



# “Thinking” about business markets: A cognitive assessment of market awareness

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## ABSTRACT

Current conceptualizations of marketing decision-making center on behavioral and cultural aspects of information flow and inter-functional coordination but neglect the cognitive, sense-making aspects of team decision-making. To fill this gap in existing business market literature, this study provides a cognitive based model of team market awareness. Drawing on theory related to entrepreneurial alertness, the paper develops constructs of management team awareness and symmetry of awareness distribution that are tested empirically. Results reveal that the management team's ability to perceive, comprehend and predict market elements (team market awareness) leads to higher firm performance. Further, the effect of team market awareness on team performance is strengthened when the team has *asymmetric* distribution of awareness, whereby a team's members have an accurate awareness of *different* market elements. Finally, team market awareness also has a stronger impact on team performance when the team has a high level of agreement on cross-functional tactics.

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## 1. Introduction

Managers can acquire and share information about customers and competitors in ways hardly imaginable a few years ago. The access and affordability of information to a management team pose several questions: 1) what does it mean to be aware of the market and is it enough to have a myriad of market information available? 2) Should everyone have a holistic understanding of the market or is it enough that one or two team members are aware of elements and trends such that they complement the team's pool of insight? 3) How do market awareness and team agreement on future actions drive performance?

Utilizing Austrian economics (Kirzner, 1997), we contend that management teams that successfully exploit opportunities do so through *team market awareness* – the capability to accurately interpret a wide cache of market information. We examine the *cognitive nature* of the team's information processing; that is, how the accuracy and distribution of market knowledge impact performance within the context of management teams. Marketing research acknowledging the importance of team cognition and its link to performance has been mostly

conceptual in nature (Day & Nedungadi, 1994; Hult, Ketchen, & Slater, 2005; Rico, Sanchez-Manzanares, Gil, & Gibson, 2008). We fill this gap empirically by testing a measure of a management team's cognitive abilities to accurately assess market awareness. We utilize an effective tool from the applied cognition literature for examining the awareness phenomenon (Endsley, 1995).

Another contribution lies in examining how market awareness is distributed across management teams' members. We focus on the degree of symmetry in the distribution of market awareness (variance) among team members, which manifests itself through symmetric distribution (low variance because of shared awareness of similar elements of the market) or asymmetric awareness (high variance because team members have awareness of different elements of the market). Extending previous research on transaction memory (e.g., Chiang, Shih, & Hsu, 2014), we posit that when team members have an asymmetric awareness of various market elements, team market awareness has a stronger performance impact.

Finally, we address the importance of cognitive agreement on what should be done going forward, or *team tactical agreement*. Previous research has focused on the significance of inter-functional collaboration from a behavioral perspective, but this research takes a cognitive approach to test team agreement on future tactical actions. We posit that the effect of team market awareness on performance is strengthened when teams have a high degree of agreement about what tactics to pursue going forward.

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## 2. Theory development

### 2.1. Team market awareness

Kirzner's view of market opportunity exploitation contends that individuals or teams have different levels of market knowledge and innate sense making (Kirzner, 1997). This premise is grounded in Austrian economics and the "knowledge of circumstances" (Hayek, 1945), which finds neoclassical economic theories unsatisfactory for understanding what happens in market economies because of assumptions that 1) market conditions are at all times in equilibrium and 2) all available opportunities have been instantaneously grasped. Rather, Austrians maintain that performance variability among management teams with access to the same information is a function of how well the teams identify *mismatches* in how resources are currently allocated in the market and the way they *should* be allocated. Contextual knowledge is asymmetric, allowing managers to see patterns in information that others cannot detect (Mises, 1949). The combination of knowledge asymmetry and cognitive processing is key to management team success (Busenitz, 1996; Dutta & Crossan, 2005; Kirzner, 1997; Yu, 2001).

While the Kirznerian literature describes it as opportunity exploitation, the marketing literature alludes to "market awareness" as a managerial capability that is asymmetric across firms (e.g., Day & Nedungadi, 1994). Few marketing studies specifically define and test this mental capability of managers or attempt to measure it. However, cognition research in other disciplines provides a detailed parallel look at this concept. Most notably, the literature on situational awareness in the human factor literature suggests the importance of accurate cognitive abilities related to market awareness (e.g., Adams, Tenney, & Pew, 1995; Cooke, Salas, Canon-Bowers, & Stout, 2000; Endsley, 1995). Situational awareness is the accurate perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future (Endsley, 1995). Used in contexts outside of the traditional business arena (e.g., military command and control situations), situational awareness research stems from the need to understand decision-making in complex and dynamic environments (O'Brien & O'Hare, 2007).

Recently, this stream of literature has extended the situational awareness concept beyond individuals to teams (Sonnenwald & Pierce, 2000), with the assertion that accomplishing objectives often requires expertise from different functions or specializations, and the integration of knowledge is critical to success. In dynamic work situations, individuals cannot acquire the rapidly expanding information and therefore must work together to execute plans through *interwoven* awareness from interconnected patterns of individual team members' knowledge stores (Sonnenwald & Pierce, 2000). Given the dynamic pace in today's market environment, adaptation of situational awareness to a business context as it relates to accurately seeing and acting upon market opportunities is straightforward. Therefore, we define team market awareness as a management team's ability to *accurately* perceive, comprehend and predict elements in the marketplace.

The *perception* element of team market awareness is the overall state of basic knowledge about the environment that the management team has at any given point of time (Adams et al., 1995; Sarter & Woods, 1991). Successful management teams must initiate the cognitive exercise of *noticing* elements in the market accurately (Ardichvili, Cardozo, & Ray, 2003; Endsley, 1995). Perception develops when individuals or groups constantly prepare and expand their knowledge base so problems or changes will be recognized (Gaglio & Katz, 2001; Lumpkin & Lichtenstein, 2005). The *comprehension* dimension of awareness is the process of forming a holistic picture by combining two or more elements to form an accurate picture of the environment (Endsley, 1995). Management teams with complex and changing schemas go through this process to cement disparate pieces of information and to make connections between market elements (Baron & Ensley, 2006; Dutta & Crossan, 2005). Finally, *prediction* is the ability to accurately

project the future states of the elements in the environment, at least in the near term (Endsley, 1995). Thus, successful management teams must recognize and understand patterns in the marketplace, and then translate the patterns in a meaningful way to see where markets are headed in the future (Baron & Ensley, 2006).

### 2.2. Team market awareness and performance

Kirzner's theory suggests that market awareness enables management teams to gain an accurate, holistic picture. This result is the ability to identify appropriate objectives or goals to pursue based upon the misallocations of resources in the market and the resources available to the firm. In aggregate, the three components of team market awareness come together in working memory as the management team engages in strategic and tactical decision-making. Without team market awareness, changes or opportunities in the marketplace are misinterpreted or missed, leading management teams to address the wrong market issues or fail to act (Lumpkin & Lichtenstein, 2005; Mitchell et al., 2002; Shepherd & DeTienne, 2005). In summary, Austrian economics suggests that team market awareness allows management teams to accurately see the gaps in the market, specifically ones that can be exploited, which results in the development of new or revised strategic initiatives that impact performance.

**H1.** Team market awareness has a positive effect on management team performance.

### 2.3. Distribution of team market awareness

A significant gap in the marketing literature is how awareness is distributed across individual members of the management team in relation to market dynamics (Kristof, 1996). In other words, team characteristics are generally measured as the average of the individual team members' knowledge, but the average does not parcel out the variance. For this research, we highlight the differences between management teams having symmetrical versus asymmetrical distributions of awareness. This constitutes the "variance" of awareness across different elements of the market among individual team members (Humphrey et al., 2011).

Specifically, asymmetric distribution of awareness occurs when a team has high levels of awareness and the awareness is mostly unshared across individual team members, i.e., individual team members are aware of different aspects of the market resulting in low overlap in awareness of the various elements of the market. For example, one person is aware of recent actions of competitors, another is aware of customer trends, and yet another team member is aware of recent financing practices. Symmetrical distribution is found at the other end of the distribution spectrum, occurring when a team has high levels of awareness and the awareness is mostly shared across individual team members. That is, individual team members are aware of the same aspects of the market resulting in high overlap in awareness of elements of the market. (Rindfleisch & Moorman, 2003). The question now becomes, "which is more effective; asymmetric distribution or symmetric distribution of awareness?"

Work on distribution of information (Brodbeck et al., 2007; Humphrey et al., 2011; Stasser et al. 2000) suggests that management teams with symmetrical information distribution (i.e., high overlap across individual team members' information and insight) run the risk of poor decision-making compared to teams with asymmetrical information distribution (i.e., low overlap across individual team members' information and insight). When team members pool shared information in discussions, these homogeneous teams spend their time discussing the "common" elements possessed by the team (Stasser et al. 2000). As the previous example suggests, members of the management team could know about competitors' recent actions and customers' reactions. However, there might be "unknown" elements such as market trends and

financing practices that should also be discussed, but this information tends to be neglected. Alternately, teams with asymmetric distribution of market awareness (i.e., high variance because team members know different elements of the market) tend to address a broader range of issues that can play a critical role in decision-making (Brodbeck et al. 2007; Humphrey et al., 2011). Our contention is that team market awareness has a stronger impact on performance when there is greater variance via asymmetric distribution of awareness among team members.

**H2.** Management teams with an asymmetric distribution of awareness will outperform teams with a symmetric distribution of awareness.

#### 2.4. Team tactical agreement

While team market awareness is critical, managers must develop a coordinated response to market opportunities through inter-functional coordination (Narver & Slater, 1990). Research addressing this need has widely conceptualized coordination as a behavioral construct. More recently, research in other areas demonstrates that it embodies a cognitive aspect (Ensley & Pearce, 2001), and that collective cognition is displayed in team decision-making (West, 2007). While individual team members may share an accurate picture of the current state of the market and where it is heading, they may still be disjointed in their perceptions of the next appropriate action steps (Schumpeter 1942; Dess, 1987; Perry-Smith & Shalley, 2003). Without agreement on the best tactics to pursue, the parts become misaligned, pulling the firm in different directions. In this case, characteristics related to a shared team cognition are more beneficial. Thus, *team tactical agreement* is the team's level of agreement about future resource allocations in order to carry out specific actions across functional areas.

However, without market awareness, a holistic understanding, and prediction about the future, high tactical agreement can be misguided and as a result, team performance suffers (Lim & Klein, 2006). Likewise, performance suffers when team market awareness is present but the team cannot come to a shared agreement about how to address the "right" tasks (Marks, Zaccaro, & Mathieu, 2000; Mathieu et al., 2005). This infers that performance gains come from the interaction of team market awareness and team tactical agreement.

**H3.** When a management team has high tactical agreement, the relationship between team market awareness and management team performance is stronger.

### 3. Research method

Cognitive research requires that respondents be caught "in the act of thinking," which is difficult to measure (Sinkula, Baker, & Noordewier, 1997). Standard methods like cross-sectional surveys do not measure the thought processes at the time of opportunity identification and exploitation. Tapping into the cognitive elements of decision-making involves testing under pre-constructed scenarios that allow control over the environment so that distractions do not contaminate the data, but that are not so controlled that they pre-ordain a particular cognitive pattern (Gaglio & Katz, 2001). For these reasons, the use of a business simulation allowed us to capture the market awareness phenomenon in a cognitive framework. Simulations have been credited for their ability to introduce real-world complexity while providing control over the study, unlike traditional cross-sectional surveys or field experiments, and there is considerable precedence for using simulations in the literature (e.g., Gundlach & Cadotte, 1994; Marinova, 2004).

The use of simulation for team market awareness must put respondents in a situation that allows them to a) analyze market environments, b) make decisions about what tactics to pursue, and c) review the performance outcomes of their decisions. To meet the criteria, the research utilized *Marketplace*, a strategic management simulation widely used in

MBA and executive education programs. In *Marketplace*, participants start and operate a company in the personal computer industry. Companies are typically comprised of 4–5 students and each company competes against a universe of 4–5 other companies made up of students enrolled in the same course. The simulation runs over 8 decision periods (quarters), during which the company's management team assumes responsibility for various facets of business. Before the game begins and after each subsequent decision period, each team is given *the same* information related to market variables: a customer segment analysis, customer preferences, competitive information, etc. With that, the teams must make decisions about which market segment(s) to pursue, product specifications, pricing strategies, geographic locations for sales offices, advertising, sales forecasting, production capacity, R&D investments, and financing decisions. After decisions are made, the game advances to the next quarter, and teams are provided with data on how their decisions impacted company performance. Performance is a result of how well the team allocated resources to either exploit an unfilled gap in the PC market or grow sales in current segments relative to the competition (i.e., the other teams playing the game).

#### 3.1. Research design

The data was collected from professional MBA classes utilizing the *Marketplace* simulation as the primary means of instruction. Masters students were participating in these simulation classes at eight different colleges and universities across the United States. The final study included 823 participants representing 179 MBA teams, with an average of 4.6 members per team. Average work experience for participants was 5.1 years.

The assessment was presented as a test of business acumen, thus disguising its research purpose for this study. It was administered in a controlled, classroom setting, which kept participants from sharing information. Administration took place as the participants were completing decision period 4. This timing gave participants the chance to reach a "steady-state" in terms of coping with the technicalities of the software, the context of the simulation and the team dynamics. The timing was especially salient as teams were required to create and present a detailed business plan for decision periods 5–8 just before responding to the assessment. Thus, the assessment was given at a time when students were being asked to reflect on the previous four rounds of decisions and develop a plan for the next four rounds. The completion of the business plan and subsequent participation in the awareness assessment meant that participants were asked questions about the market at the height of their involvement in the simulation.

#### 3.2. Measures

##### 3.2.1. Team market awareness

Development of the team market awareness assessment began with a review of the team cognition literature. Based on Ensley's work on situational awareness, we developed an assessment technique that closely modeled Ensley's (1992, 1995) situational Awareness Global Assessment Technique (SAGAT). The SAGAT method has been validated as an effective measurement tool of team awareness in various simulated environments (e.g., Ensley, 1995; Ensley, Holder, Leibrecht, Garland, Wampler and Matthews, 2000; French & Hutchinson, 2002; Sohn & Doane, 2004; Wright, Taekman, & Ensley, 2004). Although a simulated business situation is entirely different than previous uses of SAGAT, we attempted to parallel the measurement in our assessment while taking into account the significant contextual differences. We operationalized each dimension of market awareness in context to the *Marketplace* simulation. Examples of items for each dimension of market awareness are in Appendix A.

Perception is the ability to notice important elements in the environment. Participants were asked to recall pertinent competitor and industry information (e.g., brand strength, sales volume) that was available for all

previous periods in the data provided in the *Marketplace* market reports and financial statements. Perceptual questions across all five main functional areas of the business, including accounting, finance, manufacturing, marketing, and sales management were asked. The accuracy of each response was determined by comparing the participant's answers to the "true" conditions of the participant's firm and market.

Comprehension is the ability to develop a holistic understanding of the individual environmental elements. Questions were developed to determine if *Marketplace* participants could integrate the information available to make accurate conclusions (not explicitly stated in the *Marketplace* data provided to participants) about functional aspects of their firms' strengths or weaknesses. For scoring purposes, weaknesses (strengths) were judged based on whether the participant's firm was below (above) the industry average. The accuracy of each person's comprehension was based on the firm's strengths and weaknesses. Finally, prediction is the ability to see patterns and project where the market will go in the future. Participants were asked to predict future actions of competitors. Each person's predictive skills were scored by comparing his/her predictions to the actual events revealed in the next quarter.

Prior to the final launch of the market assessment tool, a panel of instructors using the simulation as well as current student participants were consulted and a pool of 90 awareness questions were developed. The questions were customized in the sense that the objective was to populate the market awareness measures for each participant to include his or her own firm and the other firms competing in the game. Three rounds of pre-testing were conducted at three major public universities using a total of 480 MBA and undergraduates. Because items on the market awareness assessment are measured against an objective "truth," traditional latent construct purification methods were inappropriate for validating and testing items. Therefore, techniques developed from item response theory (Haladyna, 1999) were used to validate the market awareness items: p-indices, point-biserial correlations, predictive validity and indices of discrimination (Haladyna, 1999; Varma, 2007). These pre-tests and evaluation procedures yielded a final battery of 33 questions to tap each of the three market awareness dimensions; 10 questions gauging perception, 15 gauging comprehension, and 8 gauging prediction. To calculate market awareness scores at the individual level based on accuracy, participants received 10 points for each correctly answered question, and 0 points for incorrect answers, with a maximum possible score of 330. The team market awareness score was formed by taking the average market awareness score for all of the team members.

### 3.2.2. Distribution of team awareness

While team market awareness is a function of accuracy, aggregating to the average of the team does not parcel out the variance among the team members. The mean can reflect a team where members were highly aware of similar elements of the market, or the mean may also reflect team members having specialized awareness in specific areas. To assess asymmetric or symmetric distribution of market awareness, we calculated the number of intra-team matches on the 33 items used to measure market awareness (Rentsch & Klimoski, 2001). A team with high number of matches is said to have symmetric awareness. The specific calculation was as follows:

$$CMA = \sum X_j \div N_j$$

where

$X_j$  = number of matches on the  $j$ th market awareness item.

$N_j$  = number of possible matches on the  $j$ th market awareness item.

To calculate  $N$ , the basic formula for determining matched pairs was followed such that:

$$n \times (n-1) \div 2$$

where  $n$  = number of team members.

This allows us to parse out the differences between two teams with similar awareness scores. For example, it is possible that one team scored high on the assessment due to low awareness variance across market elements. However, another team might have the same overall awareness score due to high awareness variance across market elements: one team member scored high on the marketing questions, one scored high on the manufacturing questions and another scored high on the finance questions (i.e. asymmetric awareness). The analysis of matches of assessment answers determines the variance of market awareness across market elements between teams.

### 3.2.3. Team tactical agreement

Team tactical agreement is the degree to which team members agree on future tactics needed to succeed. This agreement was assessed also using a calculation of intra-team matches on 16 items relating to various tactical options available to the team. Examples of these items and possible responses are in the Appendix. Questions related to future tactics were developed during pre-testing with insights from managers as well as simulation participants. The specific measurement was calculated using a paired comparison method (Rentsch & Klimoski, 2001) across the tactical questions, the goal being to obtain a composite measure of the level of agreement across all members of the team. A team with a high number of matches has high tactical agreement.

### 3.2.4. Team performance

Within the simulation, teams receive a myriad of performance reports that can be used in decision-making. The primary goal of participants is to maximize their team score on a balanced scorecard that is generated as a holistic index of various performance metrics following each decision period. Specifically, the measure of team performance for the current study was a cumulative balanced scorecard averaging team performance across decisions 5–8. The advantage of this scorecard is that it averages spikes or dips in performance over all decision periods.

### 3.2.5. Control variables

Included in the control variables was years of previous real-world work experience as well as the amount of time spent in the simulation software by members of each team. This is reflective of the level of involvement in the simulation that may impact the team's ability to make connections between separate pieces of information. This is especially poignant given that respondents were asked to complete the assessment from memory. Correlation and descriptive statistics for the independent measures and control variables are in Table 1.

## 4. Results

Data analysis used two OLS regression models and was performed at the team level unit of analysis. Specifically, Model 1 tested the direct effects of team market awareness and asymmetric distribution market awareness on team performance and then the interaction effects of

**Table 1**  
Correlation matrix and descriptive statistics for independent measures.

	1	2	3	4	5
1. Team market awareness					
2. Asymmetric awareness	.439**				
3. Tactical agreement	.299**	.188*			
4. Yrs. of work experience	.159*	−0.074	.177*		
5. Time spent in the simulation (hours)	.183*	0.028	0.084	0.123	N.A.
Mean	169.50	0.61	0.58	5.10	27.10
Standard deviation	29.70	0.17	0.09	4.50	10.70
Skewness	0.048	0.030	0.034	1.410	2.070
Kurtosis	−0.399	−0.584	−0.434	2.460	4.810

\* Significant at 0.05.

\*\* Significant at 0.01.

both independent variables on team performance. Model 2 tested the main effects of team market awareness and tactical agreement on team performance and then their interaction effect as shown below. The test of Model 1 was significant at  $F = 4.46, p < .01$ . The test of the overall Model 2 was also significant at  $F = 11.548, p < .001$ .

Using both a total score for team market awareness and a variance-based measure of symmetry of awareness distribution may create multicollinearity issues, thus all predictor variables were centered. The mean team market awareness score on the assessment was 53%, inferring that there is a good deal of “slack” in terms of how teams can achieve high scores on the assessment, also reducing the impact of multicollinearity on analysis. The variance inflation factor (VIF) for each variable is less than 5, suggesting that multicollinearity does not present a problem. Correlation between the total team market awareness score and the variance in awareness distribution was .439, which is below Kerlinger’s (1986) threshold against using mean scores and variance scores of the same variable in regression analysis. Taken together, the use of both a total score and variance score in one equation is justified in this case.

From the results, team market awareness (Model 1;  $\beta = .505, p < 0.01$  and Model 2;  $\beta = .352, p < 0.01$ ) has a strong direct effect on team performance which supports H1. A test of the interaction between the symmetry of awareness distribution and team market awareness was performed following Aiken and West (1991), accounting for the continuous nature of the data. In addition to the main effects, the interaction between the symmetry of awareness distribution and team market awareness is also significant at  $\beta = -.360, p = 0.021$ .

Further analysis was necessary to determine if the significant interactions support H2, which posits that asymmetric distribution of awareness will strengthen the relationship between team market awareness and team performance. A “spotlight” analysis (Fitzminons, 2008) was conducted using ANOVA to evaluate differences between high and low levels of symmetry in awareness distribution and team market awareness using a conservative median split of both variables (high variance group = asymmetric distribution awareness and low variance group = symmetric distribution of awareness). Illustrated in Fig. 1, groups with higher levels of team market awareness benefit significantly (42%) more from asymmetric distribution of awareness in terms of team performance (Scorecard M = 855.8) compared to teams with symmetric distribution of awareness (Scorecard M = 602.3) at  $F(1, 87) = 17.38, p < .001$ . There was a marginal difference between asymmetric and symmetric distribution of awareness in teams with low team market awareness with the difference in scorecard means of 225.21 and 323.86 respectively ( $F(1, 89) = 3.02, p = .081$ ). However, the difference in means was in the opposite direction for the low awareness groups, which indicates that shared interpretations of the situation in the market are valuable in the absence of accuracy.

The coefficients from Model 2 indicate that the interaction between team tactical agreement and team market awareness ( $\beta = .141, p = 0.042$ ) is also significant. A graph of a similar spotlight analysis for H2 was conducted for H3 and found in Fig. 2.

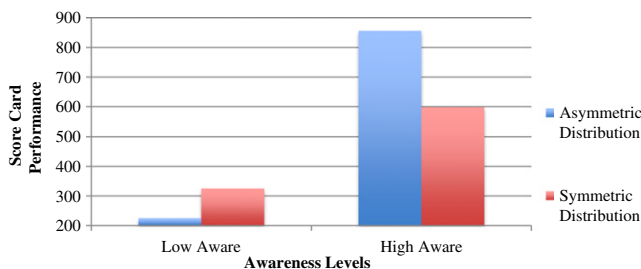


Fig. 1. Interaction of team market awareness and symmetry in awareness distribution on team performance.

As posited by H3, spotlight analysis shows a positive synergistic effect of team market awareness and tactical agreement. Specifically, an ANOVA of the contrasts shows a significant difference between high and low level tactical agreement in the high awareness group; Scorecard M = 892.13 and Scorecard M = 615.22 respectively ( $F(1, 87) = 12.02, p < .001$ ). Likewise the contrast ANOVA between high and low tactical agreement in the low level of awareness showed a marginal difference (Scorecard M = 315.89 vs. 210.43,  $F(1, 90) = 2.97, p = .096$ ). To summarize, team market awareness combined with low tactical agreement is better than team market awareness by itself and team market awareness combined with high levels of tactical agreement is even better. In sum, H3 is supported.

The control variables had no impact on team performance in either of the two models. This is important given there was very low correlation between time spent in the simulation and the measure of market awareness. In other words, team market awareness appears to be a true cognitive capability above and beyond pure repetition effects of reviewing the market information supplied by the simulation.

4.1. Post-hoc analysis of the market awareness construct

Endsley (1995) posits that awareness is both multidimensional and hierarchical in that lower level cognitive processes lead to higher-level processes. To evaluate the hierarchical nature of the three dimensions of team market awareness a stepwise regression model was conducted post-hoc whereby a model with only perception and the control variables was run followed by the inclusion of comprehension and subsequently adding prediction. The findings (see Table 2) show that perception alone has a significant effect on team performance (adjusted R<sup>2</sup> contribution = .063). The addition of comprehension to the model reduces the significance of perception to  $p > .05$  and makes an adjusted R<sup>2</sup> contribution = .112. Finally, prediction explains the most variance in team performance when added to the model (adjusted R<sup>2</sup> contribution = .168). The analysis supports each dimension of team market awareness representing a necessary but not sufficient aspect of awareness.

It appears that basic recall information is transformed into a more complete picture, followed by the prediction of future events. This research highlights the importance of teams to do more than simply recall information about the environment. In other words, the cognitive ability to notice things in the marketplace (Ardichvili et al., 2003) does not go far enough to necessarily know what to do or how to respond to that information. Comprehension, the Level 2 dimension, does have some impact on performance, which is reasonable given it is the “mid-level” processing dimension. It allows team members to integrate information and make connections to appropriate tasks or end goals, a critical capability to enhance performance (Dutta & Crossan, 2005). The ability to predict (i.e., Level 3), however, has the greatest impact on performance. Interpreting patterns to know what customers and competitors will do in the future allows management teams to exploit

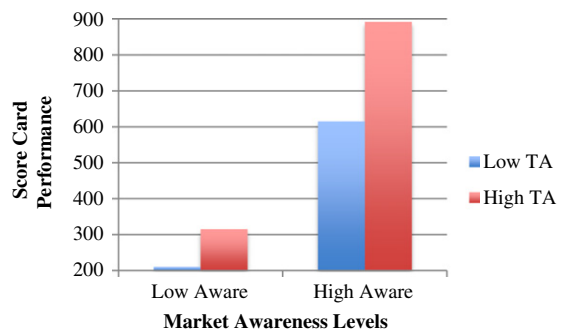


Fig. 2. Interaction of team market awareness and team tactical agreement on team performance.

**Table 2**

Results from hierarchical regression analysis of market awareness dimensions on performance.

Independent variables	Model 1		Model 2		Model 3	
	$\beta$	t	$\beta$	t	$\beta$	t
Step 1						
Perception	0.263*	3.41*	0.150	1.867	0.042	0.584
Time spent in the simulation	-0.002	-0.03	-0.013	-0.179	-0.006	-0.09
$\Delta R^2$		0.063				
Step 2						
Comprehension			0.254*	3.294	0.126	1.760
$\Delta R^2$				0.112		
Step 3						
Prediction					.454*	6.350
$\Delta R^2$						0.168
Overall $R^2$		0.069		0.177		0.352
Adjusted overall $R^2$		0.063		0.175		0.343

\*  $p < .01$ .

market opportunities that others may miss or not respond to quickly enough.

## 5. Discussion

### 5.1. Theoretical contributions

By bringing an outside theoretical perspective of market awareness posited by Hayek (1945) and later expanded upon by Kirzner (1997), the study developed and tested an under-researched phenomenon. For marketing, the importance of market awareness contributes to the literature by demonstrating that accuracy of mental models in the strategy-setting phase of business planning via team market awareness is key for success. Also, the post-hoc analysis suggests that team mental models of the market are hierarchical in nature, which should be modeled in future studies of team mental models. The study also contributes to work on shared mental models in team decision-making. An emerging trend in team research is to assess the degree of asymmetric versus symmetric distribution of awareness characteristics and to evaluate the impact of variance in team member characteristics on team performance. This study supports the contention that decision-making can be better when teams have asymmetric distribution of awareness of the market entering into the assessment stage of decision-making (Brodbeck et al., 2007).

The results of the study also demonstrate that other variables such as market awareness (accuracy) play an important role in linking shared mental models with performance (Ensley & Pearce, 2001). We considered the interaction effect of team market awareness and team tactical agreement on performance. While previous research has not tested this interaction effect, theory in the team cognition literature points out that if a team has an unclear picture about the environment yet shares a similar mental model about tactics – or vice versa, performance is less than optimal (Marks et al. 2000; Mathieu et al., 2005; Lim & Klein, 2006). The greatest performance gains are achieved when teams have a high level of market awareness and they have high levels of tactical agreement. While both variables individually had a positive impact on performance, a spotlight analysis illustrated a multiplicative effect: as tactical agreement increases, the relationship between awareness and performance becomes stronger.

Finally, the use of a complex business simulation to test market awareness and the distribution profiles of intra-team cognition allowed for a more realistic opportunity to assess the teams as they were making decisions and forming strategic responses. Rather than simply asking participants their perception of their knowledge stores (see Wong, 2008), the simulation offered both realism and control, thereby tapping the cognitive states as they were being employed in the planning

process. As with the SAGAT method utilized in the human factor literature, the simulation technique allowed us to assess objective answers, which added more accuracy to measuring the team market awareness–team performance link. Thus, the study illustrates the potential in simulations as a tool for empirically addressing the relationship between cognition, action and outcomes in business market research.

### 5.2. Managerial implications

The strong support for H1 suggests that managers should make effort to “know” their markets and the firm’s position in those markets. This is a salient point in a time when managers have a wealth of market and operations information at their fingertips via CRM and ERP systems. In one of the qualitative interviews during the measure development process, a manager questioned why respondents would be required to recall market information from memory as a measure of market awareness with the comment “why would they have to do that when all of the information is right there (pointing at his computer) and can be looked up at anytime?” The study highlights that having the information in an electronic database is not the same as having a high level of market awareness. The cognitive processing of a wide array of information is the key. Therefore managers should be leery of over-reliance on data repositories at the expense of knowing and understanding the marketplace.

The results of the study also suggest that attempts to improve individual levels of market awareness should be done in isolation of other members of the team. It is important for each team member to bring unique, yet accurate, conclusions about the market to the team so that insightful conversations can take place in meetings. Managers should observe teams to determine if the team is overly focused on common knowledge as a result of symmetric distribution of market awareness. The management team should frequently evaluate their levels of shared awareness as a sort of meta-cognitive process used to determine if group-think may be hurting performance. Similarly, managers should look for employees who have a high level of asymmetric distribution of market awareness as they build teams whose purpose is to identify and exploit opportunities. The current study indicates that this ability is important for matching resources to the current market environment and might be considered in employee recruitment in conjunction with traits such as basic intelligence, leadership skills, and the ability to work in teams. Perhaps assessments similar to the assessment of market awareness found in the current study could prove useful in employee selection and promotion.

Finally, the study points to the importance of agreement among team members in relation to the tactical choices that should be pursued, including choices that are outside a member’s respective functional area. This is especially important given that the impact of an action in one functional area can have far reaching implications across other functional areas. Managers should ensure that the group shares the same mental model of the tactics necessary to maneuver the firm in a given strategic direction. The tools and techniques used to assess team tactical agreement may prove useful to managers overseeing inter-functional teams. Any differences in the mental model could be used as an impetus for the team to pause for in-depth discussions of the differences before moving forward with tactical actions.

### 5.3. Future research and limitations

The current research on the cognitive dimensions of team market awareness provides several avenues for future research. First, the validation of business simulations as an appropriate tool for the study of team market awareness allows for future research with more controlled designs. For example, a true experimental design would be useful in exploring the granular dimensions of awareness and the importance of asymmetric versus symmetric distribution of awareness in teams. Future studies could literally manipulate the level of accuracy and the

symmetry of awareness distribution that team members brought to the table to assess how team performance is affected.

Second, the current study does not take into account the impact of team information exchange and processing during group discussions (Brodbeck et al. 2007). Specifically, Brodbeck et al. (2007) suggest that the interaction of information distribution symmetry at the individual level and how groups exchange and process information during group decision making can significantly impact awareness. Future research on awareness should attempt to account for this interaction. Likewise, Stasser and Stewart (2009) suggest that distribution of information symmetry can impact how groups go about their decision-making tasks. This should be investigated in team awareness research going forward as well.

A third avenue of future research is the investigation of the interplay between symmetry of awareness distribution and tactical agreement. There appears to be a correlation between the two variables such that team members that have different perspectives on the market will have a greater chance of reaching agreement on actions going forward. The mechanisms at work here warrant further investigation. For example, how do teams with high levels of asymmetric distribution of awareness handle inherent conflict that might arise as a result of differing perspectives in route to agreement on what actions to take?

The study has several limitations that should be noted. First, the research context represents a limitation of the study. Using a simulation provides a controlled setting for the investigation of managerial cognition yet limits the generalizability of the findings. As such the managerial implications should be taken with caution until further investigation of these constructs can be conducted in field settings and the findings replicated in even more realistic arenas. Also, while an uneven number of team members is more reflective of reality, it forced us to use the team mean score rather than the overall score. The single point-in-time method of data collection is another limitation of this study. The data for the present study was collected one time following the midpoint of the simulation exercise. This form of data collection assumes that high levels of team market awareness and team agreement in time period  $T$  were present in  $T - 1$  and will remain high in periods  $T + 1$ ,  $T + 2$  and so on. This static model fails to account for changes in market awareness, symmetry of distribution of market awareness and tactical constructs over time.

## Appendix A

Sample questions (the entire list is not publishable due to copyright issues with Innovative Learning Solutions, the developer of the *Marketplace* simulation, but available upon request).

### Sample market awareness questions

#### Perception examples

Which firm had the lowest average production cost across all brands?

Which market region contributed the most to the firm's bottom-line profitability?

#### Comprehension examples

Our ability to compete on price was a (strength or weakness)?

Our aggressiveness in hiring new sales representatives was a (strength or weakness)?

#### Prediction

Which firm will have the lowest average price in the next quarter?

Which firm will have the greatest fixed capacity in the next quarter?

Our ability to compete on price will be (strength or weakness) in the next quarter?

### Sample tactical agreement questions

#### Marketing example...

When it comes to R&D, we should...

- ( ) Invest in a limited set of R&D projects that will provide high returns over the remaining quarters
- ( ) Invest heavily in a wide range of new technologies
- ( ) Partner with competitors to share development costs at the risk of giving away our future strategies and tactics
- ( ) Both invest heavily and partner with other firms to maximize the technologies available for our products

#### Manufacturing example...

When it comes to managing production, we should...

- ( ) Aggressively pursue lean, flexible manufacturing – invest heavily to minimize changeovers
- ( ) Improve efficiency by limiting the number of brands
- ( ) Reduce brand features in order to lower per unit production costs

#### Sales management example...

When it comes to opening new sales offices, we should...

- ( ) Focus on the markets which have the greatest sales potential but with increased risk of high competition
- ( ) Focus on markets that economize operating, shipping and marketing costs
- ( ) Focus on smaller markets that may minimize competition

#### Accounting/finance example...

When it comes to debt, we should...

- ( ) Minimize debt to reduce financial dependence & interest
- ( ) Maximize leverage (debt) to take advantage of opportunities at the end of the quarter
- ( ) Use debt only as insurance when financial projections suggest that there is some risk that we may run out of cash

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