

**Knowledge Management Orientation, Market Orientation, and Firm Performance:  
An Integration and Empirical Examination**

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**Reference to this paper should be made as follows:**

Wang, C. L., Hult, G. T. M., Ketchen, D. J., Jr. and Ahmed, P. K. (2009). Knowledge management orientation, market orientation, and firm performance: an integration and empirical examination. *Journal of Strategic Marketing*, 17(2): 147-170.

## **Knowledge Management Orientation, Market Orientation, and Firm Performance: An Integration and Empirical Examination**

### **Abstract**

A growing belief has emerged that effectively managing knowledge can enhance performance. To date, however, there is limited empirical evidence. We draw on the resource-based and knowledge-based views of the firm as well as research on strategic sensemaking in order to introduce the concept of “knowledge management orientation,” and to examine the relationships among knowledge management orientation, market orientation, and firm performance. Using data from 213 United Kingdom firms, we found that organizational memory, knowledge sharing, knowledge absorption, and knowledge receptivity serve as first-order indicators of the higher-order construct we label knowledge management orientation, which, in turn, has a positive link with market orientation. Importantly, we found that market orientation mediates the relationship between knowledge management orientation on one hand and subjective and objective firm performance on the other. Our results suggest that knowledge management orientation can enhance performance, but a market orientation is needed in order to realize such benefits.

Keywords: knowledge management orientation, market orientation.

## INTRODUCTION

Organizational knowledge can be broadly defined as “credible information that is of potential value to an organization” (Hult, 2003, p.189), and thus can enhance a firm’s capability for effective action (Grant, 1996). Knowledge management focuses on “organizing and making available important knowledge, wherever and whenever it is needed” (Sabherwal and Becerra-Fernandez, 2003, p. 227). Increasingly, knowledge is believed to be an important weapon for attaining firm success (Lee and Byounggu, 2003), and knowledge management is viewed as a way for managers to cope with the heightened complexity of an increasingly global marketplace. However, most existing research is theoretical or descriptive, limiting our understanding of how knowledge management shapes performance. Thus, empirical insights that draw on survey and archival data are needed. This fuels the interest of our study.

We introduce the concept of *knowledge management orientation*, which is grounded in the literatures on knowledge management and the knowledge-based view of the firm (e.g., Grant, 1996; Nonaka, 1994). In particular, the knowledge-based view depicts an organization as an “institution for integrating knowledge” (Grant, 1996, p.109); knowledge is seen as the most crucial strategic resource that an organization can possess. Building on Simon’s (1991) notion of bounded rationality, the knowledge-based view also asserts that members of an organization must specialize in certain areas of wisdom. As such, we define “knowledge management orientation” as the firm’s relative propensity to build on its *achieved* wisdom as well as its propensity to share, assimilate, and be receptive to *new* wisdom (e.g., Anand, Manz, and Glick, 1998; Feldman and March, 1981; Levitt and March, 1988; Schulz, 2001; Simonin, 1999; Szulanski, 1996). In particular, a knowledge management orientation refers to the degree to which firms pursue these internally focused behaviors involving organized and systematic wisdom accumulation and use.

A complementary, but separate, stream of research has focused on firms' market orientation (cf. Darroch and McNaughton, 2003). Market orientation involves a set of externally focused behaviors – the collection of intelligence on customer needs and the external forces that shape those needs, the extent to which the obtained external intelligence is disseminated within the firm, and the action taken in response to the intelligence that is generated and disseminated (Jaworski and Kohli, 1993). Market orientation has been linked to both short- and long-term performance under various environmental conditions (e.g., Dobni and Luffman, 2003; Hult, Ketchen, and Slater, 2005; Jaworski and Kohli, 1993).

Interestingly, while knowledge management is centered on a firm's efforts to draw on individuals' collective wisdom in such a way as to perform important tasks well (e.g., providing the products and services that customers want), the behavioral efforts of integrating achieved knowledge with the firm's ability to share, assimilate, and be receptive to new knowledge have not been theoretically connected to firm-level performance. Instead, knowledge management studies often draw the link to performance as a "leap of faith," as in the case of Hult, Ketchen, and Slater (2004), without including a behavioral "action" or "responsiveness" component to explain its effect on performance (Grant, 1996; Huber, 1991).

This apparent underspecification can be addressed at least in part by incorporating market orientation into knowledge management models. Specifically, we argue that market orientation (i.e., externally oriented knowledge behaviors close to the marketplace) is a missing link between knowledge management and performance; market orientation mediates the knowledge management orientation – performance link. This contention builds on research on strategic sensemaking (Thomas, Gioia, and Ketchen, 1997), which has established the existence of links across cognition, action, and outcomes (Daft and Weick, 1984; Thomas, Clark, and Gioia, 1993). Based on Day's (1994) work, market orientation exemplifies properties of "outside-in processes" that are connected via spanning capabilities

to the firm's "inside-out processes" (i.e., knowledge management orientation). As Day (1994, p. 42) notes, "spanning capabilities are exercised through the sequences of [knowledge] activities that comprise processes used to satisfy the anticipated needs of customers." Continual success in these complementary tasks – the integration of knowledge management and market orientation – helps ensure the firm's prosperity.

We seek to make two main contributions. First, we introduce, describe, and delineate the concept of knowledge management orientation. Second, we examine the relationships among knowledge management orientation, market orientation, and firm performance, and thereby integrate the long-standing research on market orientation with knowledge management, an area that has attracted increasing attention. At a broad level, our study sheds new light on why some firms outperform others; a question regarded by many as the cornerstone of the strategic marketing field (e.g., Kerin, Mahajan, and Varadarajan, 1990).

## **THEORETICAL BACKGROUND AND HYPOTHESES**

The resource-based view and its extension, the knowledge-based view, provide our study's overarching theoretical foundation. The resource-based view centers on strategic resources – assets and capabilities that are valuable, rare, and difficult to imitate and substitute (Barney, 1991; Chi, 1994). To the extent that a firm possesses and capitalizes on strategic resources, its performance is expected to be strong (Wernerfelt, 1984). The knowledge-based view argues that the sharing and transfer of tacit and explicit wisdom of individuals and groups within a firm can give rise to strategic resources, and hence enable some firms to outperform others (Kogut and Zander, 1992). As detailed below, our contention is that the effective integration of a knowledge management orientation (KMO) with a market orientation (MO) is a capability that can serve as a strategic resource (cf. Day and Wensley, 1988; Hult and Ketchen, 2001).

The rationale for the integration of KMO and MO can be traced to the literature on the capabilities of market-driven organizations (Day, 1994, 1999; cf. Dierckx and Cool, 1989; Rumelt, Schendel, and Teece, 1991). Specifically, the knowledge management school of thought has been exemplified by successfully deploying capabilities from the *inside out* – firms have been defined by what they are capable of doing in the market based on leveraging their existing wisdom and developing new wisdom (e.g., Grant, 1991). The ability of a firm to use inside-out capabilities (such as KMO) to exploit external opportunities is critical to its success (Day, 1994). The MO school of thought has been identified with anticipating and responding to market requirements from the *outside in* – the customer (or market) needs that firms seek to satisfy (e.g., Kohli and Jaworski, 1990). As such, a focus on either KMO or MO is incomplete and unbalanced. In essence, KMO’s inside-out properties need to be matched with MO’s outside-in properties to both create and deploy the wisdom necessary to serve the market effectively and to be disposed toward wanting to serve the market (Day, 1999). In the next section, we delineate the KMO construct, followed by the development of hypotheses involving KMO, MO, and performance. Figure 1 provides an overview of the constructs and the linkages examined.

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Insert Figure 1 about here  
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### **The Knowledge Management Orientation Construct**

Earlier, we defined KMO as the firm’s relative propensity to build on its *achieved* wisdom (organizational memory) as well as the propensity to share (knowledge sharing), assimilate (knowledge absorption), and be receptive to *new* wisdom (knowledge receptivity). As identified by the phrases in the parentheses above, the four constructs of organizational memory, knowledge sharing, knowledge absorption, and knowledge receptivity emerge as first-order constructs that reflect the higher-order construct we label as KMO. Consistent with

the literature on higher-order phenomena, each first-order factor is important, but not individually sufficient, for reflecting the latent construct we label knowledge management orientation (e.g., Barney and Mackey, 2005; Godfrey and Hill, 1995). Following a technique endorsed by Barney and Mackey (2005), we examine KMO as a latent construct that reflects the overarching commonalities of a set of observable indicators (Jöreskog, Sörbom, Du Toit, and Du Toit, 2000).

**Organizational memory (OM).** OM is defined as achieved knowledge which is learned from previous experience that can be brought to bear on decisions (Moorman and Miner, 1997; Walsh and Ungson, 1991). Such knowledge and experience can be “past events, promises, goals, assumptions, and behaviors” (March and Olsen, 1976, p.62). The benefit of organizational memory is commonly recognized as allowing for a centralized and structured approach to otherwise scattered knowledge. OM also promotes knowledge preservation, sharing, retrieval, and use (Hamel and Prahalad, 1994; Hansen, Nohria, and Tremey, 1999). In that sense, OM serves both as the “storage” of knowledge as well as the starting point for future knowledge acquisition (Huber, 1991; Hult et al., 2004). Ideally, OM should provide for a mechanism that captures organizational lessons, preserves the lessons for later use, and facilitates their retrieval when needed (Day, 1991).

**Knowledge sharing (KS).** Within the context of knowledge management initiatives, KS is often referred to as the transfer of wisdom, skills, and technology between organizational subunits (Tsai, 2002). However, sharing of knowledge also relies heavily on individuals (Huber, 1991) and often occurs between firms such as in supply chains (e.g., Hult et al., 2004). Nevertheless, the essence of KS is to mobilize knowledge, given that effective KMO initiatives require a constant flow of wisdom, not just a stock of it (Holtshouse, 1998). Knowledge flows also connect seekers of specific wisdom to providers of such knowledge, a chain of wisdom sharing activities that often result in reciprocal knowledge exchanges (Gray,

2001). These exchanges are critical to the competitiveness of the firm, especially if the firm relies on tacit knowledge, which is possessed by individuals and embedded in firm practices (Nonaka and Takeuchi, 1995).

**Knowledge absorption (KA).** KA approximates to what Cohen and Levinthal (1990, p. 128) define as absorptive capacity – a firm’s ability to recognize the value of new wisdom, assimilate it, and apply it. KA underlines two key processes: knowledge exploration and exploitation (Van den Bosch, Volberta, and de Boer, 1999). Knowledge exploration focuses on the detection and acquisition of new wisdom, while knowledge exploitation emphasizes the utilization of existing wisdom (Cohen and Levinthal, 1990). In the exploration process, KA’s role is to transform information generated to become embedded knowledge within the firm. This involves evaluating and filtering information according to its degrees of potential value to the firm. Developing the ability to understand different types of knowledge, maintain knowledge according to its different nature, and select an effective way to leverage each type of knowledge is paramount to the exploitation process.

**Knowledge receptivity (KR).** KR reflects the ease with which new ideas are taken up inside a firm. Clearly, how new ideas and knowledge are perceived and evaluated in the firm holds organizational bearing (McDermott, 1999). Davenport, DeLong, and Beers (1998) argue that people must have a positive disposition to new knowledge if knowledge is to become effectively integrated in the firm’s operations. This positive attitude involves employees being intellectually curious, willing to explore new ideas, considering possible adoption of such new ideas, and, most importantly, managers encouraging employees to contribute their new ideas without fear of repercussions. Conceptually, closely allied to KR is the concept of “issue orientation” – the extent to which new ideas are judged according to their merit and divorced from the identity and status of the contributor (Popper and Lipshitz, 1998). Issue orientation



helps to open up communication channels (McGill, Slocum, and Lei, 1992), and reinforces the mechanism for evaluating the quality and usefulness of the processed information.

### **Links among KMO, MO, and Performance**

Extant research on strategic sensemaking supports our model's essential linkages. The strategic sensemaking perspective provides theory and evidence that organizational cognition (e.g., how a firm manages knowledge) shapes organizational action (e.g., the behaviors a firm pursues), which in turn shapes organizational outcomes (Daft and Weick, 1984; Milliken, 1990; Thomas et al., 1993). In our model, KMO reflects cognition, MO as described by Kohli and Jaworski (1990) reflects action, and performance is a key organizational outcome.

Our initial hypothesis centers on the relationship between the KMO concept developed above and the more established concept of market orientation. Earlier, we introduced MO as a set of behaviors that refers to the collection of intelligence on customer needs and the external forces that shape those needs (intelligence generation), the extent to which the obtained external intelligence is disseminated within the firm (intelligence dissemination), and the action taken in response to the external intelligence that is generated and disseminated (responsiveness) (e.g., Kohli, Jaworski, and Kumar, 1993; Jaworski and Kohli, 1993). As such, we depict MO as a higher-order phenomenon consisting of externally focused intelligence generation, intelligence dissemination, and responsiveness (e.g., Jaworski and Kohli, 1993; cf. Barney and Mackey, 2005).

MO can exist in firms to various degrees – characterized by the extent to which firms generate, disseminate, and respond to external intelligence gleaned from customers and other external forces (e.g., competitors, regulators, suppliers) (Kohli and Jaworski, 1990). A sound market orientation is regarded as essential for creating a competitive advantage (Narver and Slater, 1990). However, successful implementation of a market orientation (i.e., the degree to

which MO is exemplified strongly) depends on the support of a firm's internal culture (Deshpandé and Webster, 1989). In this respect, a firm's knowledge management orientation (or lack thereof) affects the value of the firm's market orientation efforts (Day, 1994). For example, an absence of the shared beliefs inherent in a KMO is likely to hinder the activity patterns that are such an important component of the MO phenomenon (Davis, 1984). In this situation, a firm's lack of a knowledge management orientation precludes and undermines the effectiveness of its activities of generating and disseminating external intelligence acquired about the market and its ability to utilize the intelligence to respond to the market (Day, 1991). Conversely, a strong KMO provides a foundation of wisdom that enables the firm to effectively process, interpret, and act on information about external trends and events. As such, we hypothesize that:

**Hypothesis 1:** A firm's knowledge management orientation is positively related to its market orientation, with KMO and MO being depicted as higher-order constructs consisting of sets of first-order factors and observable indicators.

The market orientation – performance link has become an increasingly studied topic in the last two decades (e.g., Kirca, Jayachandran, and Bearden, 2005). The MO phenomenon was originally conceptualized as the implementation of the “marketing concept” (Kohli and Jaworski, 1990; Narver and Slater, 1990). In addition, the notion that MO has a direct effect on a firm's performance, not just marketing outcomes, has become a critically important element of the MO construct and has bridged research between marketing and management (e.g., Hult and Ketchen, 2001). For example, a critical mass of studies in marketing (e.g., Baker and Sinkula, 1999; Han, Kim, and Srivastava, 1998; Kirca et al., 2005) as well as strategic management (e.g., Dobni and Luffman, 2003; Hult and Ketchen, 2001; Hult et al., 2005), mostly rooted in the resource-based view of the firm (e.g., Wernerfelt, 1984), has depicted and found that MO has an effect on subjective and objective performance. As such,

within the knowledge management framework, we adhere to the established wisdom on market orientation and hypothesize that:

**Hypothesis 2:** A firm's market orientation is positively related to its perceived (subjective) and objective performance, with MO being depicted as a higher-order construct consisting of a set of first-order factors and observable indicators.

Earlier we stated that we view market orientation as a missing link between knowledge management initiatives and the firm's performance (cf. Hurley and Hult, 1998). Founded in the resource-based view (e.g., Wernerfelt, 1984), the logic for this assertion is that neither a firm's knowledge management orientation nor its market orientation can be elevated to a "strategic resource" *independently*. Instead, the effective integration of both – in an interwoven manner wherein KMO serves as the inside-out foundation for the outside-in focused MO (Day, 1994, 1999) – is necessary to achieve a strategic resource which is valuable, rare, inimitable, and difficult to substitute (Barney, 1991). Some firms develop a distinctive capability of appropriately adapting, integrating, and reconfiguring internal and external organizational knowledge, skills, resources, and functional competences to match the requirements of a changing environment and thereby enjoy a competitive advantage (Grant, 1996). Across firms, this confluence evolves in unique and inimitable ways (cf. Dierickx and Cool, 1989). Other firms struggle to align inside-out and outside-in processes, and their performance suffers because this lack of fit constrains their ability to respond to market events and trends (Day, 1994).

To be more specific, we note that on one hand, KMO can be considered the firm's pre-eminent skill, and the principal driver of all other competencies and capabilities (Lei, Slocum, and Pitts, 1997). On the other, a firm's positional advantage lies in delivering value for customers, through either a low-cost or differentiation strategy or, in rare cases, a blending of both (Day and Wensley, 1988). Fundamentally, a firm's ability to capture the pulse of the market and the competition, and align its knowledge base to respond to market circumstances,

is a critical source of potential competitive advantage (Aaker, 1984). Such responses cannot be achieved without linking the inside-out focused KMO to the outside-in phenomenon of MO via the “spanning processes” discussed by Day (1994). It is not enough to develop KMO capabilities that are ingrained in the firm’s fabric; a firm must also have a mechanism to exploit KMO (e.g., Mahoney and Pandaian, 1992). We suggest that MO is a missing link in knowledge management frameworks – the outside-in process that converts KMO into performance (e.g., Hurley and Hult, 1998). Formally, we hypothesize that:

**Hypothesis 3:** Market orientation mediates the relationship between a firm’s knowledge management orientation and the firm’s perceived (subjective) and objective performance.

## METHOD

### Data Collection

The KMO, MO, and subjective performance data were collected via a mail survey (using 7-point Likert scales) and combined with objective performance data taken one year later. Prior to the full-scale data collection, we conducted three sets of pretests to evaluate the general quality of the research design and to provide an assessment of the face- and content validity of the items. The first pretest involved six executives in three firms. These six people were asked to comment on the general theoretical aspects of the study as well as provide managerial insights that could be helpful to design the survey. The second pretest involved 12 managers and academics. In this stage of the survey development, the objective was to assess the face and content validity of the items, in particular with respect to the newly developed KMO scale. Based on the input of the 12 people, we refined some items and removed others. This resulted in a survey that included 30 items for KMO, 20 items for market orientation, and 3 items for performance (along with control variables, etc.). The third pretest involved two executives from two companies. This final pretest was conducted largely for the purpose

of gaining feedback on the mechanics of filling out the survey and the time it would take, on average, to complete the survey. These three steps ensured that the final questionnaire incorporated the basic issues involved in survey research (e.g., face- and content validity; clarity, understandability, conciseness, meaningfulness, and relevance of the constructs).

The full-scale data collection involved a sampling frame of 1,500 companies based in the United Kingdom (each with at least 50 employees) that were randomly selected from the FAME Database (“Financial Analysis Made Easy”). The firms involved in the pre-tests were excluded from the sampling frame. The FAME database is a compilation of UK-based companies that includes both firms that are listed and not listed on the London Stock Exchange. The FAME database covers a broad variety of small, medium, and large firms in the manufacturing and non-manufacturing sectors. We followed Dillman’s (2000) guidelines for data collection and Huber and Power’s (1985) method on how to obtain quality from key informants. To obtain quality data and to ensure that the managers surveyed had sufficient knowledge of the study’s constructs in the context of their firms, we included only company directors and senior executives in the sampling frame. Each manager was sent a questionnaire with a cover letter and a pre-paid return envelope. Following two reminders, a total of 231 surveys were received; a 15.4% response rate. After discounting non-valid and incomplete responses, 213 usable responses remain (46.5% in service industries and 53.5% in manufacturing industries). These 213 surveys are used in the analyses. Our effective response rate of 14.2% slightly exceeds the 10-12% rate that Hambrick, Geletkanycz, and Frederickson (1993) describe as typical for surveys of executives.

To examine potential non-response bias, we conducted two tests – one using objective data and one using the survey data. First, we used objective data from the FAME database to compare respondents and non-respondents on profit (at time period  $t$ ). The difference between the two groups was not significant ( $p=.75$ ). Specifically, the respondents averaged a profit of

£35,295.40 GBP (standard deviation = £91,117.48) and the non-respondents averaged a profit of £26,884.93 GBP (standard deviation = £245,528.51). Second, we used the technique suggested by Armstrong and Overton (1977) to compare early versus late respondents on all perceptual measures in the study. The assumption is that the group who responded to the second follow-up mailing provides a proxy for non-respondents. The results revealed that no significant differences existed between early and late groups on the study variables (all  $p > .05$ ). Thus, the two tests – using objective data on respondents and non-respondents, coupled with the Armstrong and Overton (1977) test – indicate that no evidence exists of a systematic response bias.

## Measures

The Appendix lists the measures and their sources. The MARKOR scale was used to measure market orientation (Kohli et al., 1993). The knowledge management orientation scale was developed for this study, drawing from a number of sources for each construct and corresponding items (see Appendix). Performance was measured via both subjective and objective data. Using perceptual measures, we assessed three items that tapped firm-level performance: return on capital employed (ROCE), earnings per share (EPS), and sales growth (SG). Using archival data from the FAME database, we obtained data on profit (loss) before taxes and calculated the change in profit between time period  $t$  and  $t+1$  (PROFIT). The PROFIT change score was used as the objective performance variable. Additionally, we included a set of objective control variables: *age* of the firm, *size* (number of employees) of the firm, *industry classification* (manufacturing, services, retailing, and others), and *strategic type* (prospector, analyzer, defender, and reactor – Miles and Snow, 1978).

## ANALYSIS AND RESULTS

### Measurement Testing

Table 1 reports the correlations and shared variances between constructs. Table 2 summarizes the means, standard deviations, and results of the measurement testing (i.e., variances extracted, reliabilities, factor loadings, and fit indices). We used a three-step approach to assess the measures. First, we conducted a confirmatory factor analysis of all perceptual measures. Second, we assessed the scales' reliability and validity. Third, we tested for the potential of common method variance (CMV) involving the perceptual measures.

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 Insert Tables 1 and 2 about here  
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**Confirmatory factor analysis (CFA).** The first step of the measurement testing was to conduct a CFA of all perceptual items simultaneously using LISREL 8.80 (Jöreskog et al., 2000). The model fits were evaluated using the DELTA2 index, the relative noncentrality index (RNI), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). These fit indices have been shown to be the most stable and robust by Gerbing and Anderson (1992) and Hu and Bentler (1999). After deleting some items due to poor performance (e.g., Anderson and Gerbing, 1988), most during the purification process of the newly developed knowledge management scale, the model fits of the remaining 28 items and 8 factors resulted in DELTA2, RNI, CFI, and TLI all being .98, and RMSEA = .05 ( $\chi^2 = 542.11$ ,  $df = 322$ ). Thus, the measurement structure of 28 items and 8 factors produced excellent fit statistics.

**Reliability and validity.** In accordance with established procedures in confirmatory factor analysis, we calculated composite reliability using the guidelines outlined by Fornell and Larcker (1981). Coefficient alphas are included in Table 2 for comparison purposes. The factor loadings and their t-values were also examined along with the average variances

extracted for each construct. The composite reliabilities for the perceptual scales ranged from .76 to .87, with the factor loadings ranging from .59 to .88 ( $p < .01$ ), and with the average variances extracted ranging from 51.0 to 62.8 percent.

Discriminant validity was assessed by calculating the shared variances of all pairs of constructs and verifying that they were lower than the corresponding average variances extracted for the constructs (Fornell and Larcker, 1981). In all cases, the variances extracted were higher than the recommended cut-off of 50 percent and higher than the associated shared variance (See Tables 1 for shared variances and Table 2 for average variances extracted). In addition, the 28 purified items were found to be reliable and valid when evaluated based on each item's error variance, modification index, and residual covariation. The skewness (range: -.69 to .09) and kurtosis (range: -.83 to .43) results, each within the normal range of  $\pm 1.0$ , indicated that the data were reasonably normal in distribution.

### **Common Method Variance**

We conducted two assessments of the potential of common method variance (CMV) affecting the analyses – at the measurement level and within the structural equation model used to test the hypotheses. At the measurement level, we examined the potential of CMV in the dataset via the confirmatory factor-analytic approach to Harmon's one-factor test. If CMV poses a threat, a single latent factor would account for all manifest variables (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). The one-factor model for the perceptual measures yielded a  $\chi^2 = 1,203.87$  with 350 degrees of freedom (compared with the  $\chi^2 = 542.11$ ,  $df = 322$  for the measurement model), providing an initial indication (at the measurement level) that CMV is not a serious threat in the study.

At the hypothesis testing level (within the confines of the structural equation model), we investigated CMV by including a so-called “same-source” factor to the indicators of all



model constructs (e.g., MacKenzie, Podsakoff, and Fetter, 1993; Netemeyer, Boles, McKee, and McMurrian, 1997; Williams and Anderson, 1994). Specifically, we compared two models – a model where the same-source factors loadings are constrained to zero and a model where these loadings are estimated freely. The difference between the two models represents a direct test of the effects of a same-source factor (Netemeyer et al., 1997). The difference between the constrained and unconstrained models was significant ( $p < .01$ ), which suggest that a same-source factor is evident in the data (i.e., at least some CMV exists in the data). However, the structure of the results was largely the same with and without the same-source factor. Thus, CMV did not affect the basic results of the data (i.e., none of the significant paths without the same-source factor was attenuated to non-significance and vice versa). However, accounting for CMV resulted in the relationship between MO and subjective performance increasing slightly from a parameter estimate of .28 to .30 (both parameter estimates were significant at the  $p < .01$  level). Likewise, the relationship between MO and objective performance (PROFIT) increased slightly from a parameter estimate of .10 to .12 (both estimates were significant at the  $p < .05$  level). To be fully robust in the analysis, we focus on the unconstrained model that takes into account CMV when presenting the results.

### **Hypothesis Testing**

The hypothesis testing was conducted via the application of a higher-order structural equation model using LISREL 8.80 with mean substitution of cases with missing data (Jöreskog et al., 2000). This allowed for the simultaneous testing of the subjective and objective performance variables along with the control variables (age, size, industry classification, and strategic type) and the same-source factor. As hypothesized, knowledge management orientation and market orientation, respectively, were depicted as higher-order constructs. As such, KMO as a higher-order construct consisted of sixteen observable

indicators for four first-order factors (organizational memory, knowledge sharing, knowledge absorption, and knowledge receptivity). MO consisted of nine observable indicators for three first-order factors (intelligence generation, intelligence dissemination, and responsiveness).

In addition, we followed Anderson and Gerbing's (1988, p. 418) two-step approach to the CFA and SEM testing to ensure that the hypothesis findings do not result from "interpretational confounding." Interpretational confounding "occurs as the assignment of empirical meaning to an unobserved variable which is other than the meaning assigned to it by an individual a priori to estimating unknown parameters" (Burt, 1976, p.4). As such, we separated the estimation of the measurement and structural models so as not to constrain the structural parameters that relate the estimated constructs to one another (Anderson and Gerbing, 1988). These steps resulted in an overall model fit of DELTA2, RNI, CFI, and TLI all being .96, and RMSEA = .09 ( $\chi^2 = 152.20$ ,  $df = 52$ ), indicating an acceptable fit of the hypothesized model (and including the control variables and the same-source factor).

**H1 and H2 (Direct Effects).** Hypothesis 1 was supported. Specifically, as shown in Figure 1, we found that knowledge management orientation has a significant link to market orientation (parameter estimate = .94,  $t$ -value = 12.65,  $p < .01$ ), with an explained variance of  $R^2 = .54$ . None of the control variables – age, size, industry, and strategy type – were significantly related to market orientation (all  $p > .05$ ). Hypothesis 2 was also supported. We found that market orientation was related to both objective performance (parameter estimate = .12,  $t$ -value = 2.23,  $p < .05$ ) and subjective performance (parameter estimate = .30,  $t$ -value = 5.75,  $p < .01$ ). The overall objective performance equation had an  $R^2 = .04$ . None of the controls were significant (all  $p > .05$ ) in this equation. In the subjective performance equation, the same-source factor (parameter estimate = .13,  $t$ -value = 3.30,  $p < .01$ ) was significant. The overall equation had an  $R^2 = .27$ .

**H3 (Mediating Effect).** To assess H3, we followed the mediation testing procedure established by Baron and Kenny (1986). Three conditions are necessary for mediation to be present. First, the predictor (knowledge management orientation) must be related to the potential mediator (market orientation). This is satisfied by the significant path found in the H1 analysis, i.e., knowledge management orientation has a positive effect on market orientation. Second, the mediator must be related to the dependent variable (performance). This is satisfied by the significant paths found in the H2 analyses, i.e., market orientation was related to both subjective and objective performance. Third, the significant relationship between KMO and performance should be eliminated or substantially reduced when the mediator is included as a predictor in the equation. To satisfy this condition, we tested the direct relationship between KMO and subjective firm performance (parameter estimate = .22, t-value = 5.35,  $p < .01$ ) and objective firm performance (parameter estimate = .09, t-value = 2.23,  $p < .05$ ). As such, KMO is positively related to firm performance when MO is *not* included in the equation. We then incorporated market orientation in the equation. This resulted in an insignificant path coefficient between KMO and subjective firm performance (parameter estimate = -.57, t-value = 1.54,  $p > .05$ ) as well as objective firm performance (parameter estimate = .02, t-value = .06,  $p > .05$ ). As such, the previously significant relationship between KMO and firm performance is eliminated when MO is included. The result is that market orientation fully mediates the relationship between knowledge management orientation and firm performance and, thus, H3 is supported in the analyses.

## DISCUSSION

Our study offers two main contributions. First, we conceptually developed and empirically delineated the concept of knowledge management orientation. KMO appears to be a complex, multidimensional concept reflecting the firm's relative propensity to build on its

*achieved* wisdom as well as its propensity to share, assimilate, and be receptive to *new* wisdom. Using the latent construct function of structural equation modeling, we drew on extant literature to examine a proposed set of first-order indicators: organizational memory, knowledge sharing, knowledge absorption, and knowledge receptivity. We found that each first-order indicator is necessary, but not individually sufficient, for reflecting the higher-order KMO construct. This does not imply that a firm needs to be “world class” along all four dimensions to enjoy the benefits of KMO, but it must be skilled in all and it must formulate an approach to knowledge management that creates consistency in direction across them.

Our second contribution involved mapping out key elements of the nomological net surrounding the knowledge management orientation concept. Building on the resource-based view, the knowledge-based view, and research on strategic sensemaking, we suggested that KMO has performance implications, but that these effects are felt through the mediating influence of market orientation. This linkage is consistent with the cognition-action-outcomes framework developed within strategic sensemaking research (Daft and Weick, 1984; Thomas et al., 1993). The specific results associated with each of the three key relationships shown in Figure 1 (i.e., KMO-MO, MO-performance, and mediating effects of MO) are discussed below.

### **Knowledge Management Orientation, Market Orientation, and Performance**

In Hypothesis 1, we predicted that a firm’s knowledge management orientation is positively related to its market orientation. As shown in Figure 1, this prediction was supported. The finding is valuable in part because it provides evidence that knowledge management orientation is a viable and important concept for the marketing field. Across the last two decades, there has been substantial discussion within the literature about the nature and effects of firms’ knowledge management activities (e.g., Huber, 1991; Lee and Byounggu,

2003; Levitt and March, 1988). Missing from this research has been a way to capture the extent to which a firm emphasizes these activities. The description and empirical delineation of the knowledge management orientation concept, along with the establishment of its relationship with market orientation via our test of Hypothesis 1, appears to help fill this gap. Thus, the KMO concept may prove valuable over time as a reflection of the intentionality embedded in firms' approaches to knowledge management processes.

Turning to market orientation which was also examined in Hypothesis 1, MO is regarded as a key potential source of competitive advantage (Kohli and Jaworski, 1990), and as such it has been a frequent subject of research within the marketing and management literatures (e.g., Dobni and Luffman, 2003; Hult et al., 2005; Kirca et al., 2005) literatures. The support we found for the KMO-MO linkage is valuable to the market orientation literature because it expands our understanding of market orientation's antecedents. As discussed in Kirca et al. (2005) meta-analysis of the MO literature, extant research has focused on the *structural* aspects of organizations, such as centralization, formalization, reward systems, and training as factors that shape market orientation. Our study ventures into new territory by providing evidence that knowledge management systems are related to a firm's relative MO. As such, the support found for Hypothesis 1 expands the discussion beyond the structural aspects of firms and into the cognitive arena.

The market orientation-performance link has been a frequent focus of empirical inquiry in both the marketing and strategic management fields. In keeping with this literature, our second hypothesis predicted that a firm's market orientation is positively related to its performance. As shown in Figure 1, this prediction was supported. Beyond this overall result, we found that market orientation had a stronger link with subjective performance than with objective performance, but both were significant. This disparity remained even after controlling for possible common method variance within our analyses. Our relative findings

for subjective and objective performance parallel those of Kirca et al. (2005) meta-analysis of the MO literature, which provided enhanced confidence in our results. One possible explanation for the greater influence on subjective performance is that executives may tend to overestimate the degree to which market orientation can be a tool for enhancing performance. If so, a key implication is that executives need to temper their expectations regarding market orientation. While MO's performance effects are valuable and substantial, they are also limited. However, these effects may be enhanced when MO is teamed with other important organizational elements to give rise to strategic resources (Hult et al., 2005).

The knowledge-based view of the firm posits a relationship between knowledge management and performance (e.g., Grant, 1996). This relationship is unlikely to be direct because knowledge must be capitalized on in order to realize its value. Managing knowledge is not enough; wisdom must be put into practice. However, little attention has been paid to the behaviors that build on knowledge management in order to enhance outcomes. Accordingly, in Hypothesis 3, we predicted that market orientation mediates the relationship between a firm's knowledge management orientation and firm performance. As shown in Figure 1, this prediction was supported. In particular, we found that KMO does not have a direct link to performance, but instead shapes performance only via its link through market orientation. As such, market orientation appears to have been the "missing link" between knowledge management and performance in past research (cf. Han et al., 1998). One implication of our findings is that future investigations of KMO need to include MO as part of their conceptual models, otherwise the models will be underspecified. At a more general level, the results we found for Hypothesis 3 offer support for the linkage between organizational cognition and organizational action posited by Daft and Weick (1984) and the cognition-action-performance relations examined within the subsequent research on strategic sensemaking (e.g., Gioia and Chittipeddi, 1991; Thomas et al., 1993; Thomas et al., 1997).

## **Limitations and Future Research Directions**

Our paper's findings must be viewed in light of its limitations. Each limitation gives rise to fruitful areas for additional inquiry. Following the precedent of many market orientation studies, we relied on a single informant in each organization. This limits the insights directly provided by each organization to our study to those of one executive. The use of multiple respondent designs in subsequent studies would allow researchers to uncover the extent to which views of KMO and MO are shared across executives. The relative level of shared perceptions about KMO and MO within firms might be found to influence the degree to which these antecedents to performance matter. Specifically, those firms with high levels of agreement in perceptions seem more likely to be able to build on this consensus in order to leverage the performance-enhancement potential of KMO and MO than firms whose executives have lower levels of agreement (Gioia and Chittipeddi, 1991).

For parsimony and model fit purposes, the number of items in each first-order factor of the knowledge management orientation construct was kept modest. To enable more effective adoption of each first-order factor individually, future research may consider additional items. For example, our approach to organizational memory centers on the codified component. Future studies would benefit from tapping into other key elements discussed by Walsh and Ungson (1991), including individuals, culture, structure, ecology, transformation, and external archives. Similarly, our knowledge absorption items left aspects of the concept un-assessed. We hope that researchers will examine the extent to which knowledge is absorbed via codification versus interpersonal communication. Also, subsequent studies should include other potential mediators beyond MO. For example, the actual level of knowledge possessed seems likely to determine how much KMO can shape key outcomes (cf. Grant, 1996; Huber, 1991). In sum, our study offers an initial examination of the concept of

knowledge management orientation. Like most forays into novel concepts, our results both provide new insights and set the stage for more fine-tuned inquiry.

## CONCLUSION

The quest to understand why some firms outperform others is regarded by many leading scholars as the cornerstone of the strategic marketing field. Managers and academics alike believe that effectively managing knowledge can enhance performance, but there is limited empirical evidence. This study helps close some of the gap between “what we know” and “what we need to know” about knowledge management’s performance implications by examining the relationships among knowledge management orientation, market orientation, and performance. The results reveal that market orientation mediates the relationship between knowledge management orientation and performance. For firms, this indicates that knowledge management orientation can enhance performance, but it must be accompanied by a market orientation in order to realize such benefits.



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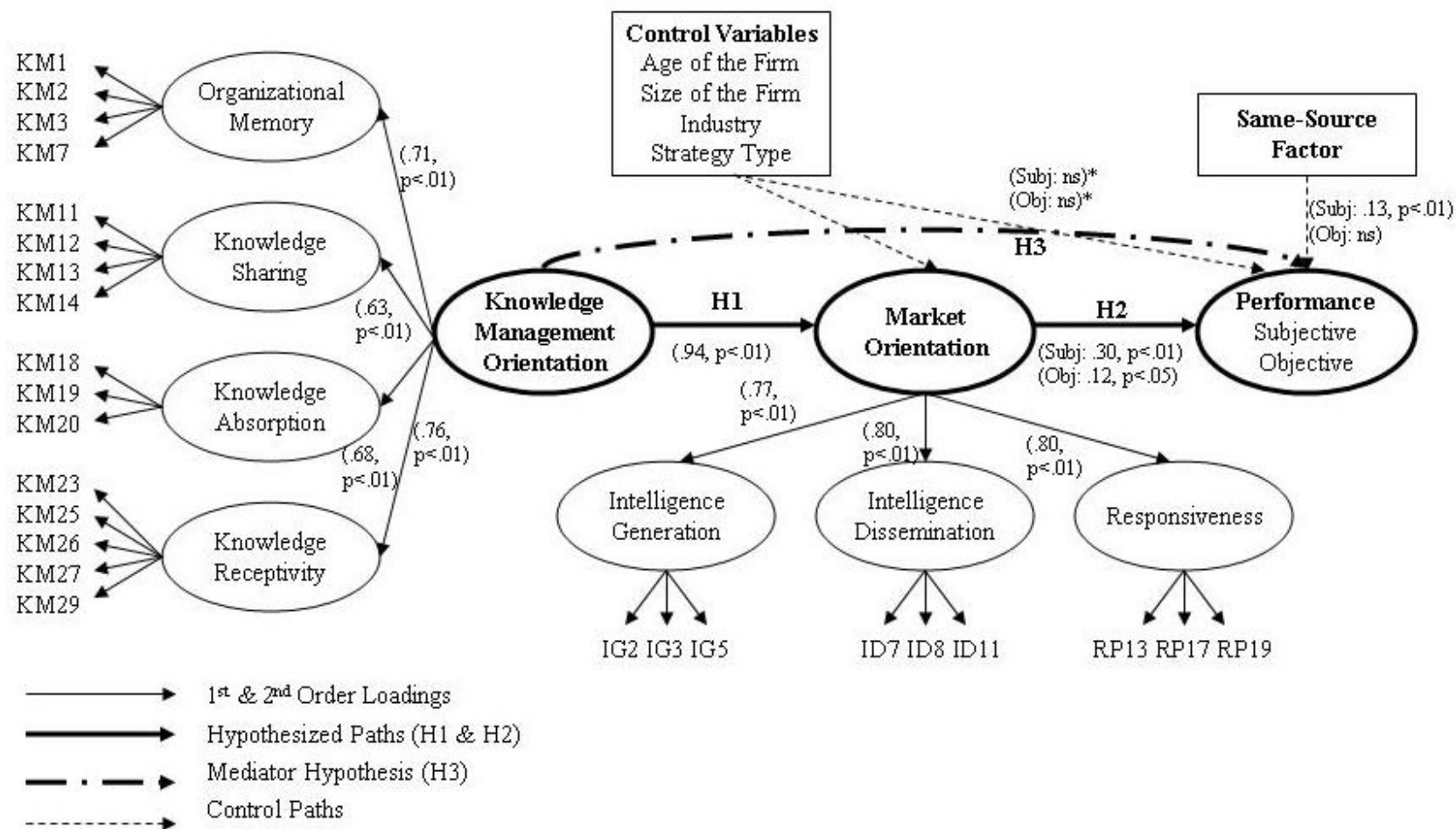
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**FIGURE 1**  
**A Model of Knowledge Management Orientation, Market Orientation, and Firm Performance**



\*The paths between "knowledge management orientation" (KMO) and subjective and objective performance, respectively, were not significant when tested together with the paths in H2. Together with KMO's significant effect on both performance variables without the H2 paths and the significant path in H1, the finding is that "market orientation" fully mediates the KMO-performance paths.

**TABLE 1**  
**Correlations and Shared Variances**

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
1. Intelligence generation	-	.26	.38	.13	.14	.24	.27	.15	.00	.00	.00
2. Intelligence dissemination	.51	-	.49	.16	.19	.26	.29	.12	.01	.04	.00
3. Responsiveness	.62	.70	-	.18	.25	.34	.38	.19	.01	.03	.00
4. Organizational memory	.36	.40	.43	-	.30	.34	.14	.07	.02	.04	.02
5. Knowledge sharing	.37	.44	.50	.55	-	.36	.44	.07	.01	.03	.01
6. Knowledge absorption	.49	.51	.58	.58	.56	-	.34	.07	.01	.03	.00
7. Knowledge receptivity	.52	.54	.62	.38	.66	.59	-	.11	.00	.02	.00
8. Subjective performance	.39	.35	.44	.26	.27	.27	.33	-	.00	.03	.00
9. Objective performance	.06	.11	.08	.14	.10	.12	.01	.07	-	.00	.01
10. Size of the firm	.01	-.19	-.17	-.20	-.17	-.16	-.14	-.18	.01	-	.02
11. Age of the firm	.03	.04	.07	.13	.08	.04	.05	.04	.09	.15	-

Note: Correlations are included below the diagonal and shared variances are included above the diagonal. All correlations  $\geq .20$  are significant at the  $p < .05$  level.

**TABLE 2**  
**Means, Standard Deviations, and CFA Results**

	Mean	Standard Deviation	Average Variance Extracted	Composite Reliability	Coefficient Alpha	Range of Factor Loadings
1. Intelligence generation	4.92	1.27	51.3%	.76	.74	.59-.76
2. Intelligence dissemination	4.52	1.45	51.0%	.76	.75	.69-.74
3. Responsiveness	4.63	1.32	51.7%	.76	.76	.68-.76
4. Organizational memory	4.26	1.35	62.8%	.87	.87	.68-.86
5. Knowledge sharing	4.80	1.14	62.0%	.87	.86	.69-.88
6. Knowledge absorption	4.65	1.21	55.3%	.78	.79	.62-.84
7. Knowledge receptivity	4.62	1.12	51.4%	.84	.84	.61-.80
8. Subjective performance	4.40	1.09	55.7%	.79	.78	.59-.84

Fit Statistics:

$\chi^2$	542.11
Degrees of Freedom	322
DELTA2	.98
RNI	.98
CFI	.98
TLI	.98
RMSEA	.05

## APPENDIX

### Measurement Scales

#### Knowledge Management Orientation

##### **Organizational Memory**

- KM1** We have systems to capture and store ideas and knowledge.
- KM2** We have systems to codify and categorize ideas in a format that is easier to save for future use.
- KM3** IT facilitates the processes of capturing, categorizing, storing, and retrieving knowledge and ideas in our company.
- KM4** We systematically de-brief projects, record good practices that we should extend and mistakes that we should avoid.
- KM5** We make efforts to remember mistakes we made and avoid making similar mistakes in the future.
- KM6** Information and knowledge stored in our systems is relevant and sufficient.
- KM7** We constantly maintain our information systems and upgrade knowledge stored in the systems.
- KM9** People are encouraged to access and use information and knowledge saved in our company systems.

##### **Knowledge Sharing**

- KM8** We treat people's skills and experiences as a very important part of our knowledge assets.
- KM10** When we need some information or certain knowledge, it is difficult to find out who knows about this, or where we can get this information.
- KM11** We have systems and venues for people to share knowledge and learn from each other in the company.
- KM12** We share information and knowledge with our superiors.
- KM13** We share information and knowledge with our subordinates.
- KM14** We often share ideas with other people of similar interest, even if they are based in different departments.
- KM15** There is a great deal of face-to-face communications in our company.
- KM16** We use information technology to facilitate communications effectively when face-to-face communications are not convenient.

##### **Knowledge Absorption**

- KM17** We very often use knowledge that our company possesses, either from the past experience or from external sources.
- KM18** We use information technology to access a wide range of external information and knowledge on competitors and market changes, etc.
- KM19** Through sharing information and knowledge, we often come up with new ideas that can be used to improve our business.
- KM20** We have networks of sharing knowledge with other organizations on a regular basis.

##### **Literature Sources**

- Hansen, Nohria, and Tierney (1999); Liebowitz and Beckman (1998); Olivera (2000); Zack (1999)
- Hansen, Nohria, and Tierney (1999); Liebowitz and Beckman (1998); Olivera (2000); Zack (1999)
- Bloodgood and Salisbury (2001); Dewett and Jones (2001); Hansen, Nohria, and Tierney (1999)
- De Long and Fahey (2000); Becker (2001); Szulanski and Winter (2002)
- Becker (2001); De Long and Fahey (2000); Szulanski and Winter (2002)
- Anand, Manz, and Glick (1998); Corbett (2000); Gray (2001); Garud and Nayyar (1994); Moorman and Miner (1997)
- Anand, Manz, and Glick (1998); Corbett (2000); Garud and Nayyar (1994); Gray (2001); Moorman and Miner (1997)
- Feldman and March (1981); Hansen, Nohria, and Tierney (1999); Levitt and March (1988)

##### **Literature Sources**

- Davenport, De Long, and Beers (1998); De Long and Fahey (2000)
- Hansen, Nohria, and Tierney (1999)
- Becker (2001); Holthouse (1998)
- Ghoshal, Bartlett, and Moran (1999); Holthouse (1998); Schulz (2001); Szulanski (1996)
- Ghoshal, Bartlett, and Moran (1999); Holthouse (1998); Schulz (2001); Szulanski (1996)
- Holthouse (1998); Lave and Wenger (1991); Wenger (1998)
- Nonaka and Takeuchi (1995)
- Feldman and March (1981); Hansen, Nohria, and Tierney (1999); Levitt and March (1988)

##### **Literature Sources**

- O'Dell, Wiig, and Odem (1999); Maria and Marti (2001)
- Hennart (1988); Kogut (1988); Simonin (1999); Szulanski (1996)
- O'Dell, Wiig, and Odem (1999); Maria and Marti (2001)
- Boxwell (1994); Hennart (1988); Kogut (1988)

## APPENDIX Continued Measurement Scales

<b>Knowledge Receptivity</b>	<b>Literature Sources</b>
KM21 Managers value knowledge as a strategic asset, critical for success.	Davenport, De Long, and Beers (1998); De Long and Fahey (2000)
KM22 Our company culture welcomes debates and stimulates discussions.	Popper and Lipshitz (1998)
<b>KM23</b> We hesitate to speak out our ideas because new ideas tend to be highly criticized or ignored (Reverse coded).	Hult, Hurley, Giunipero, and Nichols (2000); Popper and Lipshitz (1998)
KM24 In our company, new ideas are evaluated equitably.	Kanter (1989); McGill, Slocum, and Lei (1992); Popper and Lipshitz (1998)
<b>KM25</b> In our company, we evaluate ideas based on their merits, no matter who comes up with the ideas.	March and Olsen (1976); Popper and Lipshitz (1998); Shaw and Perkins (1992)
<b>KM26</b> In our company, we evaluate new ideas rapidly on a regular basis.	March and Olsen (1976); Popper and Lipshitz (1998); Shaw and Perkins (1992)
<b>KM27</b> There is a general culture in our company where people respect knowledge and knowledge ownership.	Davenport, De Long, and Beers (1998); De Long and Fahey (2000); Marchand, Kettinger, and Rollins (2000)
KM28 People who contribute new ideas are rewarded financially in our company.	Nemeth (1997)
<b>KM29</b> People who contribute new ideas are invited to participate in future development and implementation of this new idea.	Nemeth (1997)
KM30 We are held accountable for our own actions and consequences.	March and Olsen (1976); Popper and Lipshitz (1998); Shaw and Perkins (1992)

### Market Orientation

<b>Intelligence Generation</b>	<b>Literature Sources</b>
IG1 In this business unit, we meet with customers at least once per year to find out what products or services they will need in the future.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>IG2</b> In this business unit, we do a lot of in-house market research.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>IG3</b> We are slow to detect changes in our customers product preferences <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
IG4 We poll end users at least once per year to assess the quality of our products and services.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>IG5</b> We are slow to detect fundamental shifts in our industry (e.g., competition, technology, regulation). <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
IG6 We periodically review the likely changes in our business environment (e.g., regulation) on customers.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>Intelligence Dissemination</b>	<b>Literature Sources</b>
<b>ID7</b> We have interdepartmental meetings at least once a quarter to discuss market trends and developments.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>ID8</b> Marketing personnel in our business unit spend time discussing customers' future needs with other functional departments.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
ID9 When something important happens to a major customer of market or market, the whole business unit knows about it within a short period.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
ID10 Data on customer satisfaction are disseminated at all levels in this business unit on a regular basis.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>ID11</b> When one department finds out something important about competitors, it is slow to alert other departments. <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)

## APPENDIX Continued Measurement Scales

<b>Responsiveness</b>	<b>Literature Sources</b>
RP12 It takes us forever to decide how to respond to our competitor's price changes. <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>RP13</b> For one reason or another we tend to ignore changes in our customer's product or service needs. <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
RP14 We periodically review our product development efforts to ensure that they are in line with what customer want.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
RP15 Several departments get together periodically to plan a response to changes taking place in our business environment.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
RP16 If a major competitor were to launch an intensive campaign targeted at our customers, we would implement a response immediately.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>RP17</b> The activities of the different departments in this business unit are well coordinated.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
RP18 Customer complaints fall on deaf ears in this business unit. <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
<b>RP19</b> Even if we came up with a great marketing plan, we probably would not be able to implement it in a timely fashion. <R>	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)
RP20 When we find that customers would like us to modify a product or service, the departments involved make a concerted effort to do so.	Jaworski and Kohli (1993); Kohli, Jaworski, and Kumar (1993)

### Performance

<b>Subjective Performance</b>	<b>Literature Sources</b>
<b>P1</b> Return on capital employed	e.g., Jaworski and Kohli (1993); Vorhies and Morgan (2004)
<b>P2</b> Sales growth	e.g., Jaworski and Kohli (1993); Vorhies and Morgan (2004)
<b>P3</b> Earnings per share	e.g., Jaworski and Kohli (1993); Vorhies and Morgan (2004)
<b>Objective Performance</b>	<b>Literature Sources</b>
<b>P4</b> Change in the profit (loss) before taxation between time period t and t+1	e.g., Hult and Ketchen (2001); Hult, Ketchen, and Slater (2005)

### Control Variables

	<b>Literature Sources</b>
<b>C1</b> Age of the firm	e.g., Amburgey and Rao (1996); Baum (1996); Bharadwaj, Varadarajan, and Fahy (1993)
<b>C2</b> Size of the firm (number of people employed)	e.g., Amburgey and Rao (1996); Baum (1996); Bharadwaj, Varadarajan, and Fahy (1993)
<b>C3</b> Industry classification (manufacturing, services, retailing, and other)	Rumelt (1991); Schmalensee (1985)
<b>C4</b> Strategy types (prospectors, analyzers, defenders, and reactors).	Miles and Snow (1978)

**Note:** <R> = Reverse Coded Item.

**Bold** items were retained after the measurement purification (e.g., **KM1** ... **RP19**). All items were measured via seven-point Likert-type questions.