g., Baker and Sinkula 1999; Bhuian 1998; Deshpandé and Farley 1998; Jaworski and Kohli 1993; Narver and Slater 1990; Pelham 1999; Pelham and Wilson 1996; Pitt, Caruana and Berthon 1996; Ruekert 1992; Slater and Narver 1994, 1996, 2000). However, if the effect of market orientation is recursive because of its impact on the proficiency in NPD-activities, it is not clear whether market orientation should influence organizational performance, once controlling for the proficiency in NPD-activities and NPD-performance. Such an effect, beyond the impact of market orientation considered through the proficiency in NPD-activities and NPD-performance, would indicate that the market orientation of the firm affects more than the NPD-process (Gatignon and Xuereb 1997). Indeed, a market orientation may have a general impact on the effectiveness of the firm's marketing activities. Therefore, we hypothesize that market-oriented firms are adept at reacting to formal and informal feedback received from customers and competitors. Thus:

H_1 There is a positive relationship between a firm's market orientation and the firm's organizational performance.

Market Orientation and NPD-Performance

The second research stream addresses the link between market orientation and NPD-performance. A review of the literature reveals that a market-oriented culture reduces many of the risks associated with NPD (Baker and Sinkula 1999; Moorman 1995; Slater and Narver 1996). Market-oriented firms continuously monitor their external environments for NPD-opportunities and for NPD-threats from competitors. By focusing on customers' latent needs, market-oriented firms are well positioned to recognize emerging needs and rapidly assess customers' responses to new products (von Hippel 1986). Through their market-scanning efforts, they are able to discover underdeveloped market niches and segments, and they are also capable

of identifying opportunities created by competitors' miscues (Slater and Narver 1996). Market-oriented firms are likely to exploit these opportunities because their organization-wide behaviors related to information processing facilitate responsiveness to market information (Day 1994). As NPD-activities are integrated across departments in an organization, the problem solving capabilities are potentially enhanced by employees working towards the common goal of creating superior value for customers through the development and commercialization of new products. Evidence of how openness in communication, information processing and inter-functional coordination relate to NPD-performance is available from many studies that focus on the success factors in NPD (e.g., Cooper 1999; Craig and Hart 1992; Griffin and Hauser 1992; Imai, Nonaka and Takeuchi 1985). It follows that market orientation leads to congruent behaviors at the NPD-team level, because it determines the type and nature of the initiatives pursued by employees at operational levels that are unique and difficult for competitors to imitate (Kohli and Jaworski 1990).

Presently however, the empirical support for the relationship between market orientation and NPD-performance is circumscribed. For example, Slater and Narver (1996) reason that innovation and new product success are more likely to result from being market-oriented. Similarly, Deshpandé, Farley and Webster (1993), after finding that organizational performance is positively associated with both market orientation and innovation, speculate on a causal relationship between market orientation, innovation and performance. Likewise, Gatignon and Xuereb (1997) reveal a positive relationship between strategic orientation, which includes market orientation, and NPD-performance. Despite criticisms concerning the measurement of NPD-performance (Griffin and Page 1993; Hultink and Robben 1995), additional support comes from Atuahene-Gima's (1995, 1996), Baker and Sinkula's (1999) and Slater and Narver's (1994) studies in which they report a positive association between market orientation and NPD-performance. Recognizing that NPD-performance is a multidimensional phenomenon (Griffin

and Page 1996; Hultink and Robben 1995; Montoya-Weiss and Calantone, 1994) consisting of several dimensions (e.g., customer acceptance measures, market-level measures, product-level measures, timing measures and financial measures), we hypothesize that:

H_2 There is a positive relationship between a firm's market orientation and the firm's NPD-performance.

Market Orientation and the Proficiency in NPD-Activities

The third research stream investigates the link between market orientation and the proficiency in NPD-activities. Cooper and Kleinschmidt (1986) investigated the NPD-activities of 203 NPD-projects. They used a skeleton of the NPD-process taken from a variety of normative and empirically based prescriptive processes which comprises fourteen NPD-activities that firms perform from idea generation to commercialization. Cooper and Kleinschmidt (1986) found that there is considerable variance across NPD-projects in terms of the details of the NPD-activities that firms employ. However, the skeleton of the NPD-process was essentially the same in all conditions (cf. Booz, Allen and Hamilton 1982; Crawford 1994; Kotler 2000; Urban and Hauser 1993; Wheelwright and Clark 1992; Zirger and Maidique 1990) and consisted of three generic stages: predevelopment, development and commercialization (Cooper and Kleinschmidt 1988).

Drawing on this skeleton of the NPD-process, Atuahene-Gima (1995) posited and tested the relationship between market orientation and the proficiency in three NPD-activities. The results show that market orientation positively influences the proficiency in the NPD-activities related to predevelopment, launch and inter-functional teamwork. The results of Atuahene-Gima's (1996) study further reveal that the proficiency in interfunctional teamwork mediates the relationship between market orientation and NPD-performance. Based on these empirical

findings we posit a positive relationship between market orientation and the proficiency in the firm's NPD-activities in each generic stage of the NPD-process:

H_3 There is a positive relationship between a firm's market orientation and the proficiency in the firm's (i) predevelopment, (ii) development, and (iii) commercialization activities.

The Proficiency in NPD-Activities and NPD-Performance

The fourth stream addresses the link between the proficiency in NPD-activities and NPD-performance. Much accumulated evidence of robustly positive findings has been found (Cooper and Kleinschmidt 1986; Song and Montoya-Weiss 1998; Song and Parry 1996). These findings suggest that the proficiency in NPD-activities is a fundamental requirement for NPD-success (Cooper 1988; Song and Montoya-Weiss 1998; Song and Parry 1997). Thus, we hypothesize:

H_4 There is a positive relationship between the proficiency in a firm's NPD-activities and its NPD-performance.

NPD-Performance and Organizational Performance

The fifth research stream examines the link between NPD-performance and organizational performance. This link has been examined extensively by, for example, Cooper (1993), Cooper and Kleinschmidt (1991), Damanpour, Szabat and Evan (1989), and Subramanian and Nilakanta (1996). The results unequivocally provide evidence that NPD-performance has a strong positive effect on organizational performance. The rationale behind NPD-performance showing a strong positive relationship with organizational performance is ascribed to the fact that new products serve to accommodate the uncertainties a firm faces in its entrepreneurial environment (Han, Kim and Srivastava 1998). Accordingly, we hypothesize:

H_5 There is a positive relationship between a firm's NPD-performance and its organizational performance.

Keeping the above in mind, a simultaneous empirical inquiry of the five streams of previous research is imperative to investigate whether the proficiency in NPD-activities and NPD-performance mediates the relationship between market orientation and organizational performance.

Methodology

Sample and Data Collection

The sampling frame was generated using the directory of Dun and Bradstreet. This sampling frame consisted of 475 Dutch firms (SIC-codes 33 to 38) with more than 25 employees and with independent R&D, production and marketing/sales departments. Through a telephone pre-survey 315 firms were identified that met the criteria of developing and commercializing new products. Subsequent phone calls identified in each firm: (1) a new product that had been in the market for at least 12 months and that was representative of the firm's product development program, and (2) a knowledgeable informant in a position to generalize about patterns of behavior related to the content of inquiry (Seidler 1974). A new product was defined as a product that is "new to the firm but familiar to the market". New to the firm products were selected because market orientation has been shown to encourage and support the refinement and adaptations of current products to meet customer needs rather than the development of really new products targeted at emerging new needs (Bennett and Cooper 1981; Christensen and Bower 1996; Lukas and Ferrell 2000). To ensure the suitability of the respondents we adopted a self-assessment of their knowledgeability through the telephone calls, as is suggested by Kumar, Stern and Anderson (1993). The representativeness of the new product for the firm's new product development program was measured in the questionnaire on a seven point Likert scale (anchored at 1=not very

representative and 7=very representative). The mean response was 5.10 (s.d.=1.44) thus showing the representativeness of the new product selected for the firm's product development program.

A total of 211 (67%) knowledgeable informants willing to cooperate with the research received a mailing that included a personalized letter on university stationary explaining the purpose of the study, and a questionnaire. Questionnaires were returned by preaddressed, postage paid envelopes. One reminder letter and a questionnaire were sent to non-respondents. These efforts yielded 126 responses, for a final usable response rate of 40.0% (59.7% of those who received a questionnaire). To evaluate respondent bias the responses obtained from the respondents with different functional backgrounds (e.g., engineering, marketing, R&D) were compared. The results indicated that no significant differences existed in the mean responses on any construct across respondents with different functional backgrounds. Using Armstrong and Overton's (1977) time-trend extrapolation procedure no significant differences were found between early (65.1%) and late (34.9%) respondents. Together these results suggest that respondent bias and non-response bias were not a major problem. Sample characteristics are shown in table 1.

<< Table 1 about here >>

Measure Development and Pre-testing

A pool of items was generated for measuring each of the study's constructs using literature search and interviews with academics and practitioners. These items were pre-tested in two distinct phases: (1) face-to-face interviews with 3 academics and (2) face-to-face interviews with 5 R&D managers and 3 marketing managers. At each stage, participants were asked to identify items that were confusing, tasks that were difficult to respond to, and any other problems they encountered. Items that were identified as problematic were either revised or eliminated, and

new ones were developed. By the end of the second phase of pre-testing the practitioners reported no concerns, and therefore the questionnaire was ready for final administration.

Level of Analysis and Measures

This study responds to a recent call by Drazin and Schoonhoven (1996) for cross-level research as it examines market orientation and organizational performance at the organizational level, and the proficiency in NPD-activities and NPD-performance at the product level. The constructs included in this research were measured using multi-item scales predominantly drawn from prior studies. The response categories were anchored by 1 (strongly disagree) and 7 (strongly agree). The market orientation of the firm was measured using 22 items based upon Kohli, Jaworski and Kumar (1993) and Narver and Slater (1990). To measure the proficiency in the fourteen NPD-activities 62 items adapted from Atuahene-Gima (1995, 1996), Song and Montoya-Weiss (1998), Song and Parry (1997), Song, Souder and Dyer (1997) and Hultink et al. (1998) were used. NPD-performance was measured using 17 items adapted from Griffin and Page (1993, 1996). Organizational performance was measured using 6 items adapted from Naman and Slevin (1993) and Slater and Narver (1994, 1996). The items are shown in appendix A.

Unidimensionality and Reliability

The inter-item correlations and corrected item-to-total correlations were computed for each item, taking one scale at a time, to obtain unidimensionality (Steenkamp and Van Trijp 1991). Items for which these correlations were not significant ($p<0.01$) were eliminated. The unidimensionality of each purified scale was explored with principal axis factoring using an eigenvalue of 1.0 and factor loadings of 0.25 as the cut-off points. The reliability of each purified, unidimensional scale was explored by computing the reliability coefficient. In case where the coefficient alpha was smaller than 0.7, the item with the lowest corrected item-to-total correlation was removed until the requirement of 0.7 was met (Nunnally 1978). Means, standard

deviations, item-to-item correlations, corrected item-to-total correlations, reliability coefficients and eigenvalues are reported in table 2.

<< Table 2 about here >>

Convergent and Discriminant Validity

Convergent validity of the scales was investigated by performing a confirmatory factor analysis at the first-order level and the second-order level. At the first-order level 6 confirmatory factor models (models 1a, 2, 3, 4, 5a and 6) were estimated using Maximum Likelihood (ML) estimation in LISREL 8.3 (Jöreskog and Sörbom 1993). This approach was selected in order to fit the constraints of a five to one ratio of sample size to parameter estimates (Baumgartner and Homburg 1996). The results, reported in table 3, indicate that the absolute (i.e., GFI and NFI) fit indices approach the recommended 0.90 level (Bagozzi and Yi 1988). The GFI and NFI indices have, however, shown a tendency to underestimate fit in small samples (Bentler 1990; Gerbing and Anderson 1992). The incremental fit indices (i.e., NNFI, CFI and IFI) take sample size into account and are the primary indices of choice to assess model fit in this study. The incremental fit indices are above the threshold value of 0.90. The parsimonious fit measures (i.e., χ^2/df) are below the recommended threshold of 2.0 (Steenkamp and Van Trijp 1991). The RMSEA's are at, or below, the recommended 0.08 level (Browne and Cudeck 1993). The AGFI is not reported, as its usefulness is questionable (Mulaik, et al. 1989). The composite reliabilities of the scales in each model, with the exception of strategic planning and timing, exceed the 0.70 threshold for acceptable reliability (Bagozzi and Yi 1988). In each model, with the exception of idea screening, concept testing and product testing, the average value for extracted variance exceeds the threshold level of 0.40. Together, the composite reliabilities and the average extracted variance values suggest that the scales are internally consistent. Convergent validity is indicated by the fact that in each model the items load significantly (t>2.0) on their corresponding latent

construct (Bagozzi, Yi and Phillips 1991). At the second-order level, two one-factor second-order models (i.e., models 1b and 5b) were estimated for the composite scales of market orientation and new product performance (Bollen 1989). The results, reported in table 3, indicate that the average values for extracted variance exceed the recommended cut-off level, which suggest that the scales are internally consistent. Convergent validity is indicated by the fact that in both models the items load significantly on their corresponding first-order factor with the first-order factors originating significantly from the second-order factor.

<< Table 3 about here >>

Discriminant validity across the scales was assessed in two steps. First, a two-factor first order model was estimated for each possible pair of scales (cf. Anderson and Gerbing 1988). Discriminant validity is indicated when the variance extracted estimates for the two scales exceed the square of the correlation between them (Fornell and Larcker 1981). The results revealed that without exception the assessment supported the discriminant validity of the scales. Second, the 95% confidence intervals (plus or minus 1.96 * standard errors) around all pairwise latent-trait correlations were examined (Bagozzi and Phillips 1982). The results show that discriminant validity is obtained because none of the confidence intervals encompasses 1.0. The latent construct inter-correlations are shown in table 4.

<< Table 4 about here >>

Together the results of the tests for unidimensionality, reliability, convergent validity and discriminant validity provide evidence of internal and external validity of the scales used in this study. Provided with this evidence the constructs at the first-order level were formed by averaging the responses to each item in a particular scale. The constructs at the second-order

level were formed by averaging each of the first-order construct scores.

Results

Three models were estimated using path analysis through LISREL 8.3 (Jöreskog and Sörbom 1993) to test the hypotheses. The models pertain to the three generic stages in the skeleton of the NPD-process (i.e., predevelopment, development and commercialization). To assign the fourteen NPD-activities to a generic stage in the NPD-process we asked eight academic experts in the field of new product development to individually perform a sorting task. The academics were provided with fourteen cards representing the different NPD-activities that firms employ in developing and commercializing new products. The academics were instructed to classify related NPD-activities into the same generic stage and were asked to explicate the classification criteria used. To assess the inter-expert reliability we calculated Cohen's Kappa (Perreault and Leigh 1989; Siegel and Castellan 1988). Cohen's Kappa is the ratio of the proportion of times that experts agree (corrected for chance agreement) to the maximum proportion of times that the experts could agree (corrected for chance agreement). The results show that the experts strongly agree on the classification of the NPD-activities in the three generic stages (Kappa = .61). Appendix B provides the results of the sorting task. The predevelopment stage consists of the activities of strategic planning, idea generation, idea screening, and business analysis (cf. Cooper 1988). The development stage comprises the activities of concept development, concept testing, prototype development, prototype testing, product development and product testing (cf. Cooper and Kleinschmidt 1988). The commercialization stage involves the activities related to market testing, launch budgeting, launch strategy and launch tactics (cf. Crawford 1994). Appendix C presents the definitions of the NPD-activities in the three generic stages.

In estimating the three models the NPD-activities *within* each generic stage were modeled sequentially in order to be consistent with the stage gate approach to NPD-processes (e.g.,

Cooper and Kleinschmidt 1986; Craig and Hart 1992; Hise et al. 1989; Song and Montoya-Weiss 1998). Although we acknowledge that the proficiency in NPD-activities *across* the three generic stages might also be interdependent, these relationships were not tested because of constraints regarding the sample size to parameter estimates (Baumgartner and Homburg 1996). The empirical data presented hereafter therefore investigate each generic stage in the NPD-process individually, and at one point in time, and thus provide a partial and static test of the framework shown in figure 1.

Predevelopment Stage

The analysis of the predevelopment stage model resulted in a good fit to the data (χ^2/df=0.74; GFI=0.99; NFI=0.99; NNFI=1.00; CFI=0.99; IFI=0.99; RMSEA=0.01). Table 5 presents the unstandardized path coefficients and the t-values associated with the estimates. The results do not support H_1 and H_2 as the coefficients for the effect of market orientation on NPD-performance and organizational performance are not significant. The results provide partial support for H_{3i}, as the coefficients for the effect of market orientation on the proficiency in the NPD-activities of strategic planning (b=0.65), idea generation (b=0.61) and idea screening (b=0.43) are positive and significant ($p<0.05$). The coefficient for the effect of market orientation on business analysis is not significant. The results further provide partial support for H_{4i}, as the coefficients for the effect of the proficiency in NPD-activities of strategic planning (b=0.18) and idea generation (b=0.18) on NPD-performance are positive and significant. The coefficients for the effect of the proficiency in idea screening and business analysis are not significant. The results provide support for H_5, as the coefficient for the effect of NPD-performance (b=0.70) on organizational performance is positive and significant.

<< Table 5 about here >>

The results further show that the proficiency in the NPD-activity of strategic planning is significantly related to the proficiency in the NPD-activities of idea screening (b=0.36) and business analysis (b=0.66). The proficiency in idea generation is significantly related to the proficiency in idea screening (b=0.14).

Development Stage

The analysis of the development stage model also resulted in an acceptable fit to the data (χ^2/df=1.68; GFI=0.98; NFI=0.99; NNFI=0.97; CFI=0.99; IFI=0.99; RMSEA=0.07). Table 6 presents the unstandardized path coefficients and the t-values associated with the estimates. Consistent with the findings in the predevelopment stage of the NPD-process, the results do not support H_1 and H_2 as the coefficients for the effect of market orientation on NPD-performance and on organizational performance are not significant. The results provide partial support for H_{3ii}, as the coefficients for the effect of market orientation on the proficiency in concept development (b=0.79), concept testing (b=0.46) and prototype testing (b=0.18) are positive and significant. The coefficients for the effect of market orientation on the proficiency in prototype development, product development and product testing are not significant. The results further provide partial support for H_{4ii}, as the coefficients for the effect of the proficiency in the NPD-activities of prototype testing (b=0.44) and product testing (b=0.26) on NPD-performance are positive and significant. The coefficients for the effect of the proficiency in concept development, concept testing, prototype development and product development on NPD-performance are not significant. Consistent with the findings from the predevelopment stage, the results provide support for H_5, as the coefficient for the effect of NPD-performance (b=0.70) on organizational performance is positive and significant ($p<0.05$).

<< Table 6 about here >>

The results further reveal that the proficiency in the NPD-activity of concept development is significantly related to concept testing (b=0.47), prototype development (b=0.45), prototype testing (b=0.22) and product development (b=0.45). The proficiency in concept testing is related significantly to prototype development (b=0.25), prototype testing (b=1.10), and product testing (b=0.36). The proficiency in prototype development is related significantly to product development (b=0.54). The proficiency in prototype testing is related significantly to product testing (b=0.42), and the proficiency in product development is significantly related to product testing (b=0.17).

Commercialization Stage

The results of the commercialization model resulted in a good fit to the data (χ^2/df=0.56; GFI=0.99; NFI=0.99; NNFI=1.00; CFI=1.00; IFI=0.99; RMSEA=0.01). Table 7 presents the unstandardized path coefficients and the t-values associated with the estimates. Consistent with the findings from the predevelopment and development stage of the NPD-process, the results do not support H_1 and H_2 as the coefficients for the effect of market orientation on NPD-performance and organizational performance are not significant. The results further provide partial support for H_{3iii}, as the coefficients for the effect of market orientation on the proficiency in the NPD-activities of market testing (b=1.13) and launch strategy (b=0.40) are positive and significant. The coefficients for the effect of market orientation on the proficiency in launch budgeting and launch tactics are not significant. The results further provide partial support for H_{4iii}, as the coefficients for the effect of the proficiency in the NPD-activities of launch strategy (b=0.12) and launch tactics (b=0.29) on NPD-performance are positive and significant. The estimated coefficients for the effect of the proficiency in market testing and launch budgeting on NPD-performance are not significant. Consistent with the findings from the predevelopment and development stages of the NPD-process, the results provide support for H_5, as the coefficient for

the effect of NPD-performance (b=0.70) on organizational performance is positive and significant.

<< Table 7 about here >>

The results further show that the proficiency in the NPD-activity of market testing is related positively to launch budgeting (b=0.28) and launch tactics (b=0.22). The proficiency in launch budgeting is related significantly to launch strategy (b=0.43) and launch tactics (b=0.30). The proficiency in launch strategy is related significantly to launch tactics (b=0.28).

Discussion and Implications

This study tested a set of hypotheses related to the mediating effect of the proficiency in fourteen NPD-activities and NPD-performance on the relationship between market orientation and organizational performance. The discussion of the results, summarized in table 8, is organized around the five streams of previous research that have focused on a single relationship shown in figure 1.

<< Table 8 about here >>

Market Orientation and Organizational Performance

First, this study examined the influence of market orientation on organizational performance. The results reveal that market orientation has no direct effect on organizational performance. The absence of a positive relationship between market orientation and organizational performance is however not entirely unexpected in light of the non-significant and mixed findings in prior research (e.g., Greenley 1995; Han, Kim and Srivastava 1998; Hart and Diamantopolous 1993; Jaworski and Kohli 1993; Siguaw, Simpson and Baker 1998). These findings may, on the one hand, be clarified by endorsing Gatignon and Xuereb's (1997) explanation that market-oriented

firms achieve superior organizational performance because these firms are able to develop better new products and commercialize these products more effectively. This clarification also justifies Slater and Narver's (1995) focus on the NPD-process as a core value-creating capability that drives the relationship between market orientation and organizational performance.

Although we are inclined to endorse Gatignon and Xuereb's (1997) explanation, there may be a lagged relationship between market orientation and organizational performance, which was not identified in this cross-sectional study, because "major changes in customer needs that are permanent will require major modifications to marketing operations, if satisfaction of customer needs is to be sustained. However, when the costs of these modifications are spread over the long term, it is likely that profits can be increased" (Greenley 1995, p.10). Regardless which explanation is adopted, the managerial implication following is that firms should plan a market orientation strategy as a long term investment in their NPD-process, but realize that positive effects on organizational performance do not accrue immediately.

Market Orientation and NPD-Performance

Second, this study investigated the influence of market orientation on NPD-performance. The findings show that, contrary to Atuahene-Gima (1995), Baker and Sinkula (1999) and Slater and Narver (1994), there is no direct effect from market orientation to NPD-performance. This finding may, on the one hand, be explained by the fact that this study used a more elaborate measure to determine whether a new product is successful (Griffin and Page 1996). On the other hand, the relationship between market orientation and NPD-performance may be mediated by the unmeasured impact of the firm's market orientation on the characteristics of the new product (Gatignon and Xuereb 1997). This explanation seems most plausible because marketing theory predicts that market-oriented firms serve the needs of customers better, especially by providing products that fit their needs best (Griffin and Hauser 1992). This creates an advantage for the

product, which is perceived by customers as fitting their needs better than does the competition (Cooper 1988; von Hippel 1986). The managerial implication is, therefore, that firms should not view a high level of market orientation as counter productive for NPD-performance, because an increased market orientation should ensure the development and commercialization of new products with characteristics that customers value.

Market Orientation and the Proficiency in NPD-Activities

Third, this study explored the relationships between market orientation and the proficiency in fourteen NPD-activities. The results, shown in table 8, reveal that market orientation has a direct effect on the proficiency in eight (i.e., strategic planning, idea generation, idea screening, concept development, concept testing, prototype testing, market testing and launch strategy) NPD-activities. The results further indicate that, contrary to our expectations, market orientation has no direct effect on the proficiency in six (i.e., business analysis, prototype development, product development, product testing, launch budgeting and launch tactics) NPD-activities. However, the results reveal that market orientation has an indirect effect on the proficiency in four of these six NPD-activities through the effect of market orientation on strategic planning (the latter has a positive effect on business analysis), concept development (the latter has a positive effect on prototype development), concept testing (the latter has a positive effect on product testing), and launch strategy (the latter has a positive effect on launch tactics).

The finding that market orientation has no direct and indirect effect on product development is in hindsight not surprising. After all, at the product development stage in the NPD-process the conversion of customer attributes into engineering attributes has already taken place and the prototype has already been tested. Therefore, the proficiency in the NPD-activities of product development is likely to become a technical matter. The finding that market orientation only has an indirect effect on the proficiency in launch tactics through the proficiency in launch strategy is

more difficult to explain. It has been argued that market orientation's role in the NPD-process is confined to the strategic level (Hurley and Hult 1998). This explanation seems plausible because the results show that market orientation's influence on the proficiency in the NPD-activity of launch strategy is conducive for the marketing-mix decisions in the launch tactics stage of the NPD-process as reported by Hultink et al. (1998). This explanation is, however, inconsistent with market orientation's direct effect on, for example, the proficiency in NPD-activities of concept development at the operating level. The finding that market orientation has no effect on the proficiency in the NPD-activity of launch budgeting might be explained by the fact that this NPD-activity is often carried out in isolation by the finance department. Although the budgeting method of choice should be the task method, and hence requires coordinated efforts of the finance department and the marketing/sales department, a review of the literature reveals that firms most frequently use the affordable, percentage-of-sales, or competitive parity method (Cooper 1993).

The implication for managers from these findings is that market-oriented firms that develop and commercialize new products emphasize eight out of fourteen NPD-activities directly and four NPD-activities indirectly. It seems foolhardy to suggest, however, that market-oriented firms should proceed without proficiency in the launch tactics because deciding on launch tactics is important for achieving new product success.

The Proficiency in NPD-Activities and NPD-Performance

Fourth, this study examined the relationships between the proficiency in NPD-activities and NPD-performance. The findings, also shown in table 8, reveal that the proficiency in six NPD-activities (i.e., strategic planning, idea generation, prototype testing, product testing, launch strategy and launch tactics) has a direct positive effect on NPD-performance. The results further reveal that market-oriented firms emphasize the proficiency in four of these six NPD-activities

(i.e., strategic planning, idea generation, prototype testing and launch strategy). This means that market orientation indirectly influences NPD-performance through the proficiency in these four NPD-activities. It follows as a managerial implication that the proficiency in these four NPD-activities drives the relationship between market orientation and organizational performance through NPD-performance.

The finding that the proficiency in product testing and launch tactics directly effects NPD-performance reveals the importance for market-oriented firms to emphasize the proficiency in these NPD-activities directly rather then indirectly through the proficiency in other NPD-activities (i.e., concept testing and launch strategy). The results further show that market-oriented firms stress the proficiency in four NPD-activities (i.e., idea screening, concept development, concept testing and market testing) without a direct effect on NPD-performance. The proficiency in three of these four NPD-activities (i.e., concept development, concept testing and market testing) has a positive effect on the proficiency in the NPD-activities of prototype testing, product testing and launch tactics respectively, that all three have a direct positive effect on NPD-performance.

Organizational Performance and NPD-Performance

Finally, this study explored the relationship between NPD-performance and organizational performance. The results are consistent with our expectations by reaffirming the strong and positive link between NPD-performance and organizational performance. The implication is that new products are important for a firm's organizational performance. For this reason, it is not surprising that market-oriented firms emphasize the proficiency in eight NPD-activities in order to improve NPD-performance, and hence organizational performance.

Conclusions

The objective of this study was to investigate whether the relationship between market orientation and organizational performance is mediated by the proficiency in NPD-activities and NPD-performance. The results from a cross sectional sample of Dutch firms provide empirical evidence that the market orientation of the firm leads to superior organizational performance because of the proficiency in several NPD-activities and NPD-performance. The fact that this mediating role of the proficiency in NPD-activities and NPD-performance has been found in all three generic stages of the NPD-process thus provides a better understanding of the actual mechanism for transforming market orientation into superior value for customers, and hence, superior organizational performance. Market-oriented firms should be aware however that in firms that listen too carefully to their customers, resource allocations in the NPD-process tend to neglect the development of new-to-the-world products targeted at emerging new needs (Christensen and Bower 1986). This could place stringent limits on the NPD-strategies that market-oriented firms pursue, which might lead to learning myopia that stifle creative responses to emerging technologies and customer needs in the long-term.

Study Limitations and Further Research

This study is limited by several factors that should be addressed in future research. First, although the study included data from manufacturers in different industries, the hypothesized relationships should be tested further with other independent samples. Second, data for this study were collected by the key informant approach, which precludes a rigorous assessment of the validity of the informants reports, and prohibits a thorough analysis of measurement error issues (Phillips 1981). It would be interesting to use multiple respondents involved in the development and commercialization of new products. Third, this study focused on new-to-the firm products. Future research should consider focusing on products that span the full range of product newness. This would provide a more robust test of the hypotheses. Fourth, this study estimated

three models pertaining to the generic stages in the NPD-process to meet the constraints of sample size to parameter estimates. Future research should investigate the mediating effect of the proficiency in NPD-activities and NPD-performance across the generic stages on the relationship between market orientation and organizational performance. Fifth, because of the cross-sectional nature of the study, causal inferences need to be confirmed by longitudinal studies. Finally, this study modeled the NPD-process with distinct NPD-activities. Future research may consider modeling the NPD-process with overlapping activities, and fuzzy or conditional go decisions at different stages (Cooper 1994).

REFERENCES

Anderson, James C. and David W. Gerbing (1988), "Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach," *Psychological Bulletin*, 103 (3), 411-423.

Armstrong, J. Scott and Terry S. Overton (1977), "Estimating Non-Response Bias in Mail Surveys," *Journal of Marketing Research*, 14 (August), 396-402.

Atuahene-Gima, Kwaku (1995), "An Exploratory Analysis of the Impact of Market Orientation on New Product Performance: A Contingency Approach," *Journal of Product Innovation Management*, 12 (4), 275-293.

----- (1996), "Market Orientation and Innovation," *Journal of Business Research*, 35 (2), 93-103.

Bagozzi, Richard P. and Lynn W. Phillips (1982), "Representing and Testing Organizational Theories: A Holistic Construal," *Administrative Science Quarterly*, 27 (3), 459-489.

----- and Youjae Yi (1988), "On the Evaluation of Structural Equation Models," *Journal of the Academy of Marketing Science*, 16 (1), 74-94.

----- , ----- , and Lynn W. Phillips (1991), "Assessing Construct Validity in Organizational Research," *Administrative Science Quarterly*, 36 (3), 421-458.

Baker, William E. and James M. Sinkula (1999), "The Synergistic Effect of Market Orientation and Learning Orientation on Organizational Performance," *Journal of the Academy of Marketing Science*, 27 (4), 411-427.

Baumgartner, Hans and Christian Homburg (1996), "Applications of Structural Equation Modeling in Marketing and Consumer Research: A Review," *International Journal of Research in Marketing*, 13 (2), 139-161.

Bennett, Roger C. and Robert G. Cooper (1981), "The Misuse of Marketing: An American Tragedy," *Business Horizons*, 25 (2), 51-61.

Bentler, Peter M. (1990), "Comparative Fit Indexes in Structural Models," *Psychological Bulletin*, 107 (2), 238-246.

Bhuian, Shahid N. (1998), "An Empirical Examination of Market Orientation in Saudi Arabian Manufacturing Companies," *Journal of Business Research*, 43 (1), 13-25.

Bollen, Kenneth A. (1989), *Structural Equations with Latent Variables*. New York: Riley.

Booz, Allen and Hamilton (1982), *Management of New Products.* Chicago: Booz, Allen and Hamilton Inc.

Browne, M.W. and R. Cudeck (1993), "Alternative Ways of Assessing Model Fit," in *Testing Structural Equation Models*, Bollen, Kenneth A. and J. Scott Long (eds.), Newbury Park, CA: Sage Publications, 136-162.

Cameron, Kim S. and Sarah J. Freeman (1991), "Cultural Congruence, Strength, and Type: Relationships to Effectiveness," in *Research in Organizational Change and Development* 5, Woodman, W. and W.A. Passmore (eds.), Greenwich, CT: JAI Press Inc., 23-58.

Christensen, Clayton M. and Joseph L. Bower (1996), "Customer Power, Strategic Investments, and the Failure of Leading Firms," *Strategic Management Journal*, 17 (March), 197-218.

Clark, Kim M. and Takahiro Fujimoto (1991), *Product Development Performance: Strategy, Organization and, Management in the World Auto Industry*. Boston: Harvard Business School Press.

Cooper, Robert G. (1988), "Predevelopment Activities Determine New Product Success," *Industrial Marketing Management*, 17 (3), 237-247.

----- (1993), *Winning at New Products.* 3rd ed. Reading, MA: Addison Wesley.

----- (1994), "Third Generation New Product Processes," *Journal of Product Innovation Management*, 11 (1), 3-14.

----- (1999), "The Invisible Success Factors in Product Innovation," *Journal of Product Innovation Management*, 16 (2), 115-133.

----- and Elko J. Kleinschmidt (1986), "An Investigation into the New Product Process: Steps, Deficiencies, and Impact," *Journal of Product Innovation Management*, 3 (1), 71-85.

----- and ----- (1988), "Resource Allocation in the New Product Process," *Industrial Marketing Management*, 17 (3), 237-248.

----- and ----- (1991), "New Product Processes at Leading Industrial Firms," *Industrial Marketing Management*, 20 (2), 137-147.

Craig, Angie and Susan Hart (1992), "Where to Now in New Product Development Research?" *European Journal of Marketing*, 26 (11), 1-49.

Crawford, Merle C. (1994), *New Products Management*, 4th ed. Homewood, IL: Irwin.

Damanpour, Fariborz, Kathryn A. Szabat, and William M. Evan (1989), "The Relationship between Types of Innovation and Organizational Performance," *Journal of Management Studies*, 26 (November), 587-601.

Day, George S. (1994), "The Capabilities of Market-Driven Organizations," *Journal of Marketing*, 58 (October), 37-52.

----- and Robin Wensley (1988), "Assessing Advantage: A Framework for Diagnosing Competitive Superiority," *Journal of Marketing*, 52 (April), 1-20.

Deshpandé, Rohit and John U. Farley (1998), "Measuring Market Orientation: Generalization and Synthesis," *Journal of Market Focused Management*, 2 (3), 213-232.

----- , ----- , and Frederick E. Webster (1993), "Corporate Culture, Customer Orientation and Innovativeness in Japanese Firms: A Quadrad Analyses," *Journal of Marketing*, 57 (January), 23-37.

Drazin, Robert and Claudia B. Schoonhoven (1996), "Community, Population, and Organization Effects on Innovation: A Multilevel Perspective," *Academy of Management Journal*, 39 (5), 1065-1083.

Fornell, Claes and David F. Larcker (1981), "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error," *Journal of Marketing Research*, 18 (February), 39-50.

Gatignon, Hubert and Jean-Marc Xuereb (1997), "Strategic Orientation of the Firm and New Product Performance," *Journal of Marketing Research*, 34 (February), 77-90.

Gerbing, David W. and James C. Anderson (1988), "An Updated Paradigm for Scale Development Incorporating Unidimensionality and its Assessment," *Journal of Marketing Research*, 25 (May), 186-192.

----- and ----- (1992), "Monte Carlo Evaluations of Goodness of Fit Indexes for Structural Equation Models," *Sociological Methods and Research*, 21 (November), 132-160.

Greenley, Gordon E. (1995), "Market Orientation and Company Performance," *British Journal of Management*, 6 (1), 47-66.

Griffin, Abbie and John R. Hauser (1992), "Patterns of Communication Among Marketing, Engineering, and Manufacturing: A Comparison Between Two New Product Teams," *Management Science*, 38 (March), 360-373.

----- and Albert L. Page (1993), "An Interim Report on Measuring Product Development Success and Failure," *Journal of Product Innovation Management*, 10 (4), 291-308.

----- and ----- (1996), "PDMA Success Measurement Project: Recommended Measures for Product Development Success and Failure," *Journal of Product Innovation Management*, 13 (6), 478-496.

Han, Jin K., Namwoon Kim, and Rajendra K. Srivastava (1998), "Market Orientation and Organizational Performance: Is Innovation a Missing Link?" *Journal of Marketing*, 62 (October), 30-45.

Hart, Susan and Adamantios Diamantopolous (1993), "Linking Market Orientation and Company Performance: Preliminary Work on Kohli and Jaworski's Framework," *Journal of Strategic Marketing*, 1 (2), 93-122.

Hise, Richard T., Larry O'Neal, James U. McNeal, and A. Parasuraman (1989), "The Effect of Product Design Activities on Commercial Success Levels of New Industrial Products," *Journal of Product Innovation Management*, 6 (1), 43-50.

Hultink, Erik .J., Abbie Griffin, Henry S.J. Robben, and Susan Hart (1998), "In Search of Generic Launch Strategies for New Products," *International Journal of Research in Marketing*, 15 (3), 269-285.

----- and Henry S.J. Robben (1995), "Measuring New Product Success: The Difference that Time Perspective Makes," *Journal of Product Innovation Management*, 12 (5), 392-405.

Hunt, Shelby D. and Robert M. Morgan (1995), "The Comparative Advantage Theory of Competition," *Journal of Marketing*, 59 (April), 1-15.

Hurley, Robert F. and Tomas M. Hult (1998), "Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination," *Journal of Marketing*, 62 (July), 42-54.

Hutt, Michael D., Peeter H. Reingen, and John R. Ronchetto (1988), "Tracing Emergent Processes in Marketing Strategy Formulation," *Journal of Marketing*, 52 (January), 4-19.

Imai, Kenochi, Ikujiro Nonaka, and Hirotaka Takeuchi (1985), "Managing the New Product Development Process: How Japanese Firms Learn and Unlearn," in *The Uneasy Alliance*, Clark, K. and Lorenz, C. (eds.), Boston: Harvard Business School, 337-375.

Jaworski, Bernard J. and Ajay K. Kohli (1993), "Market Orientation: Antecedents and Consequences," *Journal of Marketing*, 57 (July), 53-70.

Jöreskog, Karl G. and Dag Sörbom (1993), *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*. Hillsdale New Jersey: Lawrence Erlbaum Associates.

Kohli, Ajay K. and Bernard J. Jaworski (1990), "Market Orientation: The Construct, Research Propositions and Managerial Implications," *Journal of Marketing*, 54 (April), 1-18.

----- , ----- , and Ajith Kumar (1993), "MARKOR: A Measure of Market Orientation," *Journal of Marketing Research*, 30 (November), 467-477.

Kotler, Philip (2000), *Marketing Management*, 10th ed. Englewood Cliffs, New Jersey: Prentice Hall.

Kumar, Nirmalya, Louis W. Stern, and James G. Anderson (1993), "Conducting Interorganizational Research Using Key Informants," *Academy of Management Journal*, 36 (6), 1633-1651.

Lukas, Bryan A. and O.C. Ferrell (2000), "The Effect of Market Orientation on Product Innovation," *Journal of the Academy of Marketing Science*, 28 (2), 239-247.

Montoya-Weiss, Mitzi M. and Roger J. Calantone (1994), "Determinants of New Product Performance: A Review and Meta-Analysis," *Journal of Product Innovation Management*, 11 (5), 397-418.

Moorman, Christine (1995), "Organizational Information Processes: Cultural Antecedents and New Product Outcomes," *Journal of Marketing Research*, 32 (August), 318-335.

Mulaik, Stanley A., Larry R. James, Judith van Alstine, Nathan Bennett, Sherri Lind and C. Dean Stilwell (1989), "Evaluation of Goodness of Fit Indices for Structural Equation Models," *Psychological Bulletin*, 105 (3), 430-450.

Naman, John C. and Dennis P. Slevin (1993), "Entrepreneurship and the Concept of Fit: A Model and Empirical Tests," *Strategic Management Journal*, 14 (February), 137-153.

Narver, John C. and Stanley F. Slater (1990), "The Effect of Market Orientation on Business Profitability," *Journal of Marketing*, 54 (October), 20-35.

----- and ----- (1998), Customer-Led and Market-Oriented: Let's Not Confuse the Two," *Strategic Management Journal*, 19 (10), 1001-1006.

----- , ----- , and Bryan Tietje (1998), "Creating a Market Orientation," *Journal of Market Focused Management*, 2 (3), 241-255.

Nunnally, Jum C. (1978), *Psychometric Theory*, 2th ed. New York: Macmillan.

Pelham, Alfred M. (1997), "Mediating Influences on the Relationship between Market Orientation and Profitability in Small Industrial Firms," *Journal of Marketing Theory and Practice*, 5 (3), 1-23.

----- (1999), "Influence of Environment, Strategy, and Market Orientation on Performance in Small Manufacturing Firms," *Journal of Business Research*, 45 (1), 33-46.

----- and David Wilson (1996), "A Longitudinal Study of the Impact of Market Structure, Firm Structure, Strategy and Market Orientation Culture on Dimensions of Small Firm Performance," *Journal of the Academy of Marketing Science*, 24 (1), 27-43.

Perreault, William D. Jr. and Laurence E. Leigh (1989), "Reliability of Nominal Data Based on Qualitative Judgements," *Journal of Marketing Research*, 26 (May), 135-148.

Phillips, Lynn W. (1981), "Assessing Measurement Error in Key Informant Reports: A Methodological Note on Organizational Analysis in Marketing," *Journal of Marketing Research*, 18 (November), 395-415.

Pitt, Leyland, Albert Caruana, and Pierre Berthon (1996), "Market Orientation and Business Performance: Some European Evidence," *International Marketing Review*, 13 (1), 5-18.

Quinn, Robert E. and John Rohrbaugh (1983), "A Spatial Model of Effectiveness Criteria: Toward a Competing Values Approach to Organizational Analysis," *Management Science*, 29 (3), 363-377.

Ruekert, Robert W. (1992), "Developing a Market Orientation: An Organizational Strategy Perspective," *International Journal of Research in Marketing*, 9 (August), 225-245.

----- , Orville C. Walker Jr., and Kenneth J. Roering (1985), "The Organization of Marketing Activities: A Contingency Theory of Structure and Performance," *Journal of Marketing*, 49 (Winter), 13-25.

Seidler, Lee J. (1974), "On Using Informants: A Technique for Collecting Quantitative Data and Controlling for Measurement Error in Organizational Analysis," *American Sociological Review*, 39, 816-831.

Siegel, Sidney and N. John Castellan Jr. (1988), *Nonparametric Statistics for the Behavioral Sciences*. New York: McGraw-Hill.

Siguaw, Judy A., Penny M. Simpson, and Thomas L. Baker (1998), "Effects of Supplier Market Orientation on Distributor Market Orientation and the Channel Relationship: The Distributor Perspective," *Journal of Marketing*, 62 (July), 99-111.

Slater, Stanley F. and John C. Narver (1994), "Does Competitive Environment Moderate the Market Orientation-Performance Relationship?" *Journal of Marketing*, 58 (January), 46-55.

----- and ----- (1995), "Market Orientation and the Learning Organization," *Journal of Marketing*, 59 (July), 63-74.

----- and ----- (1996), "Competitive Strategy in the Market Focused Business," *Journal of Market Focused Management*, 1 (2), 159-174.

----- and ----- (2000), "The Positive Effect of a Market Orientation on Business Profitability: A Balanced Replication," *Journal of Business Research*, 48 (1), 69-73.

Song, X. Michael and Mitzi M. Montoya-Weiss (1998), "Critical Development Activities for Really New versus Incremental Products," *Journal of Product Innovation Management*, 15 (2), 124-135.

----- and Mark E. Parry (1996), "What Separates Japanese New Product Winners From Losers," *Journal of Product Innovation Management*, 13 (5), 422-439.

----- and ----- (1997), "The Determinants of Japanese New Product Successes," *Journal of Marketing Research*, 34 (February), 64-76.

----- , William E. Souder, and Barbara Dyer (1997), "A Causal Model of the Impact of Skills, Synergy, and Design Sensitivity on New Product Performance," *Journal of Product Innovation Management*, 14 (2), 88-101.

Steenkamp, Jan-Benedict E.M. and Hans C.M. Van Trijp (1991), "The Use of LISREL in Validating Marketing Constructs," *International Journal of Research in Marketing*, 8 (4), 283-299.

Subramanian, Ashok and S. Nilakanta (1996), "Organizational Innovativeness: Exploring the Relationship Between Organizational Determinants of Organizational Performance," *Omega, International Journal of Management Science*, 24 (6), 631-647.

Urban, Glen L. and John R. Hauser (1993), *Design and Marketing of New Products.* Englewood Cliffs, New Jersey: Prentice Hall.

Von Hippel, Eric (1986), "Lead Users: A Source of Novel Product Concepts," *Management Science*, 32 (7), 791-806.

Wheelwright, Steven C. and Kim B. Clark (1992), *Revolutionizing Product Development*. New York: The Free Press.

Zirger, Billie J. and Modesto A. Maidique (1990), "A Model of New Product Development," *Management Science*, 36 (7), 867-883.

TABLE 1
Sample Characteristics

SIC-code:		No. of employees:		Sales in guilders (x 10^6):		Respondents:	
33	4.8%	26-50	8.7%	< 15	17.5%	Marketing/sales manager	21.4%
34	33.3%	51-75	21.4%	15-25	22.2%	R&D manager	19.8%
35	27.8%	76-100	20.6%	25-50	20.6%	Engineering	11.1%
36	13.5%	101-150	8.7%	50-75	13.5%	General manager	11.1%
37	12.7%	151-200	10.3%	75-100	8.7%	New business manager	8.7%
38	7.9%	201-300	11.9%	100-150	2.4%	Product manager	7.1%
		>301	18.3%	150-200	11.1%	Production manager	4.0%
				> 200	4.0%	Others	16.7%

TABLE 2
Results Assessment Unidimensionality and Reliability

	Mean:	SD:	No. items deleted:	No. items remaining:	Lowest item to item correlation:	Lowest item to total correlation:	Cronbach alpha:	Eigenvalue:
Market orientation:								
- Customer orientation	5.69	0.87	2	5	0.34	0.61	0.84	2.7
- Competitor orientation	5.06	0.86	3	5	0.34	0.57	0.83	2.5
- Interfunctional coordination	4.93	0.96	2	5	0.29	0.46	0.77	2.2
Predevelopment stage:								
- Strategic planning	4.39	1.29	2	4	0.43	0.61	0.86	2.5
- Idea generation	4.57	1.16	2	3	0.30	0.36	0.67	1.3
- Idea screening	4.48	1.13	0	4	0.25	0.46	0.72	1.7
- Business analysis	4.54	1.25	0	4	0.56	0.63	0.80	1.7
Development stage:								
- Concept development	5.35	1.21	0	3	0.77	0.81	0.93	2.4
- Concept testing	4.83	1.01	0	5	0.32	0.50	0.74	2.3
- Prototype development	5.52	0.94	1	3	0.67	0.74	0.89	2.2
- Prototype testing	4.56	1.25	1	3	0.32	0.39	0.63	1.2
- Product development	5.45	1.12	0	3	0.76	0.79	0.92	2.4
- Product testing	4.71	1.07	0	4	0.26	0.42	0.72	1.7
Commercialization stage:								
- Market testing	4.50	1.54	1	4	0.57	0.66	0.90	2.8
- Launch budgeting	4.09	1.37	0	4	0.56	0.65	0.91	2.9
- Launch strategy	4.96	1.27	3	3	0.59	0.64	0.87	2.1
- Launch tactics	4.58	1.18	0	5	0.34	0.62	0.86	2.8
NPD-success:								
- Market level	4.47	1.37	1	3	0.67	0.77	0.92	3.0
- Financial	4.89	1.07	1	3	0.58	0.68	0.86	2.1
- Customer acceptance	5.65	0.89	2	2	0.84	0.84	n.a.	1.7
- Product level	n.a.	n.a.	2	0	n.a.	n.a.	n.a.	n.a.
- Timing	4.64	1.23	1	2	0.42	0.42	n.a.	0.8
SBU-success:								
- SBU performance	4.92	0.83	0	6	0.42	0.64	0.88	3.4

Note: n.a. = not available

TABLE 3
Results Assessment Convergent Validity

Model 1a (first-order):	Lowest t-value:	Average variance extracted:	Composite reliability:
- Customer orientation	4.60	0.58	0.87
- Competitor orientation	6.94	0.53	0.84
- Interfunctional coordination	3.41	0.44	0.79
Model 1b (second-order):			
- Market orientation	2.34	0.40	n.a.
Evaluation model 1: χ^2/df=1.24; GFI=0.89; NFI=0.86; NNFI=0.95; CFI=0.96; IFI=0.96; RMSEA= 0.07			
Model 2 (first-order):			
- Strategic planning	7.25	0.52	0.68
- Idea generation	3.95	0.40	0.74
- Idea screening	4.17	0.39	0.77
- Business analysis	7.93	0.67	0.80
Evaluation model 2: χ^2/df=1.17; GFI=0.91; NFI=0.89; NNFI=0.97; CFI=0.98; IFI=0.98; RMSEA=0.04			
Model 3 (first-order):			
- Concept development	10.71	0.75	0.95
- Concept testing	4.96	0.34	0.74
- Prototype development	9.56	0.73	0.85
- Prototype testing	4.44	0.42	0.76
- Product development	10.68	0.80	0.94
- Product testing	4.67	0.39	0.82
Evaluation model 3: χ^2/df=1.81; GFI=0.80; NFI=0.81; NNFI=0.88; CFI=0.89; IFI=089; RMSEA=0.08			
Model 4 (first-order):			
- Market testing	6.46	0.62	0.87
- Launch budgeting	6.66	0.68	0.89
- Launch strategy	6.99	0.67	0.85
- Launch tactics	6.42	0.56	0.83
Evaluation model 4: χ^2/df=1.50; GFI=0.88; NFI=0.91; NNFI=0.95; CFI=0.96; IFI=0.97; RMSEA=0.07			
Model 5a (first-order):			
- Market success	5.92	0.73	0.92
- Financial success	6.78	0.67	0.90
- Customer acceptance	8.09	0.81	0.86
- Timing	4.19	0.44	0.61
Model 5b (second-order):			
- NPD-success	3.22	0.49	n.a.
Evaluation model 5: χ^2/df=1.80; GFI=0.89 ; NFI=0.90; NNFI=0.93; CFI=0.95; IFI=0.95; RMSEA=0.08			
Model 6 (first-order):			
- SBU performance	7.54	0.57	0.89
Evaluation model 6: χ^2/df=0.65; GFI=0.98; NFI=0.98; NNFI=1.00; CFI=1.00; IFI=1.00; RMSEA=0.00			

Note: n.a. = not available

TABLE 4
Latent Inter-Constructs Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Market orientation	1.00	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-
2. Strategic planning	0.38	1.00	-	-		-	-	-	-	-	-	-	-	-	-	-	-
3. Idea generation	0.44	0.32	1.00	-		-	-	-	-	-	-	-	-	-	-	-	-
4. Idea screening	0.43	0.51	0.35	1.00		-	-	-	-	-	-	-	-	-	-	-	-
5. Business analysis	0.26	0.70	0.28	0.44	1.00												
6. Concept development	0.42	0.48	0.38	0.56	0.54	1.00	-	-	-	-	-	-	-	-	-	-	-
7. Concept testing	0.51	0.62	0.46	0.77	0.54	0.70	1.00	-	-	-	-	-	-	-	-	-	-
8. Prototype development	0.39	0.47	0.22	0.39	0.37	0.59	0.54	1.00	-	-	-	-	-	-	-	-	-
9. Prototype testing	0.49	0.53	0.50	0.68	0.44	0.48	0.76	0.43	1.00	-	-	-	-	-	-	-	-
10. Product development	0.46	0.62	0.36	0.54	0.50	0.77	0.65	0.72	0.48	1.00	-	-	-	-	-	-	-
11. Product testing	0.51	0.53	0.42	0.72	0.50	0.58	0.82	0.52	0.82	0.61	1.00	-	-	-	-	-	-
12. Market testing	0.46	0.44	0.37	0.41	0.38	0.39	0.54	0.33	0.63	0.46	0.58	1.00	-	-	-	-	-
13. Launch budgeting	0.24	0.31	0.52	0.24	0.27	0.29	0.45	0.28	0.40	0.34	0.39	0.40	1.00	-	-	-	-
14. Launch strategy	0.37	0.48	0.44	0.52	0.47	0.41	0.62	0.45	0.62	0.51	0.62	0.56	0.65	1.00	-	-	-
15. Launch tactics	0.39	0.47	0.28	0.28	0.55	0.34	0.42	0.40	0.40	0.31	0.32	0.38	0.53	0.62	1.00	-	-
16. NPD-performance	0.31	0.41	0.32	0.36	0.32	0.30	0.45	0.34	0.54	0.44	0.46	0.30	0.48	0.56	0.43	1.00	-
17. SBU performance	0.29	0.38	0.27	0.26	0.19	0.16	0.25	0.26	0.35	0.34	0.30	0.16	0.35	0.44	0.35	0.63	1.00

TABLE 5
Results Path Analysis Predevelopment Stage (unstandardized coefficients and t-values)

Path to:	From:	Estimates:	T-value:[#]	R^2:	Hypothesis:
- Organizational performance	- Market orientation	0.14	1.41	0.42	H_1
	- NPD-performance	0.70	8.48		H_5
- Strategic planning	- Market orientation	0.65	4.33	0.13	H_{3i}
- Idea generation	- Market orientation	0.61	4.01	0.19	H_{3i}
	- Strategic planning	0.16	1.93		
- Idea screening	- Market orientation	0.43	3.50	0.41	H_{3i}
	- Strategic planning	0.36	5.37		
	- Idea generation	0.14	1.98		
- Business analysis	- Market orientation	-0.12	-0.84	0.46	H_{3i}
	- Strategic planning	0.66	8.34		
	- Idea generation	0.04	0.52		
	- Idea screening	0.05	0.49		
- NPD-performance	- Market orientation	0.13	1.22	0.27	H_2
	- Strategic planning	0.18	2.28		H_{4i}
	- Idea generation	0.18	3.09		H_{4i}
	- Idea screening	-0.07	-0.97		H_{4i}
	- Business analysis	0.09	1.29		H_{4i}

Evaluation model: χ^2/df=0.74; GFI=0.99; NFI=0.99; NNFI=1.00; CFI=0.99; IFI=0.99; RMSEA=0.01

Note: [#] A t-value of 1.96 was used as the cut-off point.

TABLE 6
Results Path Analysis Development Stage (unstandardized coefficients and t-values)

Path to:	From:	Estimates:	T-value: #	R^2:	Hypothesis:
- Organizational performance	- Market orientation	0.14	1.41	0.42	H_1
	- NPD-performance	0.70	8.48		H_5
- Concept development	- Market orientation	0.79	6.19	0.24	H_{3ii}
- Concept testing	- Market orientation	0.46	5.00		H_{3ii}
	- Concept development	0.47	8.27		
- Prototype development	- Market orientation	-0.03	-0.27	0.57	H_{3ii}
	- Concept development	0.45	6.54		
	- Concept testing	0.25	2.88		
- Prototype testing	- Market orientation	0.18	1.97	0.59	H_{3ii}
	- Concept development	0.22	2.10		
	- Concept testing	1.10	9.09		
	- Prototype development	0.05	0.45		
- Product development	- Market orientation	0.14	1.46	0.74	H_{3ii}
	- Concept development	0.45	5.82		
	- Concept testing	-0.03	-0.25		
	- Prototype development	0.54	6.31		
	- Prototype testing	0.02	0.27		
- Product testing	- Market orientation	0.04	0.48	0.79	H_{3ii}
	- Concept development	-0.02	-0.22		
	- Concept testing	0.36	3.70		
	- Prototype development	0.04	0.43		
	- Prototype testing	0.42	7.43		
	- Product development	0.17	2.10		
- NPD-performance	- Market orientation	0.09	0.84	0.33	H_2
	- Concept development	-0.13	-1.22		H_{4ii}
	- Concept testing	-0.08	-0.59		H_{4ii}
	- Prototype development	0.19	1.66		H_{4ii}
	- Prototype testing	0.44	4.86		H_{4ii}
	- Product development	0.20	1.83		H_{4ii}
	- Product testing	0.26	2.12		H_{4ii}

Evaluation model: χ^2/df=1.68; GFI=0.98; NFI=0.99; NNFI=0.97; CFI=0.99; IFI=0.99; RMSEA=0.07

Note: # A t-value of 1.96 was used as the cut-off point.

TABLE 7
Results Path Analysis Commercialization Stage (unstandardized coefficients and t-values)

Path to:	From:	Estimates:	T-value:[#]	R^2:	Hypothesis:
- Organizational performance	- Market orientation	0.14	1.41	0.42	H_1
	- NPD-performance	0.70	8.48		H_5
- Market testing	- Market orientation	1.13	5.83	0.22	H_{3iii}
- Launch budgeting	- Market orientation	0.23	1.22	0.16	H_{3iii}
	- Market testing	0.28	3.61		
- Launch strategy	- Market orientation	0.40	2.58	0.38	H_{3iii}
	- Market testing	0.10	1.52		
	- Launch budgeting	0.43	5.89		
- Launch tactics	- Market orientation	0.05	0.42	0.64	H_{3iii}
	- Market testing	0.22	4.88		
	- Launch budgeting	0.30	5.44		
	- Launch strategy	0.28	4.59		
- NPD-performance	- Market orientation	0.11	1.09	0.38	H_2
	- Market testing	-0.06	-1.37		H_{4iii}
	- Launch budgeting	0.06	1.08		H_{4iii}
	- Launch strategy	0.12	1.97		H_{4iii}
	- Launch tactics	0.29	3.60		H_{4iii}

Evaluation model: χ^2/df=0.56; GFI=0.99; NFI=0.99; NNFI=1.00; CFI=1.00; IFI=0.99; RMSEA=0.01

Note: [#] A t-value of 1.96 was used as the cut-off point.

TABLE 8
The Mediating Effect of the Proficiency in NPD-Activities and NPD-Performance

Research stream 1:	Significant:	Research stream 2:	Significant:
- MO to organizational performance	No	- MO to NPD-performance	No

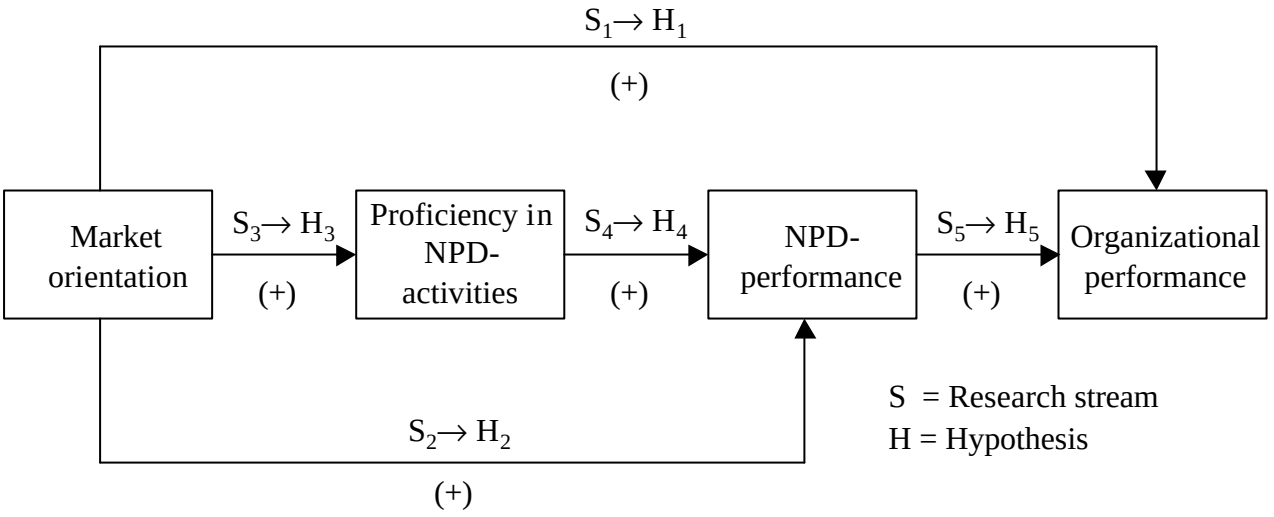
Research stream 3:	Significant:	Research stream 4:	Significant:
- **MO to strategic planning**	**Yes**	- **Strategic planning to NPD-performance**	**Yes**
- **MO to idea generation**	**Yes**	- **Idea generation to NPD-performance**	**Yes**
- MO to idea screening	Yes	- Idea screening to NPD-performance	No
- MO to business analysis	No	- Business analysis to NPD-performance	No
- MO to concept development	Yes	- Concept development to NPD-performance	No
- MO to concept testing	Yes	- Concept testing to NPD-performance	No
- MO to prototype development	No	- Prototype development to NPD-performance	No
- **MO to prototype testing**	**Yes**	- **Prototype testing to NPD-performance**	**Yes**
- MO to product development	No	- Product development to NPD-performance	No
- MO to product testing	No	- Product testing to NPD-performance	Yes
- MO to market testing	Yes	- Market testing to NPD-performance	No
- MO to launch budgeting	No	- Launch budgeting to NPD-performance	No
- **MO to launch strategy**	Yes	- **Launch strategy to NPD-performance**	**Yes**
- MO to launch tactics	No	- Launch tactics to NPD-performance	Yes

Research stream 5:	Significant:
- **NPD-performance to organizational performance**	**Yes**

Note:
The mediating role of the proficiency in NPD-activities and NPD-performance in the relationship between market orientation and organizational performance is shown in **bold**.

FIGURE 1

The Mediating Role of the Proficiency in NPD-Activities and NPD-Performance in the Relationshoip between Market Orientation and Organizational Performance



APPENDIX A
Items

Market Orientation:

Customer orientation:
- Our firm gathers information about customers' needs.
- Our firm has insight into the buying process of customers.*
- Our firm consults customers to improve the quality of service.
- Our firm handles customers' complaints well.
- Our firm involves customers in decisions that affect the relationship.
- Our firm looks for ways to offer customers more value.*
- Our firm treats customers as partners.

Competitor orientation:
- Our firm knows whether competitors are open to complaints by customers.*
- Our firm knows why customers continue buying from competitors.
- Our firm knows whether customers buying from competitors are satisfied.*
- Our firm knows how competitors maintain relationships with customers.*
- Our firm monitors customers buying from competitors.
- Our firm knows why customers switch to competitors.
- Our firm knows which products competitors offer customers.
- Our firm knows in what way competitors attract customers.

Interfunctional coordination:
- Our firm's departments coordinate their contacts with customers.
- Our firm's departments jointly satisfy customers' needs.
- Our firm's departments are collectively responsible for the relationship with customers.*
- Our firm's departments jointly visit customers' plants.*
- Our firm's departments take decisions that affect the relationship with customers collectively.
- Our firm's departments are collectively aware of the importance of the relationship with customers.
- Our firm's departments coordinate their activities aimed at customers.

NPD-Performance:

Customer acceptance measures:
- Customer acceptance.
- Customer satisfaction.
- Number of customers.*
- Customer competitive advantage.*

Market level measures:
- Unit volume goals.*
- Met revenue goals.
- Met sales growth goals.
- Met market share goals.

Financial measures:
- ROI or IRR.
- Met profitability goals.
- Met contribution margin goals.*
- Development costs.

Timing measures:
- Launch on time.
- Time-to-market.
- Break even time.*

Product level measures:
- Met performance specifications*
- Met quality specifications*

Organizational Performance:
- Sales growth.
- Profitability.
- New product success.
- Sales share new product (i.e., products introduced last 5 years ago),
- Market share.
- ROI or IRR.

* Item deleted from further analysis

APPENDIX A (continued)

Predevelopment Stage:

Proficiency in strategic planning:
- Initial assessment of the required investments, time, and risk of the project.
- Establishing a time table for the project.
- Determining estimated expenditures for the project.
- Scheduling project tasks within the approved budget for the project.*
- Defining team members responsibilities.
- Scheduling project tasks within the approved timetable for the project.*

Proficiency in idea generation:
- Determining market characteristics and trends.
- Determining technological trends.
- Involving lead users to generate product ideas.
- Involving lead suppliers to generate product ideas.*
- Using brainstorming techniques to generate new product ideas.*

Proficiency in idea screening:
- Submitting product idea to customers for testing.
- Submitting product idea to suppliers for testing.
- Submitting product idea to employees for testing.
- Interpreting findings from in-house and out-house testing of product idea.

Proficiency in business analysis:
- Conducting a detailed market study.
- Identifying appeal characteristics that would differentiate and sell the product.
- Determining required investments, time, and risk of the project.
- Establishing milestones for measuring performance and progress.

Development Stage:

Proficiency in concept development:
- Expanding the idea into a full product concept
- Determining specifications of the product concept.
- Designing the product concept.

Proficiency in concept testing:
- Selecting customers and suppliers to evaluate product concept.
- Submitting product concept to customers for testing.
- Submitting product concept to suppliers for testing.
- Submitting product concept to employees testing.
- Interpreting findings from in-house and out-house testing of product concept.

Proficiency in prototype development:
- Translating the product concept into prototype.
- Designing technical specifications prototype.
- Designing functional specifications prototype.
- Developing the prototype.*

Development Stage (cont.):

Proficiency in prototype testing:
- Submitting prototype to customers for testing.
- Submitting prototype to suppliers for testing.
- Submitting prototype to employees for testing.*
- Interpreting findings from in-house and out-house testing of prototype.

Proficiency in product development:
- Determining final specifications of the product.
- Designing the product.
- Developing the product.

Proficiency in product testing:
- Submitting product design to customers for testing.
- Submitting product design to suppliers for testing.
- Submitting product design to employees for testing.
- Interpreting findings from in-house and out-house testing of product design.

Commercialization Stage:

Proficiency in market testing:
- Selecting customers for testing market acceptance.
- Submitting the product to customers for in-use testing.
- Submitting the product to employees for in-use testing.*
- Submitting the marketing program to customers for testing.
- Interpreting results from market testing program.

Proficiency in launch budgeting:
- Determining advertising expenditures.
- Determining distribution expenditures.
- Determining launch budget.
- Allocating the launch budget.

Proficiency in launch strategy:
- Segmenting the market.*
- Selecting target customer groups.
- Selecting the new product's positioning.
- Determining launch objectives.*
- Formulating the growth strategy.
- Establishing standards to judge new product's performance and market acceptance.*

Proficiency in launch tactics:
- Selecting channels of distribution.
- Determining the new product's price.
- Designing marketing communication mix.
- Designing product mix.
- Determining role of sales force in launch.

* Item deleted from further analysis

APPENDIX B
Results of the Sorting Task

	Predevelopment Stage:	Development Stage:	Commercialization Stage:	Total
NPD-Activities:				
- Strategic planning	**8**	0	0	8
- Idea generation	**8**	0	0	8
- Idea screening	**8**	0	0	8
- Business analysis	**7**	1	0	8
- Concept development	2	**6**	0	8
- Concept testing	1	**7**	0	8
- Prototype development	0	**7**	1	8
- Prototype testing	0	**7**	1	8
- Product development	1	**6**	1	8
- Product testing	0	**5**	3	8
- Market testing	0	1	**7**	8
- Launch budgeting	1	0	**7**	8
- Launch strategy	2	0	**6**	8
- Launch tactics	0	1	**7**	8

Cohen's Kappa = .61

APPENDIX C
Definition of NPD-Activities in the Three Generic Stages

Predevelopment Stage:

Strategic planning:
- Comprises the preliminary assessment of NPD-resource requirements, market opportunities and strategic directives.

Idea generation:
- Relates to the generation and elaboration of potential solutions to strategic opportunities.

Idea screening:
- Relates to the evaluation of potential solutions to strategic opportunities.

Business analysis:
- Involves an extensive assessment of the new product's resource requirements, market opportunities, risks and strategic directives.

Development Stage:

Concept development:
- Comprises the execution of the marketing and technical tasks required for converting new product ideas into well-defined customer attributes that fulfill customers' needs and desires.

Concept testing:
- Relates to the activities of alpha testing (i.e., with employees) and beta testing (i.e., with suppliers and customers) of the new product's concept.

Prototype development:
- Relates to the execution of the technical and marketing tasks required for converting the customer attributes into engineering attributes.

Prototype testing:
- Comprise the activities related to alpha and beta testing of the prototype.

Product development:
- Relates to the designing, engineering and building of the product.

Product testing:
- Relates to the in-house and out-house testing of the product.

Commercialization Stage:

Market testing:
- Relates to the activities required to test the physical product and launch tactics in the target market.

Launch budgeting:
- Involves a budgeting task required to develop, implement and monitor launch strategy and tactics.

Launch strategy:
- Involve the tasks required for answering the what, where, when and why to launch questions (e.g., segmenting, targeting and positioning),

Launch tactics:
- Tasks related to the marketing mix decisions: product tactics, distribution, pricing and promotion.

ERASMUS **R**ESEARCH **I**NSTITUTE OF **M**ANAGEMENT

REPORT SERIES
RESEARCH IN MANAGEMENT

Publications in the Report Series Research* in Management

Impact of the Employee Communication and Perceived External Prestige on Organizational Identification
Ale Smidts, Cees B.M. van Riel & Ad Th.H. Pruyn
ERS-2000-01-MKT

Critical Complexities, from marginal paradigms to learning networks
Slawomir Magala
ERS-2000-02-ORG

Forecasting Market Shares from Models for Sales
Dennis Fok & Philip Hans Franses
ERS-2000-03-MKT

A Greedy Heuristic for a Three-Level Multi-Period Single-Sourcing Problem
H. Edwin Romeijn & Dolores Romero Morales
ERS-2000-04-LIS

Integer Constraints for Train Series Connections
Rob A. Zuidwijk & Leo G. Kroon
ERS-2000-05-LIS

Competitive Exception Learning Using Fuzzy Frequency Distribution
W-M. van den Bergh & J. van den Berg
ERS-2000-06-LIS

Start-Up Capital: Differences Between Male and Female Entrepreneurs, 'Does Gender Matter?'
Ingrid Verheul & Roy Thurik
ERS-2000-07-STR

The Effect of Relational Constructs on Relationship Performance: Does Duration Matter?
Peter C. Verhoef, Philip Hans Franses & Janny C. Hoekstra
ERS-2000-08-MKT

Marketing Cooperatives and Financial Structure: a Transaction Costs Economics Analysis
George W.J. Hendrikse & Cees P. Veerman
ERS-2000-09-ORG

---

* ERIM Research Programs:
LIS Business Processes, Logistics and Information Systems
ORG Organizing for Performance
MKT Decision Making in Marketing Management
F&A Financial Decision Making and Accounting
STR Strategic Renewal and the Dynamics of Firms, Networks and Industries

A Marketing Co-operative as a System of Attributes: A case study of VTN/The Greenery International BV,
Jos Bijman, George Hendrikse & Cees Veerman
ERS-2000-10-ORG

Evaluating Style Analysis
Frans A. De Roon, Theo E. Nijman & Jenke R. Ter Horst
ERS-2000-11-F&A

From Skews to a Skewed-t: Modelling option-implied returns by a skewed Student-t
Cyriel de Jong & Ronald Huisman
ERS-2000-12-F&A

Marketing Co-operatives: An Incomplete Contracting Perspective
George W.J. Hendrikse & Cees P. Veerman
ERS-2000-13– ORG

Models and Algorithms for Integration of Vehicle and Crew Scheduling
Richard Freling, Dennis Huisman & Albert P.M. Wagelmans
ERS-2000-14-LIS

Ownership Structure in Agrifood Chains: The Marketing Cooperative
George W.J. Hendrikse & W.J.J. (Jos) Bijman
ERS-2000-15-ORG

Managing Knowledge in a Distributed Decision Making Context: The Way Forward for Decision Support Systems
Sajda Qureshi & Vlatka Hlupic
ERS-2000-16-LIS

Organizational Change and Vested Interests
George W.J. Hendrikse
ERS-2000-17-ORG

Strategies, Uncertainty and Performance of Small Business Startups
Marco van Gelderen, Michael Frese & Roy Thurik
ERS-2000-18-STR

Creation of Managerial Capabilities through Managerial Knowledge Integration: a Competence-Based Perspective
Frans A.J. van den Bosch & Raymond van Wijk
ERS-2000-19-STR

Adaptiveness in Virtual Teams: Organisational Challenges and Research Direction
Sajda Qureshi & Doug Vogel
ERS-2000-20-LIS

Currency Hedging for International Stock Portfolios: A General Approach
Frans A. de Roon, Theo E. Nijman & Bas J.M. Werker
ERS-2000-21-F&A

Transition Processes towards Internal Networks: Differential Paces of Change and Effects on Knowledge Flows at Rabobank Group
Raymond A. van Wijk & Frans A.J. van den Bosch
ERS-2000-22-STR

Assessment of Sustainable Development: a Novel Approach using Fuzzy Set Theory
A.M.G. Cornelissen, J. van den Berg, W.J. Koops, M. Grossman & H.M.J. Udo
ERS-2000-23-LIS

Creating the N-Form Corporation as a Managerial Competence
Raymond vanWijk & Frans A.J. van den Bosch
ERS-2000-24-STR

Competition and Market Dynamics on the Russian Deposits Market
Piet-Hein Admiraal & Martin A. Carree
ERS-2000-25-STR

Interest and Hazard Rates of Russian Saving Banks
Martin A. Carree
ERS-2000-26-STR

The Evolution of the Russian Saving Bank Sector during the Transition Era
Martin A. Carree
ERS-2000-27-STR

Is Polder-Type Governance Good for You? Laissez-Faire Intervention, Wage Restraint, And Dutch Steel
Hans Schenk
ERS-2000-28-ORG

Foundations of a Theory of Social Forms
László Pólos, Michael T. Hannan & Glenn R. Carroll
ERS-2000-29-ORG

Reasoning with partial Knowledge
László Pólos & Michael T. Hannan
ERS-2000-30-ORG

Applying an Integrated Approach to Vehicle and Crew Scheduling in Practice
Richard Freling, Dennis Huisman & Albert P.M. Wagelmans
ERS-2000-31-LIS

Informants in Organizational Marketing Research: How Many, Who, and How to Aggregate Response?
Gerrit H. van Bruggen, Gary L. Lilien & Manish Kacker
ERS-2000-32-MKT

The Powerful Triangle of Marketing Data, Managerial Judgment, and Marketing Management Support Systems
Gerrit H. van Bruggen, Ale Smidts & Berend Wierenga
ERS-2000-33-MKT

The Strawberry Growth Underneath the Nettle: The Emergence of Entrepreneurs in China
Barbara Krug & Lászlo Pólós
ERS-2000-34-ORG

Consumer Perception and Evaluation of Waiting Time: A Field Experiment
Gerrit Antonides, Peter C. Verhoef & Marcel van Aalst
ERS-2000-35-MKT

Trading Virtual Legacies
Slawomir Magala
ERS-2000-36-ORG

Broker Positions in Task-Specific Knowledge Networks: Effects on Perceived Performance and Role Stressors in an Account Management System
David Dekker, Frans Stokman & Philip Hans Franses
ERS-2000-37-MKT

An NPV and AC analysis of a stochastic inventory system with joint manufacturing and remanufacturing
Erwin van der Laan
ERS-2000-38-LIS

Generalizing Refinement Operators to Learn Prenex Conjunctive Normal Forms
Shan-Hwei Nienhuys-Cheng, Wim Van Laer, Jan Ramon & Luc De Raedt
ERS-2000-39-LIS

Classification and Target Group Selection bases upon Frequent Patterns
Wim Pijls & Rob Potharst
ERS-2000-40-LIS

New Entrants versus Incumbents in the Emerging On-Line Financial Services Complex
Manuel Hensmans, Frans A.J. van den Bosch & Henk W. Volberda
ERS-2000-41-STR

Modeling Unobserved Consideration Sets for Household Panel Data
Erjen van Nierop, Richard Paap, Bart Bronnenberg, Philip Hans Franses & Michel Wedel
ERS-2000-42-MKT

The Interdependence between Political and Economic Entrepeneurship
ERS-2000-43-ORG
Barbara Krug

Ties that bind: The Emergence of Entrepreneurs in China
Barbara Krug
ERS-2000-44-ORG

What's New about the New Economy? Sources of Growth in the Managed and Entrepreneurial Economies
David B. Audretsch and A. Roy Thurik
ERS-2000-45-STR

Human Resource Management and Performance: Lessons from the Netherlands
Paul Boselie, Jaap Paauwe & Paul Jansen
ERS-2000-46-ORG

Average Costs versus Net Present Value: a Comparison for Multi-Source Inventory Models
Erwin van der Laan & Ruud Teunter
ERS-2000-47-LIS

A Managerial Perspective on the Logic of Increasing Returns
Erik den Hartigh, Fred Langerak & Harry Commandeur
ERS-2000-48-MKT

Fuzzy Modeling of Client Preference in Data-Rich Marketing Environments
Magne Setnes & Uzay Kaymak
ERS-2000-49-LIS