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Managerial identification of competitors: accuracy and performance consequences

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Managerial identification of competitors: accuracy and performance consequences

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Previous research has examined what drives managerial identification of competitors and how well managers' perceived overall market structures match customer market structures. This research tests the proposition that the degree to which a manager accurately identifies competitors to his or her firm should improve firm performance. It examines this relationship in a longitudinal study of an emerging high-technology industry. Accuracy was associated with superior performance, but only when managers exhibited a detailed knowledge of the competition facing the firm. Accuracy in turn was negatively associated with the manager's industry experience. A firm's overall business experience demonstrated an inverted-U relationship with accuracy. Whether the firm's product had been certified by a third-party endorser in the industry was broadly related to accuracy, but overall had little relationship with performance.

Keywords: market structure; competition; competitor analysis; cognition

Introduction

Research demonstrates that understanding managers' mental models of the nature of competition provides valuable insights for understanding the behaviours that drive competitive advantage (Day & Nedungadi, 1994; Tollin, 2008; Varadarajan & Jayachandran, 1999). A part of this mental model is an understanding of the competitive market structure itself. Awareness of competition is a necessary precursor to competitive action (Chen, Su, & Tsai, 2007; Williams, 2007). To the extent he or she wishes to achieve a superior competitive position in the market (e.g. Attia & Hooley, 2007; Hooley, Broderick, & Moller, 1998), an executive must understand 'superior compared to whom?'

Advice for managers on how to identify or choose competitors is widely available (e.g. Bergen & Peteraf, 2002; Lehmann & Winer, 2008) and the process by which managers do this has attracted research attention both inside and outside marketing (Clark & Montgomery, 1999; Hodgkinson, 1997a). There is, however, no rigorous empirical evidence to support the contention that accuracy in competitor identification improves performance.

Indeed, precious few studies have compared managerial- and customer- or objectively derived market structures at all. In the cognitive strategic groups literature, researchers have examined agreement between managerially derived groups and groups identified by more objective means (e.g. Nath & Gruca, 1997; Osborne, Stubbart, & Ramaprasad, 2001; Reger & Huff, 1993). These have usually found statistically significant agreement between managerial and objective structures.

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In marketing, two studies have explicitly examined agreement between managerial views and customer views of competition. De Chernatony, Daniels, and Johnson (1994) studied the perceptions of suppliers and buyers in the North Sea oil pump industry. They found that buyers identified a larger number of competing suppliers in the industry than did suppliers themselves. Suppliers' views on supplying firms also correlated only .49 on average with buyer ratings and .57 on average regarding dimensions used to categorise competitors. De Chernatony et al. conclude that managers of supplier firms filtered out more detail about competition than did the buyers.

In the Spanish automobile market, Bigne and Lopez (2002) found that correlations of interfirm distances between managers' and consumers' multidimensional scaling (MDS) maps ranged from .20 to .93. None of the managers' maps correlated more than .41 with a map based on actual purchases in the market.

This research has two objectives. First, it examines the crucial question of whether senior management accuracy in identifying competitors is related to the performance of their firms. Second, it looks at how experience and firm strategy might influence the accuracy of a given manager. Empirically, it addresses these objectives with a longitudinal study in the context of an emerging, high-technology industry.

Theory and research hypotheses

Accuracy in managerial identification of competitors

How a manager in a firm classifies a particular target firm as a competitor or non-competitor is a cognitive process. Managers form an impression of a target firm, retrieve a 'competitor' category representation from memory and evaluate whether the target firm can be classified as a competitor (Clark & Montgomery, 1999).

Accuracy is defined in this context as the degree to which a manager's model of competition for his or her firm (what I will call the 'focal firm') matches an appropriate referent. The appropriate referent in this case is a customer-derived model of competition for the focal firm. While companies attempt to position their offerings competitively in the marketplace, it is customers who are the 'ultimate arbiters of competitiveness' (Wilson, 1999, p. 34).

The accuracy–performance relationship

Correct identification of competitors should be related to performance in three ways.

First, competitor identification is relevant to market attractiveness judgements (Day, 1997; Porter, 1980). A superior choice of target market should reflect an accurate understanding of the competitors a firm is likely to face in that market. One concern is that a firm might underestimate the competition it will face. However, firms might also overestimate competition, leading to non-entry (giving up potential sales) or excess commitment of resources to the entry process.

Second, competitor identification is relevant to positioning decisions within markets (cf. Hooley et al., 1998; O'Donnell, Gilmore, Carson, & Cummins, 2002). Day and Wensley (1988) argue that competitive advantage can only be assessed through an effective evaluation of how skills and resources translate into a superior competitive position. Attia and Hooley (2007), for example, demonstrate how different assets and capabilities relate to innovation, price and quality competitive positioning.

Empirical research demonstrates important performance consequences to competitive positioning. Hooley and Greenley (2005) uncover five distinct positions in their multi-

industry study that are in turn associated with significant differences in sales volume, customer satisfaction and customer loyalty for the firms. Green, Barclay, and Ryans (1995) find significant positive effects of initial value and quality competitive positions on performance in business software. To the extent managers identify the wrong competitors, it will be difficult for them to choose the right position.

Finally, without awareness of competition, a manager will be unable to understand competitive dynamics within a market (Chen et al., 2007; Williams, 2007). Misunderstanding of competitive relationships increases the likelihood that the manager will misjudge whom a tactic will affect, how it will affect them or both (Moore & Urbany, 1994; Zajac & Bazerman, 1991).

Despite the appeal of the above arguments, there are also reasons to believe competitor identification may be loosely coupled to firm performance. In particular, accuracy in competitor identification should matter only to the extent that (a) managers pay attention to the competitors identified and (b) paying attention to competitors improves performance.

Regarding the first point, there is evidence that managers pay relatively little attention to competition. Research suggests managers name relatively few competitors and perform little competitor classification beyond looking at direct competitors (Clark & Montgomery, 1999; Johnson & Hoopes, 2003; Porac & Thomas, 1990). Across multiple studies, Montgomery, Moore, and Urbany (2005) report that managers are relatively unlikely to try to anticipate competitive reactions to their efforts.

To the second point, paying attention to competitors is sometimes counterproductive. Armstrong and Collopy (1996) demonstrate that an orientation to competitors can have negative performance consequences. Several market orientation studies have found competitor orientation has negative effects or only has positive effects under certain conditions (e.g. Gatignon & Xuereb, 1997; Han, Kim, & Srivastava, 1998; Olson, Slater, & Hult, 2005). Generally, Weick (1995) observes that accuracy about an organisation's environment is secondary to plausibility in driving organisational behaviour.

Allowing that this broader literature suggests the link between competitor identification and performance may be weak, I test the following basic hypothesis:

H1:   Firms whose senior managers are more accurate in their competitor identification will demonstrate higher performance.

Antecedents of managerial accuracy

Competitor identification is a judgement much like many other managerial tasks (e.g. forecasting, market choice, strategy choice, etc.). A manager's ability to judge some aspect of the environment is likely to rest on not only individual but firm and industry characteristics (Daniels, Johnson, & de Chernatony, 1994; Sutcliffe & Huber, 1998). Empirically this study focuses on individual and firm characteristics due to the nature of the sample: individual- and firm-level experience along with firm-level strategy. I will return to industry characteristics in discussion.

Experience

Managerial experience. One factor that might influence a manager's accuracy is his or her level of experience. Managerial experience has been widely studied as an explanatory variable in management research; it is generally believed to have positive effects on performance at both an individual (e.g. salespeople, Franke & Park, 2006; Fu, 2009) and firm level (Kor, 2003; McEnrue, 1988).

In terms of judgement, however, research suggests that experience has negligible or negative effects. There is abundant research in judgement and forecasting that experienced forecasters are usually no better than inexperienced ones and sometimes worse (see Cassidy & Buede, 2009, for an interdisciplinary review). Research in marketing reveals that practitioners and 'experts' are no better than novices at predicting consumer behaviour (Armstrong, 1991; Hoch, 1988). There is even evidence to suggest what Lawrence, Goodwin, O'Connor, and Onkal (2006) term an 'inverse expertise effect' where novices outperform experts. Lambert, Marmorstein, and Sharma (1990) find that more experienced industrial salespeople are actually less likely to have an accurate understanding of customers' expected performance levels. Specific to competitor identification, Clark and Montgomery (1999) find that more experienced managers use fewer attributes to describe competitors, suggesting either a less rich or less conscious categorisation model. I therefore hypothesise a negative relationship between experience and accuracy:

H2:   The more experienced the manager, the less accurate his or her classification of competition.

Experience of the firm. Beyond individual experience, a firm's overall experience may have an influence on the manager's accuracy. The literature regarding firm age is informative in this regard. Management scholars have found varying relationships between age and survival, with some studies indicating that age is a benefit ('the liability of newness'), some indicating age is a hazard ('the liability of obsolescence') and some indicating a curvilinear relationship ('the liability of adolescence'). Hannan (1998) and Henderson (1999) provide discussions.

The closest research to competitor identification in this literature examines organisational learning, and leans to age being a hazard. Older firms appear less likely to learn from and adapt to a changing environment (Guillen, 2002; Henderson, 1999; Thornhill & Amit, 2003). Guillen (2002) finds marginal support for the hypothesis that firms are less likely to imitate competitive strategies as they age. While Diamantopoulos and Winklhofer (1999, p. 75) suggest older firms should have better data to forecast export sales (see also Mohan-Neill, 1995), they find virtually no relationship between firm age and forecast accuracy, leading them to conclude that firm age does not 'automatically translate' into increased accuracy. Overall the learning research suggests:

H3:   The more experienced the firm, the less accurate a manager's classification of competition.

Strategy

The strategic posture of a firm is likely to lead to different perspectives (Sutcliffe & Huber, 1998) and resources relative to competitors (cf. the strategic groups literature, Leask & Parnell, 2005). This study focuses on one general strategic factor, the specialist–generalist distinction, and one factor that is salient within the industry, third-party certification.

Specialisation. The distinction between specialist and generalist firms is well developed in the management literature (Hannan, 2005; Hannan & Freeman, 1989; see also Alvarez & Merino, 2008 for a recent empirical example). Specialists define their markets in terms of

narrow customer niches that they seek to dominate through focus and innovation. Generalists spread their efforts over more heterogeneous markets and attempt to succeed through scale and accumulated skills.

Specialists should be accurate for a number of reasons. First, specialist firms depend more on a given market than do generalists that compete across a variety of markets, and are more likely to be sensitive to events in that market (e.g. Chen, Smith, & Grimm, 1992). Given these higher stakes, it is in the specialist's interest to understand its market as accurately as possible.

Second, there is evidence that specialists learn about a given market better than do generalists. Haunschild and Sullivan (2002) find that generalist airlines learn less from their accident experiences than do specialists. Ingram and Baum (1997) find that specialist hotel chains are more affected by their operating experience than generalist hotel chains in terms of survival. Barnett, Greve, and Park (1994) show that the specialist banks in their sample generate greater returns on experience than generalists. Therefore:

H4: The more a manager's firm specialises in a market, the more accurate his or her classification of competition will be in that market.

Third-party certification. Choosing to pursue certification of a firm's products or processes is an important aspect of marketing (Ferguson, 1996; Miles, Munilla, & Russell, 1997). Certification is often thought to be a strong signal of product quality (Dewally & Ederington, 2006). Related research on third-party endorsements suggests they can be a positive factor in consumer choice (Dean, 1999; Dean & Biswas, 2001). The management literature looks at third-party endorsements as conferring a form of legitimacy on the endorsed organisation (e.g. Rao, 1994; Ruef & Scott, 1998).

Certified organisations are likely to be more competent and thus more likely to be accurate in their understanding of their markets (Ruef & Scott, 1998). Certifying bodies may also provide resources that allow the certifying organisation to understand their market better such as education and training (Slayter, 2004). Finally, there may be a social networking aspect of being a certified organisation: certified organisations are part of the 'club', and thus have the information resources of other members to draw upon; O'Donnell et al. (2002) find that industry associations are a common source of information for the competitor identification process. Correspondingly:

H5: If a manager's firm has been certified by an independent authority, he or she will be more accurate in classifying competition.

Method

Empirical setting and samples

The study hypotheses were tested in the Balanced Scorecard (BSC) software industry, an emerging, high-technology, business-to-business market. The Balanced Scorecard is a multidimensional corporate performance measurement and management framework (Kaplan & Norton, 1992). Software vendors have developed packages to help companies implement scorecards. Customers for these vendors tend to be large organisations; implementation and maintenance of BSC software can cost from tens to hundreds of thousands of pounds (Marr & Neely, 2003).

Managerial sample – Year 1

The 33 major vendors (together about 95% market share) in the market for BSC software were identified from an industry report (Marr & Neely, 2003). Vendors are geographically dispersed across Europe and North America, with nine countries represented in the sample.

Card sort specifically and classification methods generally have characterised the research eliciting managerial models of competition (e.g. de Chernatony et al., 1994; Reger & Huff, 1993). Alcaniz and Lopez (2001) specifically recommend classification methods as the best approach to this task. This study uses a survey with a direct listing of competitors, however. First, unlike previous studies, I am not trying to elicit a manager's impression of competitive market structure as a whole, but only his or her impression of competition relative to the focal firm. Sorting the industry into multiple groups of firms is not critical here, since only the group that contains the manager's firm is relevant. Second, I take Hodgkinson's (1997b) caution that the interview process typically used to conduct the card sort can be biasing, and note that on a practical basis, the highly geographically dispersed respondents make face-to-face interviewing prohibitive. Alcaniz and Lopez (2001) find a very high correlation between classification and direct listing methods, suggesting little information may be lost here.

E-mails were sent to senior executives at the 33 firms asking them to fill out a survey regarding competition within the industry. Executives were identified through the Marr and Neely (2003) report as key strategic decision makers within their organisation regarding BSC software. Respondents from 20 firms returned surveys. Of the 13 non-responding firms, five were not named as competitors by any of the responding firms; this suggests that these firms represent a niche different enough that they may be segmented from the population of interest. Twenty firms represent a 71% response rate of the remaining 28 firms.

Competitor categorisation is likely to be 'graded' rather than binary: some target firms are seen as more competitive with the focal firm than others (Chen et al., 2007; Clark & Montgomery, 1999; Porac & Thomas, 1994; Reger & Huff, 1993). The survey therefore elicited a graded category structure. Respondents were given a list of the 33 vendors in the industry and were asked to check whether a given firm represented a 'major' or 'minor' competitor to the respondent's BSC product (respondents were instructed to leave non-competing firms blank).

Customer sample – Year 1

At the same time as vendor firms were contacted in Year 1, a separate survey was sent to a sample of customers to learn customer perceptions of vendors' offerings. Questionnaires were e-mailed to 64 contact managers from customer organisations identified in Marr and Neely (2003). Fifty-one customers returned the survey for a response rate of 80%. The resulting sample is broadly distributed across vendors (at least one respondent per vendor and not more than three per vendor). Respondents typically held general management or senior IT positions and were directly involved in the purchase and/or use of BSC software.

Customers were presented a list of the same 33 vendors as in the managerial survey in a similar tabular, check box format. Customers were asked to indicate whether they would 'seriously consider', 'might consider' or 'would not consider' purchasing from a given vendor in the future.

Managerial sample – Year 2

One year after the original survey, a second managerial questionnaire similar to the one in Year 1 was e-mailed to the 20 executives who had responded in Year 1. Executives in Year

1 had been solicited as part of research for the next edition of the Marr and Neely report; they had not been informed that a second survey would be administered.

Eighteen of the 20 managers who responded in Year 1 also responded in Year 2; the two non-responding firms had been acquired in the interim. Along with a competitor checklist, managers self-reported performance and background information on this survey. One of the 18 managers did not fill out the performance scales, leaving an effective sample size of 17.

Measures

Table 1 presents descriptive statistics and a correlation matrix for the study variables.

Measures of performance

Performance was self-reported as objective performance measures were not available; responding units were either privately held or represented subunits of larger organisations for which results are not broken out. While objective measures would be preferable, research suggests that objective and subjective measures of performance are usually significantly correlated statistically, so one hopes there is little loss of information in using subjective measures. Dess and Robinson (1984), for example, report subjective–objective correlations in the .6–.7 range. Robinson and Pearce (1988) find a range of .45–.92. Covin, Slevin, and Schultz (1994) and Harris (2001) also find significant subjective–objective correlations. Hart and Banbury (1994) report statistically significant relationships in the .4–.6 range and find that higher correlations are more likely in more narrowly defined industries of the kind studied here.

On the second managerial survey, respondents were asked to rate performance on four different five-point items – overall business performance, financial performance, revenue or turnover, and profit – compared to last year. Collecting performance data in Year 2 and independent variable data in Year 1 was designed to eliminate the problem of common method bias.

Fifteen respondents completed all four scales. Coefficient alpha for the composite scale of the four items was .93. However, to preserve all observations from an already small sample, I elected to analyse only the overall business performance item, which was completed by 17 respondents. In the subsample that completed all four items, overall business performance was correlated .95 with the composite scale, suggesting that little information is lost by using a single item.

Measures of accuracy

Accuracy is defined as the degree to which the competitive set a manager identifies for the focal firm matches a referent competitive set. I examine the degree of match between the set of focal firm competitors a manager identifies in Year 1 (manager set) and a customer competitive set in Year 1 (referent set). Again, note this differs from previous studies where researchers have elicited views of market structure as a whole. First, the likelihood that a manager will be either willing or able to understand competitors with whom he or she has little interaction is low. Second, it is the firm's interaction with its own competitors that is most likely to drive performance. In this sense, this study looks at what Weick (1995, p. 58) calls circumscribed accuracy (regarding the focal firm's competitors) rather than global accuracy.

Table 1.　Descriptive statistics and correlation matrix ($N = 17$).

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Performance	4.18	.73	1.00												
2. Broad accuracy vs. customer structure 1	.36	.21	.00	1.00											
3. Narrow accuracy vs. customer structure 1	.21	.16	.28	.87	1.00										
4. Misclassification vs. customer structure 1	.15	.10	–.43	.64	.18	1.00									
5. Broad accuracy vs. customer structure 2	.35	.20	–.06	.94	.77	.68	1.00								
6. Narrow accuracy vs. customer structure 2	.18	.13	.22	.84	.88	.30	.83	1.00							
7. Misclassification vs. customer structure 2	.17	.12	–.34	.69	.35	.83	.80	.33	1.00						
8. Specialisation	3.47	1.55	.20	.03	.05	–.02	.03	–.19	.26	1.00					
9. Certified	.71	.47	–.20	.58	.53	.33	.52	.54	.30	–.40	1.00				
10. Company age	13.88	9.69	–.01	.21	.20	.11	.23	.42	–.07	–.61	.32	1.00			
11. Experience with firm	5.31	2.89	.28	.24	.28	.05	.07	.10	.01	.35	.07	.00	1.00		
12. Experience in industry	6.29	2.23	–.03	–.02	–.34	.49	–.01	–.32	.34	.21	–.21	–.09	.14	1.00	
13. Career experience	16.94	7.96	.05	–.01	.04	–.08	–.08	–.15	.02	.10	.06	–.30	.43	–.12	1.00

Notes: $|r| > .41$: $p < .10$, two-tailed; $|r| > .48$: $p < .05$, two-tailed; $|r| > .60$: $p < .01$, two-tailed.

The graded category structure allows investigation of both a broad and a narrow sense of accuracy (see Figure 1). If the manager and the referent both declare a firm some kind of competitor, either major or minor, to the manager's firm (cells A, B, D and E in Figure 1), I call the manager *broadly* accurate. If the manager and the referent agree on the competitive importance a target firm represents (i.e. both say 'major', cell A, or both say 'minor', cell E) I call the manager *narrowly* accurate. This allows a test of whether merely knowing a firm is a competitor (broad accuracy) is sufficient to generate benefits, or whether the manager must know the exact degree of competition (narrow accuracy).

I construct a modification of the Jaccard similarity coefficient as a similarity measure between the manager's competitive set and the referent set. The coefficient is the number of positive matches divided by the number of mismatches (one firm is named a competitor but the other is not) plus the number of positive matches (see Figure 1 for the algebraic definitions of broad and narrow accuracy in this study). Negative matches (cell I) are excluded because I cannot say with certainty why a respondent might leave a firm out of a competitive set (see Borg & Groenen, 1997 for a discussion).

For the referent set, responses are aggregated from customers to construct an overall competitive market structure. I use a technique discussed by Rao and Steckel (1998, pp. 128–129). I count the number of times two firms are put in the same consideration set by customers. The more two firms are grouped together, the more competitive they are. As with the manager sample, the customer sample has both a narrow consideration set ('would seriously consider') and a broad consideration set ('would seriously consider' plus 'might consider').

To construct the referent set in Figure 1, one must identify decision rules by which one judges that customers overall declare two firms major competitors, minor competitors or non-competitors. I use two different customer structures to reduce the likelihood of identifying a relationship between accuracy and performance by chance. Decision rules were chosen to produce average competitor set sizes that resembled descriptive set sizes; the rules for the structures are as follows:

Customer structure 1:

- If $\geq$ 50% of customers put two firms in the broad consideration set, the two are considered major competitors.

Manager categorises a target firm as

	Major competitor	Minor competitor	Non-competitor
Major competitor	A	B	C
Minor competitor	D	E	F
Non-competitor	G	H	I

Referent categorises a target firm as

Algebraic formulae:
Broad accuracy = $(A + B + D + E)/(\text{grand total} - I)$
Narrow accuracy = $(A + E)/(\text{grand total} - I)$
Misclassification = $(B + D)/(\text{grand total} - I)$

Figure 1. Generic accuracy classification table.

- Else if $\geq$ 25% of customers put two firms in the broad consideration set, the two are considered minor competitors.

Customer structure 2:

- If $\geq$ 33% of customers put two firms in the narrow consideration set, the two are considered major competitors.
- Else if $\geq$ 33% of customers put two firms in the broad consideration set, the two are considered minor competitors.

Measures of antecedents of accuracy

Information regarding antecedents of accuracy was provided directly by respondents or obtained from company websites. *Managerial experience* was self-reported in Year 2 in terms of years of experience (a) with the manager's current firm, (b) in the Balanced Scorecard industry and (c) over the manager's career as a whole. (Note that neither firm nor career experience had any significant effects in any analyses, so they are not presented in the results.)

Firm age was used as a proxy for *firm experience*; it is measured in years from the firm's founding as of Year 2 of the research. *Specialisation* was operationalised through a five-point item asking 'to what degree does your firm specialise in balanced scorecard software?' anchored by 'A very small portion of our business' (= 1) and 'A very large portion of our business' (= 5). *Certification* is issued by the Balanced Scorecard Collaborative, an endorsing body in this industry.

Analysis and results

Descriptive data

Table 1 includes mean accuracy rates (Jaccard coefficients). Even regarding immediate competition for their firm, managers are not very accurate against the customer referents. Broad agreement between manager judgements and the two referent customer structures are .35 (structure 1) and .36 (structure 2), where $0 =$ no agreement and $1 =$ perfect agreement. The corresponding numbers for narrow agreement (e.g. both manager and referent name two firms 'major' competitors) are .18 and .21.

The accuracy–performance relationship

To test Hypothesis 1, I regress the measure of firm performance on the Jaccard accuracy indices. The regressions labelled 'Regression 1' in Table 2 test the relationship between performance and broad accuracy, the degree to which focal firm and referent agreed that the focal firm competed at some level with a given target firm. As indicated in the table, broad accuracy has no statistically significant association with performance.

Does detailed knowledge of the competitive market structure help? In the analyses labelled 'Regression 2' in Table 2, the broad accuracy cells are split into two groups: (1) narrow accuracy, where focal firm and referent both agreed that the target firm was a major competitor (cell A in Figure 1) or both agreed focal and target firms were minor competitors (cell E), and (2) misclassification, where the focal firm and the referent agreed focal and target firm competed, but disagreed regarding whether the level of competition was major or minor (cells B and D). Narrow accuracy should be positively related to performance, and misclassification should be negatively related to performance.

Table 2. Performance regressions (dependent variable: overall business performance compared to last year, $N = 17$).

Independent variables (Jaccard index)	Accuracy vs. customer structure 1 Parameter (standard err.)		Accuracy vs. customer structure 2 Parameter (standard err.)	
	Regression 1	Regression 2	Regression 1	Regression 2
Broad accuracy (cells A + B + D + E)	− .221 (.925)		− .004 (.910)	
Narrow accuracy (cells A + E)		2.098* (1.387)		1.652* (1.016)
Misclassifications (cells B + D)		− 2.859** (1.511)		− 3.494** (1.580)
Intercept	4.253*** (.370)	4.285*** (.334)	4.178*** (.372)	4.342*** (.325)
F statistic (*p* value)	0.06(.815)	2.23(.144)	0.00(.996)	3.22(.071)
R²	.004	.242	.000	.315
Adj. R²	− .063	.133	− .067	.217

Notes: *$p < .10$, one-tailed; **$p < .05$, one-tailed; ***$p < .01$, one-tailed.

The regressions reveal that narrow accuracy and misclassification have exactly the expected relationship: Hypothesis 1 is supported.

Antecedents of managerial accuracy

The sample is too small to estimate simultaneously a system of equations. To test Hypotheses 2–5, Tables 3 and 4 report a second set of regressions independent of the performance regressions. The narrow accuracy and misclassification variables from Table 2 are used as dependent variables since these are the variables that Table 2 shows are related to performance.

Table 3 reports the narrow accuracy regressions regarding the two customer structures. The regressions labelled 1 and 3 show the main effects of the hypothesised independent variables. The overall regressions are marginally significant, with only certification showing a consistent significant positive effect across the two structures. As the firm age literature in management has shown curvilinear effects of age, I checked for a curvilinear effect of firm age on narrow accuracy. Including a squared term for company age and dropping one non-significant variable produces the regressions labelled 2 and 4. These regressions show marked improvements in fit and more consistent results across the two structures; I treat them as the final models.

Overall, these regressions support Hypotheses 2 (managerial experience) and 5 (certification). As expected, the more industry experience a manager has, the less accurate he or she is regarding competition, and managers of certified firms are more accurate as well. Hypothesis 4, that managers at specialised firms would be more accurate, is supported only in customer structure 2. Hypothesis 3, suggesting a negative effect of firm experience, is not supported. Rather, there is an inverted-U relationship, where accuracy is highest for firms of moderate age.

Table 4 presents the corresponding regressions for misclassifications, where managers and customers agreed firms competed in some way, but disagreed on the degree of competition. Here there are no curvilinear effects. Regressions 1 and 3 show the full main

Table 3. Narrow accuracy regressions (dependent variable: Jaccard index for cells A + E, $N = 17$).

	Narrow accuracy vs. customer structure 1 Parameter (standard err.)		Narrow accuracy vs. customer structure 2 Parameter (standard err.)	
	Regression 1	Regression 2	Regression 3	Regression 4
Independent variables				
Industry experience	− .0145	− .0238**	− .0217*	− .0334**
	(.0127)	(.0110)	(.0153)	(.0138)
Company age	.0060*	.0107***	.0052	.0120**
	(.0036)	(.0035)	(.0043)	(.0046)
Specialisation	.0273		.0559**	.0473**
	(.0235)		(.0283)	(.0242)
Certification	.1302**	.0822*	.1985**	.1609**
	(.0647)	(.0522)	(.0779)	(.0676)
Company age X Company age		− .0008***		− .0008**
		(.0003)		(.0003)
F Stat (*p* val.)	2.58 (.091)	5.40 (.010)	2.96 (.065)	4.49 (.018)
R^2	.462	.643	.497	.671
Adj. R^2	.283	.524	.329	.521

Notes: *$p < .10$, one-tailed; **$p < .05$, one-tailed; ***$p < .01$, one-tailed.

effects models for the two customer structures, while Regressions 2 and 4 show the models with non-significant terms deleted. Note that because these are misclassifications, the desired signs for the coefficients change from the accuracy regressions.

Once again, Hypothesis 2 is supported: the more experienced the manager, the more misclassifications he or she commits. There is no significant relationship between company age and misclassification (H3). Hypothesis 4, that specialised firms will be more

Table 4. Misclassification regressions (dependent variable: Jaccard index for cells B + D, $N = 17$).

	Misclassifications vs. customer structure 1 Parameter (standard err.)		Misclassifications vs. customer structure 2 Parameter (standard err.)	
	Regression 1	Regression 2	Regression 3	Regression 4
Independent variables				
Industry experience	.0196*	.0197*	.0267**	.0271***
	(.0124)	(.0119)	(.0104)	(.0095)
Company age	.0005		.0007	
	(.0035)		(.0029)	
Specialisation	.0323*	.0303*	.0055	
	(.0229)	(.0183)	(.0192)	
Certification	.1354**	.1365**	.1024**	.1005**
	(.0632)	(.0604)	(.0528)	(.0453)
Company age X Company age				
F Stat (*p* val.)	1.93 (.170)	2.77 (.083)	2.36 (.112)	5.42 (.018)
R^2	.392	.390	.441	.436
Adj. R^2	.189	.250	.254	.356

Notes: *$p < .10$, one-tailed; **$p < .05$, one-tailed; ***$p < .01$, one-tailed.

accurate, is contradicted for customer structure 1 and not significant in customer structure 2. Hypothesis 5 is also contradicted in the misclassification analysis: managers at certified firms are *more* likely to commit misclassifications compared to both customer structures. I will examine the overall effects of these independent variables in the discussion.

Discussion

The accuracy–performance relationship

Despite Weick's (1995) contention that accuracy is a poor criterion for environmental sensemaking, this study demonstrates a positive association between managerial accuracy regarding customer-derived competition and performance. Further, the study demonstrates the benefit of depth of knowledge (cf. Li & Calantone, 1998): managers must not only be able to identify their competitors but also the degree of competition these target firms represent, major or minor in this sample, to gain a performance benefit.

This finding occurs despite the fact that the survey asks for a relatively quick, holistic judgement of competition. There is much akin in the task here to Gladwell's (2005) discussion of 'snap judgment'. Here, a manager looks at a list of competitors and makes an immediate 'major/minor/not' judgement about whether another firm competes with his or her own. Similar to many of Gladwell's examples, the ability to make this quick judgement accurately appears to be diagnostic of superior performance.

This study demonstrates the accuracy–performance link for two levels of competition (cf. Clark & Mongtomery, 1999; Porac & Thomas, 1990). An important research question is how many levels a manager needs to understand. Would managers benefit from a more nuanced view (e.g. three or five levels)? Bogner and Barr (2000) and Weick (1995) both note the trade-off between decision speed and accuracy; understanding more levels accurately would clearly consume more time and attention. At some point, one would expect diminishing returns to accuracy.

The antecedents of accuracy

The results from the analysis of antecedents of accuracy are mixed. Generally the study reveals more significant results for the experience variables than the strategy variables. Hypothesis 2, regarding managerial experience, is the most consistently supported in the analyses. It is negatively associated with narrow accuracy and positively associated with misclassification. Note, however, that this is for the industry experience measure only; neither experience with the focal firm nor career experience in general had any association with accuracy. Interestingly, Hambrick, Geletkanycz, and Fredrickson (1993) find that industry experience dominates firm experience in commitment to the status quo among members of top management teams. The more industry experience, Hambrick et al. (1993) suggest, the more senior managers may internalise industry conventions about strategy and positioning.

Hypothesis 3, regarding firm experience (as measured by company age), was not supported. Rather than a negative main effect, there is an inverted-U effect for narrow accuracy and no relationship with misclassification. Firms are most accurate if they are of moderate age, representing seven to 15 years in this sample. This finding is consistent with selected research suggesting diminishing returns to company age in organisational learning (Hoang & Rothaermel, 2005; Ingram & Baum, 1997). The notion expressed in both the organisational learning (Levinthal & March, 1993) and organisational ecology

(Hannan, 1998) is that with time organisations become biased towards and myopic in exploiting existing competencies.

Hypothesis 4, that managers at specialist firms will be more accurate, is partially supported in customer structure 2, but contradicted in customer structure 1. Overall, it is difficult to identify a substantive association. Hypothesis 5, that managers in certified firms will be more accurate, produces more interesting results. Supporting Hypothesis 5, managers at certified firms are more narrowly accurate regarding both customer structures (Table 3). However, managers at certified firms also produce more misclassifications, contradicting Hypothesis 5 (Table 4). Returning to the definitions of broad and narrow accuracy, it turns out that managers at certified firms are markedly more accurate in a broad sense (agreeing with customers that two firms compete in some way) than managers at uncertified firms (41% vs. 19% for customer structure 1 and 43% vs. 18% for customer structure 2, both differences $p < .05$). The problem is that broad accuracy provides no performance benefits. An analysis of the total effects of certification on performance reveals a marginal negative effect of certification on performance for customer structure 1, and a near zero effect for customer structure 2.

Managerial implications

This is one of a handful of studies to examine the accuracy with which managers identify competitors, and to my knowledge the only study that demonstrates performance benefits to this accuracy. In this study, accurate identification of a focal firm's competitors is associated with superior performance. As noted previously, however, attaining greater levels of accuracy incurs costs. Whether the benefit exceeds the costs is more difficult to answer in this context: perfect accuracy may be neither achievable nor rational. Peteraf and Bergen (2003) observe that managers have many demands on their time and that a comparison of the benefits from environmental scanning to its costs might reveal other tasks deserve higher priority. Striving for 'pretty good' accuracy that provides cost-efficient, timely guidance to decision making is better than pursuing perfect accuracy.

Given low levels of accuracy, commissioning a market research study is an obvious option, but the expense and availability of this kind of research may limit its usefulness. To the extent firms rely on their own resources, two options present themselves based on this research: first, firms should hire at least some senior managers from outside their industry. That industry experience is negatively associated with accuracy reinforces cautions one should be wary of deferring to a manager's 'experienced' judgement (cf. Cassidy & Buede, 2009). Further, spending too much time with a subset of industry actors may produce what Paton and Wilson (2001, p. 296) call 'collective ignorance'.

Second, there may be a general benefit to seeking certification but firms should be careful to exploit the social and informational resources of certifying bodies to be able to understand competitive market structure in detail. By its nature, certification simply puts a firm on a level playing field with other certified firms: exploiting the resources provided by certification better than other firms leads to advantage. On the other hand, whether one is a specialist or a generalist has little overall effect in this study.

Managers should beware that the cost–benefit ratio of competitor identification and analysis may vary by industry type. Industries that are dynamic and complex are ones in which it is simply more difficult for a manager to be accurate (Bogner & Barr, 2000). Because of this, however, firms that are able to understand successfully competition in detail may have a particular advantage because this level of understanding is likely to be

rare. In contrast, understanding is likely to be high and widely shared in an industry that is mature or features very few firms.

Limitations and research implications

Two obvious limitations are sample size and single-informant data. The two are related in that requiring multiple respondents per firm would no doubt have reduced the sample size further. That industry experience of the respondent is associated with accuracy suggests one might see differences across respondents within a company; on the other hand, Daniels et al. (1994) note that views of competition are more homogeneous within companies than across companies, so perhaps any bias would not be large. A check for an effect of job title on responses revealed no association with narrow accuracy or misclassification, offering some comfort that the exact respondent within a firm is less important than the firm context itself. As noted previously the study also relies on self-reported performance, albeit collected a full year after information was collected for the independent variables.

The work would have been enriched if it had further explored the activities in which these firms engaged. For example, in-depth interviews would have allowed the study to examine the degree of competitive analysis and market research the responding firms performed to address the cost–benefit trade-off of competitor identification. It also would be helpful to understand the tools and resources used in these activities. Diverse time zones and geography among respondents made e-mail a preferred medium, but the study could have included more open-ended questions or dialogue by e-mail with respondents.

A single-industry empirical setting is a well-respected choice in research on competition (e.g. Daniels, Johnson, & de Chernatony, 2002; de Chernatony et al., 1994; Paton & Wilson, 2001). This gives a sense of the industry market structure in depth and also controls for market-level factors in the data. However, understanding relevant conditions across industries is important to further research in this area. For example, environmental volatility is especially likely to affect both the degree and value of accuracy (Bogner & Barr, 2000; Reger & Palmer, 1996). Studying environmental turbulence and uncovering other market conditions that favour or disfavour an accuracy–performance relationship would enrich research. Firms competing in this industry are also concentrated in Europe and North America, meaning that this study's findings might not generalise to an industry in which firms from other regions compete.

Researching across companies, it is also likely that the internal structure of the firm may affect accuracy and its relationship to performance. For example, a company with a more customer-focused structure (e.g. Day, 2006) is more likely to (a) have an accurate understanding of how customers see competition and (b) be able to exploit more effectively superior knowledge of customer views.

Both accuracy and referent may vary as well depending on the goal of the analysis. For example, competitor identification for the purposes of a tactical decision such as a sales promotion may involve a clear and limited competitive set. Competitor identification regarding a strategic venture such as a major new market offering may involve many more competitors and competitors of different types. A benchmarking goal might well take a manager outside his or her industry in search of competitors. More generally, Daniels et al. (2002) discuss the influences of task characteristics vs. institutional characteristics on mental models of competition. This study used a general instruction regarding competitiveness relative to the manager's BSC products, but specifying different evaluation tasks would produce deeper insights.

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