M@n@gement

ISSN: 1286-4892

■ David GOTTELAND
Christophe HAON 2010

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M@n@gement, 13(5), 366 - 381.

accepted by Jean-Luc Arrègle

M@n@gement vol. 13 no. 5, 2010, 366-381

The Relationship between Market Orientation and New Product Performance: The Forgotten Role of Development Team Diversity

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Abstract:
Several meta-analyses highlight the benefits of market orientation for organizational performance. However, results diverge regarding its impact on new product performance. This fact calls for investigation of new moderators for this causal relationship. We hypothesize a moderation effect of competency diversity in new product development teams. We indeed observe this moderation and its specific effects on each dimension of market orientation (customer orientation, competitors and technology).

Keywords:
Market orientation, new product performance, team diversity

INTRODUCTION

Market orientation has attracted ever-increasing interest since the publication of seminal works by Kohli and Jaworski (1990) and Narver and Slater (1990). A strategic orientation designed to create "the necessary behaviors for the creation of superior value for buyers and, thus, continuous superior performance for the business" (Narver & Slater, 1990, p. 21), a market orientation can have critical implications for the market and financial performance of a firm. Accordingly, research in the field has mostly focused on this theme. In successive publications, three meta-analyses also converge to provide proof of the positive and significant effects of a firm's market orientation (Cano, Carrillat, & Jaramillo, 2004; Ellis, 2006; Kirca, Jayachandran, & Bearden, 2005)[1].

In particular, market orientation may affect the performance of new products (Slater & Narver, 1994), though the definition of novelty remains extremely variable, without a consensus conceptualization (Garcia & Calantone, 2002). For this study, a new product is defined as one for which the adopter perceives that its attributes are appearing for the first time. Extant research

1. For a more detailed presentation of market orientation, see the meta-analysis by Kirca, Jayachandran, and Bearden (2005) or the synthesis by Gotteland, Haon, and Gauthier (2007).

into new product performance is also vast, which might encourage the level of heterogeneity in the definitions and measures applied to it. To standardize these notions, Griffin and Page (1993) performed a census across companies and researchers and derived the following classification: New product performance can be interpreted from a market or financial perspective to refer to the product itself (technical performance), the process of its development, or even its contribution to the global performance of the company. Montoya-Weiss and Calantone's (1994) meta-analysis of the determinants of new product performance indicates that market and financial performance are common variables. Another analysis of articles pertaining to the relationship between market orientation and new product performance concurs with this assessment (Gotteland, Haon, & Jolibert, 2009): 24 studies focused on market performance, 9 on financial performance, 5 on process performance, 3 on technical performance, and 16 measured performance in a general manner. This study in turn considers both market and financial performance.

Three meta-analyses also investigate findings about the connection between market orientation and new product performance, with divergent results. Whereas Henard and Szymanski (2001) find no significant effect of market orientation on the performance of new products, Grinstein (2008) and Gotteland, Haon, and Jolibert (2009) observe positive, significant correlations. Without a clear confirmation of the beneficial effects of market orientation on new product performance, we must question whether potential moderators appear in the relation between market orientation and new product performance that affect the significance, the direction, or the strength of this relation.

Some prior research into potential moderators focuses on either contextual or organizational variables (Gotteland & Boulé, 2006) but neglects the likely role of the development team and its characteristics, which have been studied as possible mediators (Gotteland & Boulé, 2006; Langerak, Hultink, & Robben, 2004). With this study, we propose to consider their moderating effects and thereby offer a new explication for the contradictory results of meta-analyses devoted to the relation between market orientation and new product performance. If we can demonstrate such effects, managers will gain a new means to leverage the effects of market orientation on the performance of their newly developed products.

In line with the behavioral approach that defines market orientation as "the organizationwide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organizationwide responsiveness to it" (Kohli & Jaworski, 1990, p. 6), we prioritize the acquisition and exploitation of information. Accordingly, with regard to the characteristics of the development team, we study their diversity, which should have clear influences on the way team members acquire and exploit information (Watson, Kumar, & Michaelson, 1993). Furthermore, the effects of team diversity has prompted increasing academic interest (Joshi & Roh, 2009; Kearney, Gebert, & Voelpel, 2009); from a managerial standpoint, we recognize that 97% of companies claim to have interfunctional development teams, and approximately one-third of them use this method systematically (McDonough, 2000).

In the next section, we therefore review pertinent literature about market

orientation and diversity in the context of new product development teams. After we detail our hypotheses regarding the moderating effects of diversity, we present our survey study of 157 product managers and sales managers, which offers strong evidence that the moderating effects of diversity cannot be ignored. We conclude with some implications of our findings.

THEORETICAL FRAMEWORK AND HYPOTHESES

We begin by outlining the concept of market orientation, then present our research hypotheses.

Market Orientation

From a cultural perspective, a market orientation designates "the organization culture (…) that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers" (Narver & Slater, 1990, p. 21). Within the organization, this culture is manifest in three elements: customer orientation, or "the sufficient understanding of one's target buyers to be able to create superior value for them continuously"; competitor orientation, which "means that a seller understands the short-term strengths and weaknesses and long-term capabilities and strategies of both the key current and the key potential competitors"; and interfunctional coordination, which designates "the coordinated utilization of company resources in creating superior value for target customer" (Narver & Slater, 1990, pp. 21-22). Homburg and Pflesser (2000) also propose that a market orientation culture is an antecedent of market orientation behaviors (Kohli & Jaworski, 1990), which therefore are manifestations of culture.

In pursuit of a better understanding, authors have suggested several new behavioral manifestations of a market orientation culture. Gatignon and Xuereb (1997, p. 78) and Voss and Voss (2000) distinguish the technological orientation of the company, which constitutes "the ability and will to acquire a substantial technological background and use it in the development of new product."

This study therefore regards market orientation as composed of three dimensions: customer, competitor, and technology orientations. For the first two dimensions, we adopt the definitions offered by Narver and Slater (1990), and for the third, we use Gatignon and Xuereb's (1997) definition.

Diversity in Development Teams as a Moderator

The effect of market orientation on new product performance results from the better use of available information about customers, competitors, and technologies (Gotteland & Boulé, 2006). Diversity in terms of the team members' competences might improve performance through a similar mediation (Haon, Gotteland, & Fornerino, 2009). Therefore, with the degree of market orientation as an organizational variable and competence diversity as a team attribute, we propose that the effects of the former depend on the latter. That is, competence diversity in the development team alters the effects of market orientation on new product performance. Because the effects of diversity are complex, we also specify the potential moderation.

First, competence diversity may facilitate the exploitation of information, because it induces creative abilities (Bantel & Jackson, 1989; Nemeth & Kwan, 1987) and a superior capacity to envision a broad spectrum of potential applications (Gruenfeld, 1995; Watson, Kumar, & Michaelsen, 1993), in the sense that the team gains varied information and perspectives (Kanter, 1988). Even if the degree of market orientation exerts a positive effect on performance, it could be hindered by an absence of competence diversity, in that the team cannot imagine new ways to exploit a market orientation without diverse ideas and capabilities. The introduction of diversity should eliminate this hindrance, as long as the diversity influences the team's functioning. Thus, there exists a threshold of diversity, below which the positive effect of market orientation is limited but above which the influence of market orientation grows more important.

Second, extensive diversity among a group may inhibit interactions or cause conflicts (Rodan & Galunic, 2004). For example, apprehension about being evaluated by unknown other members of a group can arrest individual creativity (Larey & Paulus, 1999). Since its introduction by Janis (1972) and confirmation in other studies (Aldag & Fuller 1993; Stasser & Titus, 1985), observers have generally agreed that such apprehension pushes participants to minimize the risk of conflict by considering only a limited range of common, shared, consensual knowledge. The resultant decline in the amount of information used then creates the danger of negative performance effects. An excess of diversity also might mitigate the beneficial effects of market orientation on new product performance. We predict a second threshold, above which the effect of market orientation is minimized.

In summary, the moderated effects of diversity appear nonlinear and characterized by two thresholds that mark the boundaries of a zone in which the effect of market orientation on new product performance is superior. In line with common practice in market orientation research, we distinguish three dimensions (i.e., customers, competitors, and technology), but we do not predict different moderating effects across these dimensions. Instead, we infer that the moderating effect depends on the level of expertise in a particular dimension, as perceived by the other team members. For example, imagine that the new product development process aims to pursue a customer orientation. If members of the development team perceive that their coworkers from the marketing department are experts in this field, they likely are less confident in their judgments about consumers and might self-censor. But if the development process is oriented toward competitors, each member of the team might perceive that he or she has the same level of expertise as any other group member. Therefore, they should participate more in decision making and tend to self-censor less. We consider this reasoning logical, but prior literature cannot confirm it; to the best of our knowledge, no research has proven a relationship between perceptions of others' expertise and self-censoring. Perhaps there are comparable effects, regardless of the dimension of market orientation.

H1: *The effect of a customer orientation on new product performance rises and then drops when the degree of diversity increases.*

H2: *The effect of a competitor orientation on new product performance rises and then drops when the degree of diversity increases.*

H3: *The effect of a technological orientation on new product performance rises and then drops when the degree of diversity increases.*

METHODOLOGY AND RESEARCH RESULTS

Product managers or sales directors who participated in a recent product development project received questionnaires; each of these 500 potential respondents represented a development team (Sethi, 2000, Sethi, Smith, & Park, 2001). The 157 received questionnaires represents a 31.40% response rate. After eliminating incomplete questionnaires, 142 were left for the final analysis, a 28.40% rate[2]. We present descriptors of the samples, in terms of company size and turnover, in **Tables 1 and 2**. Every industrial field in France, as defined by INSEE (French National Institute for Statistics and Economic Studies), is represented.

Table 1: Sample by company size

Range	Percentage of Sample
0 to 49 employees	17.60%
50 to199 employees	15.49%
200 to 499 employees	19.01%
500 to 999 employees	8.45%
1,000 to 4,999 employees	20.42%
5,000 employees or more	19.01%

Table 2: Sample by company turnover

Range (millions of Euros)	Percentage of Sample
0 to 10	16.19%
10 to 50	11.97%
50 to 100	13.38%
100 to 500	4.93%
500 to 1,000	30.28%
1,000 or more	23.24%

To test for non-response bias, we followed Armstrong and Overton's (1997) procedure; later respondents did not differ from the earlier ones.

To check for potential bias resulting from using same respondents for the independent and dependent variables (i.e., common method variance), we used three approaches. First, the Harman test revealed that no single, unique factor accounts for the items' variance. Second, a confirmatory factorial analysis in which we linked each method factor to the set of items showed that this measurement model was not well supported by the data (Malholtra, Kim, & Patil, 2006). The fit statistics were poor (RMSEA = .223; SRMR = .168; AGFI = .405; and GFI = .524). Third, we followed the approach suggested by Lindell and Whitney (2001), as modified by Malhotra, Kim, and Patil (2006), to compensate for the limitations of the previous two approaches and again confirmed the results. Specifically, we substituted correlations between factors (i.e., customer, competitor, and technology orientations and new

2. Data are the same as those used by Haon, Gotteland et Fornerino (2009).

product performance) for correlations corrected for a common method variance bias, but we detected no deterioration in the measurement model adjustment ($\chi^2 = 2.32 < \chi^{2(0.05.\ 6)} = 12.59$). Therefore, our data do not appear to suffer from a common method variance bias.

Measure Quality

The measures for this study appear in the appendix. Competence diversity comprises educational, functional, experience, and expertise diversity (Haon, Gotteland, & Fornerino, 2009). Because it is a formative scale, we followed the validation procedure suggested by Diamantopoulos and Winklhofer (2001). We checked for potential multicollinearity; the maximum variance inflation factor of 2.347 was less than the suggested threshold of 10. We therefore computed the index as an average of the four diversity scores.

Customer and competitor orientations were measured with Narver and Slater's (1990) scales. Technological orientation was measured with Gatignon and Xuereb's (1997) scale. Finally, for the new product performance measure, we used Song and Parry's (1997) scale. To verify the psychometric qualities of the scales, we followed the procedure recommended by Gerbing and Anderson (1998). After purification, we also checked for reliability and convergent validity, as we detail in **Table 3**, and find support for the scales' psychometric properties.

Table 3: Scale reliability and validity

		Customer Orientation	Competitor Orientation	Technological Orientation	New Product Performance
Principal Component Analysis	KMO	.825	.767	.815	.905
	Bartlett	.001	.001	.001	.010
	AVE	59.71 %	56.56 %	73.61 %	75.46 %
	Communalities	> .500	> .500	> .500	> .500
	Parameters after bootstrap	> .627	> .566	> .612	> .810
Confirmatory Factorial Analysis	p-values	< .001	< .001	< .001	< .010
	RMSEA	.043	.000	.056	.078
	SRMR	.028	.009	.016	.019
Reliability	α	.822	.743	.874	.935
	ρ	.836	.744	.880	.938
Convergent Validity[3]	ρvc	.507	.423	.652	.718
	p-values	< .001	< .001	< .001	< .010

Notes: We verify the discriminant validity of the three dimensions of market orientation. The weakest convergent validity (.423) is greater than the correlation squared between the latent variable object of calculation ρ^{VC} and the other latent variables.

RESULTS

To test our hypotheses, we identified three diversity groups: low, intermediate, and high. We expect a maximal effect of each market orientation dimension on new product performance for the intermediate level. The split was rational, in that we identified critical thresholds at which diversity influenced the relation between market orientation and new product performance. During an exploratory phase, we estimated this relation according to a subset of different diversity levels. The thresholds we identified to distinguish the three homogeneous groups according to their level of diversity were inferior or equal to 4.50, between 4.75 and 5.00, and superior to 5.25. A series of Levene tests for the homogeneity of the variance verified that this split did not lead to heterogeneity that might bias the results.

For each group, we evaluated the effect of each dimension of market orientation on new product performance using multiple linear regressions. Thirteen outliers were identified for which the Cook distances were greater than 4/(n – k – 1), where n is the sample size and k is the number of independent variables (Hair et al., 2005). We chose to suppress these observations, after verifying that doing so did not affect the results substantially. We also confirmed the lack of multicollinearity among the independent variables (VIFmax. = 1.598). The results **Table 4** show that no standardized residual is greater than three standard deviations from the average residual; the Kolmogorov-Smith test further indicates that the residuals follow a normal distribution ($p > .10$).

Table 4: Results

Independent Variables	Low Diversity	Intermediate Diversity	High Diversity
Customer Orientation	.338**	.441***	n.s.
Competitor Orientation	n.s.	– .317***	n.s.
Technological Orientation	-.323**	.397***	n.s.
Adjusted R^2	.062*	.290***	n.s.

Notes: Dependent variable = new product performance. n.s. = nonsignificant.
* $p < .10$; ** $p < .05$; *** $p < .01$.

The highest R^2 value occurs for the intermediate level of diversity. In this condition, the effects of market orientation appear to be the strongest, in support of our hypotheses. However, two results are surprising: the negative effect of technological orientation on new product performance in low diversity settings and the insignificance of this same effect in high diversity conditions. We discuss these points further in the next section.

In **Table 5**, we present the results of our tests for verifying whether the effects of the three market orientation dimensions on new product performance vary according to the levels of team diversity.

Table 5: Test of the moderation of team competence diversity

	Low vs. Intermediate Diversity	Intermediate vs. High Diversity	High vs. Low Diversity
Customer–Performance	$p < .10$	$p < .05$	n.s.
Competitors–Performance	n.s.	n.s.	n.s.
Technological–Performance	$p < .01$	$p < .01$	n.s.

The effect of customer orientation on new product performance is significantly higher when diversity is intermediate ($p < .10$); that is, this effect increases and then decreases as the degree of diversity increases, in support of H1. Similarly, the effect of technological orientation on new product performance is stronger at an intermediate level of diversity ($p < .01$), in support of H3. However, we cannot confirm H2, because we find no significant difference in the effect of competitor orientation according to the degree of diversity.

DISCUSSION AND CONCLUSION

In addition to providing a review of literature pertaining to the relationship between new product development team diversity and new product performance (**Table 1**), this article makes two key contributions. First, regarding the market orientation–new product performance relationship, we show that it is moderated by the degree of competence diversity in the new product development team. From a theoretical perspective, we offer a new explanation for the contradictory results in previous meta-analyses. We also analyze, for the first time to the best of our knowledge, the moderating effect of variables that characterize the team, which complements existing investigations of the moderating effects of environmental and organizational conditions.

Second, our study establishes the significant moderation effects of competence diversity, which have important managerial consequences. The process of implementing a market orientation within an organization is long and costly (van Raaij, 2001), and controlling for the effects of moderators, as much as possible, helps ensure the benefits expected from the transformation into a market-oriented culture (Gotteland, Haon, & Gauthier, 2007).

As a separate check, we noted the potential for the effects of team diversity to be moderated themselves by team familiarity (Haon, Gotteland, & Fornerino, 2009). Therefore, we checked for a potential moderation by familiarity by estimating our proposed model separately for strong and weak degrees of familiarity, then comparing the parameters in a Chow (1960) test. We observed no significant differences, which suggests that these results remain strong, whether we account for familiarity or not.

Two further results seemed surprising and thus deserve closer attention as well. For a low level of diversity, we found that technological orientation had a significantly negative effect on new product performance. That is, members with closely matched competencies apparently could not exploit their collected information about available technologies. The

potential benefits for market performance derived from such information generally cannot emerge without an interaction between the R&D and marketing departments: The former can list an inventory of available technologies and judge their integration with an existing offer, as the latter evaluate the value of these integrations for customers. Therefore, our research parallels existing articles that suggest the benefits of interfunctional integration, as summarized in a meta-analysis by Troy, Hirunyawipada, and Paswan (2008). However, confirming this proposed explanation would require further investigation, beyond considering the general diversity in the team, and precise identifications of the team functions that provide competencies for a project. This effort represents a promising path for further research.

Also in contrast with our expectations, the effect of competitor orientation on new product performance was not significant, regardless of the level of diversity. This finding might reflect our lack of control for the type of innovation, namely, radical versus incremental. Radical innovations are founded on new scientific principles and offer significant new benefits to consumers, such that they can create market upheaval, threaten established market positions, and suggest strong growth opportunities. It follows that competitors' reactions to radical innovations should differ from those they express in response to incremental innovations (Aboulnasr, Narashiman, Blair, & Chandy, 2008). Thus, the effect of competitor orientation on new product performance could be stronger for more radical new products, which then might explain the absence of any significant effect of a competitor orientation on new product performance. These observations should serve as a base for a more comprehensive study of the specificities of each market orientation dimension, as well as their interactions with variables that characterize new product development teams and processes.

This research also suffers from several limitations that suggest additional paths for ongoing research. With regard to the diversity measure, we recognize that the process of new product development often is long, and team members might vary over time as well, which would imply different forms of diversity. Even a seemingly identical degree of diversity could appear across very different organizational contexts; the way in which the members of the team work together and the sequence of their work thus might be important and affect their development of new products (Dougherty, 1992). Finally, though one of the advantages of competence diversity is the team's access to diverse information networks (Gotteland, Haon, & Fornerino, 2009), our methodology did not allow us to study the content of the discussions among team members (Audia & Goncalo, 2007) or any evolution in the importance of team networks over the development period (Kijkuit & Van den Ende 2007). Although our measure of competence diversity provides some advantages compared with other existing scales, it cannot capture such long-term phenomena. Different methodological approaches, including qualitative studies, might help clarify the complexities of the relationships between the focal variables.

Our methodology also suffers several limitations, according to the meta-analysis by Gotteland, Haon, and Jolibert (2009). They demonstrate a

stronger link between market orientation and new product performance when that link is measured subjectively, though the estimate of the link varies by respondent type. Our measure of new product performance is subjective, and there are only a few functions represented in our sample. However, our hypotheses deal with the moderating effects of diversity on the market orientation–performance relationship, not the market orientation–performance relationship itself. Therefore, though our methodological choices might cause some bias, it does not directly affect our tests or main results.

Finally, the directions given to the questionnaire respondents might have different effects on measured performance: they were asked to refer to a recently developed product for which they could estimate market and financial performance. If this choice creates a selection bias, our study likely includes more successful projects than failures. Moreover, the degree of the product innovativeness was not known, though it is undoubtedly related to performance. Again, though we do not find evidence that these biases have direct impacts on our results, further research should investigate these issues more closely.

Acknowledgements: The authors thank the anonymous reviewers, the editor, and the members of the research team in the marketing department at Grenoble Ecole de Management.

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APPENDIX 1: Measurement scales

Each item uses a scale ranging from 1 ("completely disagree") to 6 ("completely agree").

Customer Orientation

Our business objectives are driven primarily by customer satisfaction.
We constantly monitor our level of commitment and orientation to serving customer needs.
Our strategy for competitive advantage is based on our understanding of customers' needs.
We measure customer satisfaction systematically and frequently.
We give close attention to after-sales service.

Competitor orientation

Our salespeople regularly share information within our business concerning competitors' strategies.
We rapidly respond to competitive actions that threaten us.
We target customers where we have an opportunity for competitive advantage.
Our top managers from every function regularly visit our current and prospective customers.

Technological Orientation

Our company uses sophisticated technologies in its new product development.
Our products are always the state of the art of technology.
Our company seeks to adapt its products as new technologies become available .
Our company pays a lot of attention to research and development.

New Product Performance

Relative to our firm's other new products, this product performed better in terms of market share.
This product met our firm's objectives in terms of market share.
This product met our firm's objectives in terms of return on investment.
Our product was superior to main competing products from a sales volume standpoint.
Relative to our firm's other new products, this product performed better from a sales volume standpoint.
This product met our firm's objectives from a sales volume standpoint.

Team Competence Diversity

Members having participated in the project had different training.
Members having participated in the project had different fields of expertise.
Members having participated in the project belonged to different departments.
Members having participated in the project had different professional experience.