Attainment discrepancy and investment: Effects on firm performance

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ABSTRACT

Although the behavioral theory of the firm posits that performance shortfalls trigger problemistic search, the actual performance consequences of problemistic search remain an open question. We argue that certain cognitive, affective, and behavioral mechanisms triggered by performance shortfalls make managers more aware, attentive, motivated, and disciplined, resulting in adaptation, learning, and enhanced firm value. Furthermore, differences in the extent to which managers feel pressured to adapt, and have the ability to adapt, can shape managerial awareness, motivation, and capability, and hence firm value. Our empirical analysis, using data for a sample of US manufacturing firms (1994–2013), confirms that problemistic search enhances firm value, and this association is strengthened when firms face greater pressure to adapt or have a greater ability to adapt.

1. Introduction

Rational choice paradigms in economics propose that managers make strategic investments based on a rational profit-maximizing calculus, and therefore view performance feedback as largely irrelevant to resource allocation and change in organizations. In contrast, a significant body of work on the behavioral theory of the firm (BTF) identifies attainment discrepancy (i.e., performance below aspiration) as a central driver of strategic investment (Greve, 2003a), theorizing that negative feedback draws attention to problems and motivates managers to engage in 'problemistic search' for solutions with a view to closing the performance-aspiration gap (Cyert & March, 1963; Greve, 2003a). This work implicitly assumes that problemistic search triggered in response to negative performance feedback facilitates adaptation that closes the performance-aspiration gap by improving future performance (Cyert & March, 1963; Greve, 2003a; Posen, Keil, Kim, & Meissner, 2018). However, despite extensive research in BTF on how performance-feedback shapes problemistic search in the form of strategic resource allocation and change in organizations (Greve, 2003a), prior research has not explicitly examined if strategic investment under attainment discrepancy indeed enhances future performance, as envisaged in the BTF.

This is a significant omission, as behavioral scholars have long held that problemistic search enhances adaptation and creates firm value and have called for research that investigates this critical premise of the BTF. Greve (2003a: 39), for example, notes that the BTF has important

implications for firm performance, stating how "(a)spiration levels have both direct behavioral consequences such as risk-taking or innovations and outcome consequences such as the performance or survival that results from making appropriate changes." Similarly, Iyer and Miller (2008: 819) call for research that studies this relationship, stating that "the effects on shareholder value of corporate responses to performance feedback may differ depending on firms' behavioral motivations. A key issue for future research is whether managers responding to performance feedback make value-enhancing investment decisions."

This question also has important implications for our knowledge and understanding of problemistic search. Problemistic search is defined as search undertaken when firm performance drops below aspirations in order to identify and resolve problems and raise performance levels to (at least) the aspiration level (Cyert & March, 1963). It typically involves strategic investments in R&D (Chen & Miller, 2007), mergers and acquisitions (Iyer & Miller, 2008), and capital expenditures (Greve, 2003b). Problemistic search, while intended to do so, may not always lead to performance enhancement. Instead, when performance drops below aspirations, firms may simply reduce their aspiration levels or shift attention to alternate goals (Cyert & March, 1963). Given the uncertain performance effect, the performance implications of problemistic search remains an open question. As the canonical issue in strategic management relates to the determinants of firm performance (Porter, 2008), we seek to address this open question by studying the direct performance effects of problemistic search.

Furthermore, as firms are likely to differ in the extent to which

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problemistic search yields performance improvements, we explore contingencies that moderate the association between problemistic search (i.e., search under conditions of attainment discrepancy) and performance. Specifically, we explore boundary conditions that make performance improvements more or less likely to happen, such as when firms face greater pressure to adapt (due to industry conditions such as lower growth, higher R&D, lower shareholder returns, higher stock price volatility and moderate-to-high product market competition) or have a greater ability to adapt (as indicated by nimbleness afforded by firm size and age, and buffers provided by slack resources).

To address our focal research question of whether problemistic search has performance consequences, we draw on analogous research on stretch goals (see Sitkin, See, Miller, Lawless, & Carton, 2011) by arguing that performance shortfalls motivate adaptive behavior through problemistic search to improve performance. Specifically, problemistic search triggers certain cognitive, affective and behavioral changes that make managers more aware, motivated, and disciplined in undertaking strategic investments when performance drops below aspirations. To explore the boundary conditions for our main hypothesis, we draw on the awareness/motivation/capability (AMC) framework in the strategy literature (Chen, 1996; Chen, Su, & Tsai, 2007) to explain how a firm's external strategic context can further motivate managers by imposing pressures to adapt, and how the firm's internal strategic context can shape the manager's ability to adapt. We propose that the positive relationship between problemistic search and performance will be strengthened when firms face pressures to adapt or have the ability to adapt.

Using a sample of US firms between 1994 and 2013, we find strong support for the hypothesis that problemistic search enhances firm performance. In addition, our results indicate that this effect is strengthened when firms face greater pressure to adapt or have a greater ability to adapt. Our study makes an empirical contribution to the BTF literature by documenting the performance consequences of problemistic search that is undertaken under conditions of attainment discrepancy. From a practical perspective, it enables a better understanding of how aspirations can be used to motivate managers and improve performance, and how specific boundary conditions can inform a firm's strategic direction to further enhance value.

2. Theory and literature review

Cyert and March (1963) developed the BTF to explain decision-making in firms. They conceive of organizations as a coalition of individuals which includes various stakeholders such as managers, employees, customers, suppliers, owners, etc., each with different goals and demands. Bargaining and negotiations lead to the emergence and shifting of dominant coalitions. Organizational goals with respect to profits and sales are formed through bargaining among coalitions. Sequential attention to goals and decision rules are used to resolve conflicts and avoid uncertainty. The BTF also proposes that individuals are not rational decision-makers who can foresee all possible contingencies and make optimal, profit-maximizing choices, but are boundedly rational actors with narrow attention spans, limited information-processing capabilities, and cognitive biases that lead them to 'satisfice' rather than 'maximize' by choosing acceptable alternatives that nevertheless fulfil their immediate goals (March & Simon, 1958).

Behavioral theory posits that firms engage in problemistic search, an implication that has been extensively studied (see Posen et al., 2018, for a recent overview). Firms form aspirations about the desired level of performance. Actual performance that falls short of aspirations is indicative of a problem that induces firms to initiate problemistic search for solutions. Problemistic search is distinct from other forms of search that are not driven by performance feedback, such as institutional search that is undertaken as part of a regular strategic planning activity embedded in a firm's routines and processes, or slack-based search that arises from the presence of excess resources (Greve, 2003a).

Problemistic search is initially directed locally but can evolve to explore more distant possibilities until the problem is solved and performance is raised to aspiration levels, at which point problemistic search is terminated. Alternatively, if problemistic search fails to address the problems, it will not yield performance enhancements and search is terminated by lowering aspiration levels or shifting attention to a different goal (Posen et al., 2018). Thus, performance feedback has two implications. First, it has implications for the antecedents of problemistic search, i.e., the initiation of search when performance drops below aspirations. Second, it has implications for the consequences of problemistic search, i.e., whether or not search undertaken in response to performance gaps results in higher performance.

Considerable research has addressed the antecedents of problemistic search (Posen et al., 2018). Performance relative to aspirations has been shown to influence problemistic search processes such as R&D intensity (Chen, 2008; Chen & Miller, 2007; Greve, 2003a), new product introductions (Gaba & Joseph, 2013), new partner selection (Baum, Rowley, Shipilov, & Chuang, 2005), corporate acquisitions (Iyer & Miller, 2008), capital allocation (Arrfelt, Wiseman, & Hult, 2013; Arrfelt, Wiseman, McNamara, & Hult, 2015) and divestitures (Kolev, 2016). Furthermore, performance feedback has also been shown to have behavioral consequences such as risk-taking (Audia & Greve, 2006; Lim & McCann, 2013), organizational learning (Levitt & March, 1988), and strategic change (Kacperczyk, Beckman, & Moliterno, 2015; Park, 2007). This work relates performance relative to aspirations to search and provides evidence that problemistic search increases as performance falls further below aspirations, and is reduced as the gap is closed.

The performance consequences of problemistic search, however, remain an open question. Strategy scholarship has extensively studied the relationship between various indicators of search (such as R&D investments, mergers and acquisitions, capital investments, and risk-taking) and firm performance. Research has shown that R&D (Chan, Lakonishok, & Sougiannis, 2001) and capital investments (Kerstein & Kim, 1995) lead to higher performance, while acquisitions (Jensen & Ruback, 1983; Laamanen & Keil, 2008) and risk-taking (Bowman, 1980; Nickel & Rodriguez, 2002) are associated with lower performance. However, "because problemistic search is hard to disentangle from alternative search processes (slack and institutionalized search) in empirical studies" (Posen et al., 2018, p. 220), it is hard to draw any inferences from aggregated studies of relationships between indicators of search and firm performance as to whether or not *problemistic* search enhances subsequent performance.

Similar problems arise in inferring the performance consequences of problemistic search from evidence on the stopping of problemistic search. According to the BTF, problemistic search may be stopped for three reasons: 1) performance rises above aspirations; 2) aspiration levels are reduced to match current levels of performance; or 3) goals are shifted to a different parameter in which firms are no longer below the aspiration level (Posen et al., 2018). Given the variety of reasons for ending search, empirical evidence that problemistic search is reduced when performance exceeds aspirations provides no guidance as to whether or not problemistic search under attainment discrepancy successfully raises performance. In a review of the studies on problemistic search, Posen et al. (2018) note that there is no direct evidence linking problemistic search to performance in the organizational context.[1] We

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[1] Caplin, Dean, and Martin (2011), the one direct test of stopping, focuses on the individual level of analysis. However, because BTF is a theory about decision making at the firm level, the usefulness of this study in directly explaining the performance implications of problemistic search in firms is limited. At the firm-level, while various studies (e.g., Bromiley, 1991; Fiegenbaum, 1990; Gaba & Bhattacharya, 2012; Greve, 1998, 2007; Miller & Leiblein, 1996; Park, 2007; Posen & Chen, 2013; Wiseman & Bromiley, 1996) collectively provide some general insights on the performance implications of problemistic search, none conduct a direct test that relates problemistic search with subsequent financial performance.

therefore extend this line of research by empirically examining whether, under conditions of attainment discrepancy, investment in problemistic search enhances firm value. In doing so we argue that performance shortfalls can serve as a cue that makes managers more aware of the problem at hand, and therefore motivates more efficient investment choices that promote adaptation, learning and firm performance.

Additionally, we explore boundary conditions in terms of contingencies that moderate this relationship. In choosing our contingencies we rely on fairly universal considerations in the strategy literature, namely how managerial decisions typically reflect some combination of external pressure (which generates opportunities and threats) and internal capabilities (strengths and weaknesses), with the goal of attaining sustainable competitive advantage.[2] We draw on the AMC framework in strategy (Chen, 1996; Chen et al., 2007) to explain that attainment discrepancy enhances managerial *awareness* of performance shortfalls and, along with other sources of pressure from the firm's external context, boosts *motivation* to close the performance-aspiration gap. Furthermore, although awareness and motivation are very important, it is equally imperative to examine if a firm's internal strategic context (e.g., firm resources) bestows on managers the *capability* to make prudent investment choices. In sum, for a strategic action to yield returns, managers must be aware of the problem/opportunity, be motivated to act, and also have the capability to act. Therefore, motivated by the AMC framework, we look at how the firm's external strategic context puts pressures to adapt, while the firm's internal strategic context shapes the manager's ability to adapt, thereby serving as important boundary conditions for the performance effects of problemistic search.

3. Hypothesis

3.1. Performance consequences of problemistic search

Problemistic search is motivated by problems identified when performance drops below aspirations and is conducted with a view to raising performance to the aspiration level by identifying and solving the underlying problems. Unlike other forms of search that are not responsive to performance below aspirations (i.e., institutional search which is undertaken as part of the regular strategic planning activity embedded in a firm's routines and processes, or slack-based search which arises from the presence of excess resources), problemistic search is governed solely by attainment discrepancy, increasing in intensity as performance drops further below aspirations (Greve, 2003a).

Research on stretch goals (Sitkin et al., 2011) provides a useful analogy to understand the effects of problemistic search under attainment discrepancy on firm performance. Sitkin et al. (2011) argue that stretch goals, by "forcing a substantial elevation in collective aspirations" (p. 545), widens the gap between actual performance and aspiration, and this eventually leads to higher learning and enhanced performance. Admittedly, because stretch targets represent more ambitious, difficult and novel aspirations, it will likely lead to a greater gap between performance and aspiration, and could therefore engender search processes that are different from problemistic search, Nonetheless, stretch targets and aspirational targets are analogous in that they both involve a gap or shortfall that spurs managers to close the gap due to the operation of certain cognitive, affective and behavioral mechanisms.

The cognitive mechanism would suggest that as performance drops

below aspirations, it provides a jolt that serves as a wake-up call for managers, making them increasingly aware and mindful of the problems at hand, and refocusing attention on how to close the performance-aspiration gap through adaptive firm behaviors such as problemistic search. In undertaking such search, firms may, for example, go beyond extant routines and procedures and explore newer ways of learning and adaptation (e.g., Levinthal & March, 1981; March, 1991). Indeed, the greater the gap, the higher the awareness and attention, and more intense and/or innovative the search procedure (e.g., Greve, 1998). Thus, while initially search is undertaken locally in the vicinity of the problem using simple decision rules, more complex and distant search is undertaken as the performance-aspiration gap widens and simple rules no longer work. In sum, performance shortfalls trigger managerial cognition that transforms these novel or alternative routines into capabilities that can better exploit performance-enhancing opportunities.

Affect influences critical organizational factors such as creativity (e.g., Amabile, Barsade, Mueller, & Staw, 2005), decision-making (e.g., Isen, 2001) and performance (e.g., Wright, Cropanzano, & Meyer, 2004). Managers and organizations facing performance shortfalls have an enhanced motivation to improve performance, and therefore bring a lot of energy, enthusiasm and initiative to the process of problemistic search, especially in terms of alternative routines and capabilities focused on closing the gap between aspiration and performance.

Behaviorally, because problemistic search under conditions of attainment discrepancy is aimed specifically at improving performance, it entails resource allocation based on "coherent action strategies" (p. 550; Sitkin et al., 2011) that managers execute with effort and persistence. Additionally, performance below aspiration fosters discipline in managers apprehensive of adverse scrutiny and censure from the boards of directors, investors, and creditors (Desai, 2016). Managers will become aware that close scrutiny may impose significant personal costs on them such as reduced compensation, loss of reputation, and, in extreme cases, termination of employment. To avoid these costs, managers will make prudent investment choices aimed at closing the performance-aspiration gap.

Taken together, we predict that, as performance falls below aspirations, managers, who are now more aware, attentive, motivated, hard-working and disciplined, will make efficient investment choices that result in adaptation, learning and enhanced firm value. Thus, the greater the performance-aspiration gap, the more focused the manager, and more efficient the resource allocation. Accordingly, we propose that investments in search undertaken when performance is below the aspiration (i.e., problemistic search) will benefit firm performance.

H1. Problemistic search enhances firm performance.

3.2. Moderators

3.2.1. Pressure to adapt

As performance falls below aspirations, a firm's strategic context can impose additional competitive pressures, further motivating the manager to make prudent search decisions. When firms are relatively insulated from competitive forces, they face less pressure to adapt, but when competitive forces are strong, there is heightened pressure to adapt when firms fall short of performance aspirations (Barnett, 1997). When firms operate in industries with relatively low growth, it can be harder to regain lost ground given the lower level of available investment opportunities, thereby amplifying the pressure to adapt (Wiersema & Bowen, 2008). Furthermore, when firms face considerable product market competitive rivalry, they are likely to feel more pressure when they underperform (Giroud & Mueller, 2011). Enhanced competition in general engenders an intense rivalry for resources. With increased struggles to attract customers, suppliers and employees away from the competition, managers of firms in competitive industries are under constant pressure to improve efficiency in order to survive. Thus,

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[2] For example, in their review of the contingencies for the diversification-performance relationship, Ahuja and Novelli (2017) classify the contingencies into (a) characteristics of the industry/market in which the firm operates (e.g., industry profitability, business cycles, industry life cycles) and (b) characteristics of the firm (e.g., organization structure, compensation strategy, debt-equity ratio, etc.).

higher competition provides strong motivation and incentives for managers to work harder to rectify the negative attainment discrepancy by improving firm performance.

Competitive pressures can be manifested in a variety of contexts. For example, these pressures can be accentuated in industries where firms generally compete on the basis of R&D (Chen, Katila, McDonald, & Eisenhardt, 2010), which are complex and uncertain (Deb, David, & O'Brien, 2017), and where laggards find it harder to catch up. Similarly, firms operating in dynamic and volatile markets, where future profitability and stock price movements are hard to predict, can face considerable pressures to adapt to the rapidly changing environment. Finally, firms operating in industries with typically low shareholder returns may face pressures from analysts and investors to ensure above-industry returns to their shareholders in order to avoid a drop in share prices. In contrast, when firms are in more munificent environments with higher industry growth, fewer competitors, lower R&D-based competition, lower price volatility, and higher shareholder returns, there is much less urgency to adapt. Thus, we propose that firms differ in the extent to which they face pressures to adapt during performance shortfalls, and the more intense these pressures, the more likely that problemistic search will enhance future performance. Hence, we predict:

H2. Problemistic search enhances performance to a greater extent when firms face higher pressures to adapt.

3.2.2. Ability to adapt

As performance falls below aspiration, a firm's strategic context can provide managers with a higher ability to adapt. We consider two factors that enhance the ability to adapt: slack, and agility or nimbleness. Because slack can foster adaptation and provide the resources necessary to create strategic options (Deb et al., 2017; Kim & Bettis, 2014), we further argue that slack shapes managerial capabilities and moderates the performance consequences of problemistic search under attainment discrepancy. These strategic options provide flexibility to the manager and include the ability to undertake search through resource-consuming actions such as boosting experimentation (Bourgeois, 1981; Nohria & Gulati, 1996), making acquisitions feasible (Iyer & Miller, 2008), and enabling growth-orientated risk-taking (Wright, Ferris, Sarin, & Awasthi, 1996). Slack resources arise from available slack (access to highly liquid assets like cash, stock and marketable securities), absorbed slack (resources that have been invested in short-term expenses and assets that can be recovered and redeployed), and potential slack (access to new capital in the form of debt or equity) (Bourgeois & Singh, 1983).

In addition to slack, firms also differ in the extent to which they are agile and nimble in their responsiveness to environmental changes (Nayyar & Bantel, 1994). Younger firms are generally less constrained by routines, processes and structures, and are therefore more flexible and nimble in their operations (Kotha, Zheng, & George, 2011). Likewise, smaller firms are generally associated with reduced bureaucracy and centralized decision-making, resulting in nimble organizations whose managers are therefore bestowed with a higher capability to adapt in response to emerging performance shortfalls (Roberts & Grover, 2012). Thus, we predict:

H3. Problemistic search enhances performance to a greater extent when firms have higher ability to adapt.

4. Methods

4.1. Data and sample

We collected data for all publicly-traded US manufacturing firms (SIC codes 2000–3999) in the COMPUSTAT North America database between 1994 and 2013. Manufacturing firms are chosen because the

variables that encompass risky strategic investment relate most directly to such firms (Chen, 2008; Lim & McCann, 2013; Martin, Gomez-Mejia, & Wiseman, 2013). These variables, discussed in detail below, are R&D spending, capital investment and acquisition expenditure. The COMPUSTAT data are supplemented with data from the following databases: Securities Data Corporation (SDC) Mergers & Acquisitions, Center for Research in Security Prices (CRSP), Business Segments, and the 13f filings within Thomson Reuters. Because our study examines the effects of strategic investment under performance discrepancy on future performance, we employ a lagged model structure in which all explanatory and control variables are lagged by one year, an approach similar to Sanders and Hambrick (2007). The sample comprises 3929 firms over 1994–2013 for a total of 27,984 firm-year observations.

4.2. Dependent variable

Our dependent variable is firm performance. Given our focus on how investment in search influences future performance, we measure performance using *Tobin's q*, a forward-looking performance metric that reflects the value investors assign to the firm, and one that is less susceptible than accounting measures to discretionary choices (Barney, 1997). It is also worth noting that investments to improve performance can take varying lengths of time to pay off. Tobin's *q* is therefore an appropriate measure as it embodies the future performance expectations of analysts and investors and should reflect the expected value-added from investment irrespective of the number of years needed for payoff.

Tobin's *q* is measured as the market value of a firm's assets relative to replacement costs. Given the difficulties in estimating replacement costs, we follow common practice and use the market-to-book (M/B) ratio as a proxy for Tobin's *q* (Richard, Devinney, Yip, & Johnson, 2009). The numerator denotes the firm's market value, defined as the book values of long-term debt and debt in current liabilities plus the market value of equity plus preferred stock liquidation value minus deferred taxes and investment tax credit. The denominator is the book value of the firm's assets. Following precedence (Alti, 2006; Gatchev, Pulvino, & Tarhan, 2010) we use fiscal year end prices instead of calendar year end prices to compute the market value of the firm.

4.3. Explanatory variables

Problemistic search typically involves strategic investment in R&D (Chen & Miller, 2007), capital expenditures (Greve, 2003b), and mergers and acquisitions (Iyer & Miller, 2008). Following prior studies (Sanders & Hambrick, 2007; Zhu & Chen, 2014), we measure *Investment* in search with the natural logarithm (after adding the constant one) of the sum of investment spending on R&D, capital expenditures, and acquisitions. The R&D and capital investment values are obtained directly from COMPUSTAT, while acquisition expenses are "measured as the sum of the transaction values for all acquisitions completed during the year, as reported in SDC" (Sanders & Hambrick, 2007: 1064). Missing values for all three variables are replaced with zero (Celikyurt, Sevilir, & Shivdasani, 2010; Hall, 1993).

To measure performance relative to aspiration, we follow earlier work (Arrfelt et al., 2013; Greve, 2003b), and use return on assets (ROA) as our measure of current operating performance, where ROA is measured as operating income before depreciation divided by total firm assets. To construct the variable, we first develop a proxy for the aspiration level (AL). Recent studies argue that historical and social aspirations differ fundamentally in terms of nature and impact, and that the two measures should not be combined (Bromiley & Harris, 2014; Lucas, Knoben, & Meeus, 2018). More importantly, recent studies argue that social aspirations, rather than historical aspirations, provide the central, baseline performance feedback that managers are more likely to respond to. Thus, Tarakci, Ateş, Floyd, Ahn, and Wooldridge (2018) "develop and test hypotheses suggesting that social aspirations are

more important drivers of divergent strategic behavior than historical aspirations" (pp. 1140) and that "managers are more likely to heed social rather than historical aspirations when unit performance is below aspirations" (pp. 1142). They argue that, unlike historical aspirations, performance feedback provided by social aspiration levels "leaves less room for self-enhancing interpretations justifying poor performance while boosting managerial self-esteem and self-efficacy when performance exceeds social aspirations" (pp. 1140). Similarly, Kacperczyk et al. (2015: 233) assert that it is "…well established that social referents external to the firm are the central source of feedback about organizational problems", while Kim, Finkelstein, and Haleblian (2015: 1365) suggest that "…managers first focus on social aspirations as this constitutes the baseline performance level ("how well they should perform") before they attend to other performance benchmarks".

Social aspiration (SA), which is the mean ROA of all firms excluding the focal firm in the focal firm's industry (Greve, 2003b), is therefore used as a proxy for the AL, with industry being defined at the four-digit SIC level. AL is then deducted from actual ROA to construct the variable *Performance – Aspiration (P-A)*. Next, a second variable (*Performance > Aspiration (P > A)*) that equals ROA – AL if ROA > AL, and 0 otherwise, is constructed for a spline regression that ascertains if the slope of the relationship is different depending on whether ROA is above or below the aspiration level.

For the split sample analysis, we also define the following additional variables. *Industry R&D intensity* is the mean R&D intensity of all firms in the focal industry (Gentry & Shen, 2013). *Industry growth* is the mean growth rate of firms in the industry ('firm growth' is defined below). *Product market competition* is operationalized using the Herfindahl Index, which is the sum of squared market shares (based on sales) of firms in an industry (Giroud & Mueller, 2011). *Industry stock price volatility*, which reflects the variability or uncertainty in the long-term performance expectations of firms in that industry, is computed as the mean industry volatility, where a firm's stock volatility is the annualized standard deviation of daily stock returns (Cohen, Dey, & Lys, 2013). *Industry shareholder returns* is the mean return to shareholders for firms in the focal industry, where total shareholder returns are calculated as year-end stock price minus year-start stock price, plus dividends paid, all divided by year-start stock price (Sanders & Hambrick, 2007). *Firm age* is proxied by (one plus) the number of years since the firm first appeared in COMPUSTAT (Hale & Santos, 2009).

We measure *firm size* as the natural logarithm of the total number of employees.

When the dependent variable is Tobin's q, the log of employees is a more prudent measure of firm size than the log of assets or sales (Kim & Bettis, 2014; Vomberg, Homburg, & Bornemann, 2014). As Kim and Bettis (2014: 2059) argue, "(h)aving already used total assets to scale Tobin's q, using total assets again as the proxy for size may introduce a spurious statistical relation between Tobin's q and size", and that a "similar issue may arise when we use sales as the proxy for size".

Next, we conceptualize and define organizational *slack* following the prior literature on slack (Bourgeois & Singh, 1983; Bromiley, 1991; Tyler & Caner, 2015). Accordingly, we classify slack into three categories: available slack, absorbed (or recoverable) slack, and potential slack. *Available slack* is defined as the current ratio, or the ratio of current assets to current liabilities. *Absorbed slack* is the ratio of selling, general, and administrative expenses to sales. *Potential slack* is the leverage ratio, or the ratio of total debt to total assets. To ensure that increasing values denote high potential slack, the leverage ratio is then subtracted from one.

4.4. Control variables

We use *lagged Tobin's q* to control for serial correlation among residuals that may arise out of performance persistence across years. *Diversification* is constructed from the COMPUSTAT Segments database using Palepu's entropy measure (Kang, 2013; Palepu, 1985). *Firm*

advertising intensity is defined as advertising expenditure scaled by sales, and all missing values are replaced with zeros. Following Brush, Bromiley, and Hendrickx (2000), we measure *firm growth* as the compounded annual growth rate in sales, calculated as the natural logarithm of $Sales_{J,T}$ divided by $Sales_{J,T-1}$ for firm J in year T. Earlier studies also find that ownership by large institutions is associated with risky search (Wright et al., 1996) and firm performance (David, O'Brien, Yoshikawa, & Delios, 2010), and thus we control for *institutional ownership*, defined as the proportion of total shares outstanding that is owned by institutions.[3]

Distance from bankruptcy may inform the kind of strategic investments in R&D (Chen & Miller, 2007) and M&A (Iyer & Miller, 2008) pursued by a firm, with implications for firm risk and returns. Threat of bankruptcy is measured using Altman's Z (Altman, 1968, 1983), a commonly-used measure (Chen & Miller, 2007). Z is calculated as: (1.2 × working capital / total assets) + (1.4 × retained earnings/total assets) + (3.3 × income before interest expense and taxes/total assets) + (0.6 × market value of equity/total liabilities) + (1.0 × sales/ total assets). Firms with Z-scores below 1.81 are classified as financially distressed, and an indicator variable is created assigning a value of 1 to distressed firms, and 0 otherwise (Eisdorfer, 2008; Iyer & Miller, 2008). We also control for *industry Tobin's q* using the mean value of the dependent variable at the four-digit SIC level. Finally, we control for *year fixed effects* to account for unobserved heterogeneity across time.

4.5. Analyses

Fixed-effects or random-effects models are commonly used in panel data analysis, since "(p)anel data models estimated with ordinary least squares (OLS) often experience problems with heteroscedastic error terms and autocorrelation, which can lead to biased and inconsistent results" (Martin et al., 2013: 460). Both Hausman (1978) and Mundlak (1978) specification tests confirmed the superiority of fixed effects models over random effects (p < 0.001), and we therefore employ fixed effects models in the regressions. Furthermore, the lagged dependent variable is included as a control variable in all models to account for potential first-order autocorrelation in our panel dataset (as suggested by Greene, 2003), and hence we run 'dynamic' fixed effects models (see also, Barnett & Salomon, 2012; Gentry & Shen, 2013). Next, an examination of the variance inflation factors (VIFs) confirms the absence of multicollinearity in our dataset (all VIFs are < 3.89, and only two VIFs exceed 1.5). To ameliorate the effects of outliers without dropping observations, we winsorized the following variables at the 1st and 99th percentiles of their distributions: available slack, potential slack, ROA, R&D intensity, advertising intensity and institutional ownership. For Tobin's q, there were more extreme outliers, and so we winsorized the distribution at the 98th and 2nd percentiles. Winsorizing Tobin's q using higher percentiles is consistent with current studies (Miller, Xu, & Mehrotra, 2015). Cook's distance tests confirmed that after winsorizing, no outlier has a statistically significant impact on the models.

Next, we address the issue of endogeneity which could arise from omitted variables that influence both the dependent variable and one or more independent variables (Woolridge, 2006). Similarly, while we study the effects of investment in search on subsequent performance, prior performance can also influence investment, resulting in endogeneity due to simultaneous causality. Our models ameliorate the impact of endogeneity by including (a) the lagged dependent variable (O'Brien & Folta, 2009) and (b) firm fixed effects. However, while the firm fixed effects approach can account for time-invariant omitted

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[3] Institutional investors are entities such as banks, insurance companies, investment companies (mutual funds), investment advisors (e.g. large brokerage firms), pension funds and university endowments that invest funds on behalf of others and manage at least $100 million in equity (Gompers & Metrick, 2001).

variables, it cannot control for omitted variables that vary over time. We therefore employ another model using two-stage least square (2SLS) estimations with instrumental variables applicable to fixed effects, panel data models (specifically, the 'xtivreg2' command in STATA) as our *baseline* model.

Investment in search, our explanatory variable, is potentially endogenous because firm-specific omitted factors such as prior experience in doing problemistic search or the prior success rate of investments made in search, might be correlated both with current investment in search and with the potential performance consequences of that search. To address these potential endogeneity issues, we employ two-stage least squares (2SLS), the most common IV estimator. We choose two instruments (average industry investment and average industry diversification) based on theoretical and statistical considerations. Theoretically, choosing industry-level variables as instruments ensures instrument exogeneity, meaning that the instruments are less likely to be correlated with the typically firm-level omitted variables in the error term. All instruments also have to be relevant, implying that there should be a strong fit between the endogenous regressor ('investment') and the instruments. The first instrument, average industry investment, is typically highly correlated with the investments made by individual firms in that industry (r = 0.56, p < 0.001, in our sample).

For our second instrument (industry diversification) it is well-established that diversification of product lines typically takes place either through investments in inorganic growth modes like M&A, or through organic growth modes that involve capital expenditures on creating new projects or business units, repurposing an existing business unit, etc. Therefore, there is likely to be a strong correlation between the degree of diversification in an industry and the investments made by firms in that industry in terms of capex, M&A, etc. (r = 0.12, p < 0.001, in our sample). Since both instruments are likely to be highly correlated with investment, the endogenous regressor, there is high instrument relevance. We also conduct a Sargan test to statistically validate instrument relevance and find both instruments to be valid (p > 0.05).

4.6. Split sample analysis

To test Hypotheses 2 and 3, we use split sample analysis. We use five proxies to represent the pressure to adapt: industry R&D intensity, industry growth, product market competition, industry stock price volatility and industry shareholder returns. For Hypothesis 3, pertaining to the firm's ability to adapt, we use another set of five proxies: available slack, absorbed slack, potential slack, firm age and firm size. For each proxy variable used to test Hypotheses 2 and 3, a median split creates two sub-samples, one high and one low. The regression for the main model (see Table 2 Model 3) is then run across both sub-samples for each proxy variable. Next, a Z-test is conducted to assess if the statistical difference across sub-samples is significant.

5. Results

Table 1 presents the descriptive statistics for our sample. Table 2 presents both the dynamic fixed effects (Model 2) and the dynamic fixed effects 2SLS–IV (Model 3) regression results regarding the effects of investment under attainment discrepancy on firm performance (i.e., Hypothesis 1). Table 3 presents the results of the split sample analyses pertaining to Hypotheses 2 and 3. In Table 2, the control and explanatory variables are entered in Model 1, the interaction terms are added in Model 2, and the 2SLS results are shown in Model 3 (our main model). Among the control variables, *firm size* is found to be negatively associated with Tobin's q (p ≈ 0.000), consistent with prior research (Welbourne & Andrews, 1996). Interestingly, *potential slack* has a large, negative association with q (p ≈ 0.000). This suggests that investors assign higher values to firms with higher debt levels, presumably because debt induces discipline and prudence in investment decisions by

managers (Titman & Wessels, 1988).

In Models 1 and 2, the main effect of *Investment* on performance is strongly negative (p ≈ 0.000), suggesting that investment in search generally reduces returns. This implies that unless incentivized by internal benchmarks (e.g., aspirations) or prodded by the external environment (e.g., pressure to adapt), strategic investments undertaken by managers run the risk of reducing future performance. This, however, must be read with the fact that the relationship is no longer statistically significant in the endogeneity-corrected baseline model, i.e., Model 3. In both Models 2 and 3 in Table 2, the interaction term for *Investment x P-A* is negative (p ≈ 0.000) while that for *Investment x P > A* is positive (p ≈ 0.000).

To facilitate interpretation of the interaction results and to display the effect sizes, we plot these relationships in Fig. 1, Panels A and B (based on Model 3). As the figure in Panel A illustrates, for a firm that makes low investments in search, future expected performance increases only modestly as current performance falls further below the aspiration level. However, consistent with Hypothesis 1, high investment in search has a very sharp and economically significant positive impact on Tobin's q for firms performing below the aspiration level, and even results in expected future performance exceeding that of firms that are currently performing above aspirations. To illustrate, when performance is below aspiration and investment is at its median value, a change in *P-A* between the 25th and 75th percentiles causes an increase in Tobin's q equivalent to about 31% of mean q. When investment is in the highest quartile, this increase is about 53%, but only about 12% when investment is in the lowest quartile. Remarkably, performance relative to aspiration does not meaningfully moderate the returns to investment in search when performance is above aspiration. Panel B depicts the same relationships from a different perspective: it considers only firms whose performance is below aspiration, and shows how, as investment increases, a high-performance shortfall (90th percentile) induces a much sharper increase in predicted performance than a low-performance shortfall (10th percentile).

In Table 3, we report the split sample analysis results for Hypotheses 2 (Panel A) and 3 (Panel B). For both sub-samples corresponding to each of the ten proxies, we run the full fixed effects-IV model (i.e., the main model given in Table 2, Model 3), including all explanatory and control variables, and interaction terms. However, for brevity, we do not report the results for the control variables, which are broadly similar to what we reported earlier. Instead, we report the coefficient values and standard errors for the '*P-A x Investment*' and '*P > A x Investment*' interaction terms, along with the associated Z-statistics and p-values to show whether there is a significant difference in coefficient values of the interaction terms across the two sub-samples.

We mostly find strong support for both Hypotheses 2 and 3. Note from the main model in Table 2 that for problemistic search to improve performance, the coefficient for the '*P-A x Investment*' interaction term should be negative, while the coefficient for the '*P > A x Investment*' interaction term should be positive. Accordingly, from Table 3, Panel A we find that problemistic search enhances performance when firms face higher pressures to adapt arising from operating in industries with high R&D intensity, low growth, high stock price volatility, and low total shareholder returns. On the other hand, in industries with lower pressures to adapt, either the size of the coefficient is smaller or the coefficient sign is reversed, and these sub-sample differences are statistically significant (p ≈ 0.000) for all four proxies mentioned above. However, for the product market competition proxy, the sub-sample results based on a median-split are unclear. Hence, we conducted an additional analysis using this proxy.

Based on US government guidelines[4] on what constitutes a competitive industry, we divided the sample based on Herfindahl Index

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[4] See: https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#5c

Table 1
Descriptive statistics and correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
Tobin's *q*	1.78	2.26	1												
Firm size	1.17	1.20	−0.13	1											
Available slack	3.12	2.69	0.07	−0.32	1										
Absorbed slack	0.46	1.30	0.31	−0.16	0.11	1									
Potential slack	0.79	0.29	−0.24	−0.09	0.29	−0.11	1								
Diversification	0.14	0.26	−0.10	0.20	−0.11	−0.08	−0.03	1							
Firm advertising intensity	0.01	0.03	0.06	0.02	−0.01	0.08	−0.02	−0.06	1						
Firm growth	0.09	0.35	0.08	−0.02	0.00	−0.10	0.02	−0.03	0.01	1					
Institutional ownership	0.41	0.32	−0.05	0.26	0.03	−0.10	0.08	0.07	0.01	0.04	1				
Altman's Z	0.19	0.39	0.06	−0.08	−0.22	0.15	−0.34	−0.03	−0.01	−0.10	−0.22	1			
Industry Tobin's *q*	2.49	1.54	0.28	−0.17	0.13	0.19	0.03	−0.10	0.02	0.06	−0.01	0.05	1		
Investment in search	3.35	2.12	−0.07	0.83	−0.22	−0.12 2	−0.02	0.14	−0.01	0.05	0.41	−0.10	−0.04	1	
Perform. – aspiration	0.20	0.45	−0.25	0.08	0.09	−0.26	0.32	0.01	−0.03	0.09	0.17	−0.20	0.40	0.15	1
Perform. > aspiration	0.24	0.33	0.04	0.01	0.07	−0.04	0.08	−0.03	−0.01	0.06	0.11	−0.10	0.61	0.09	0.79 11

Notes: All means, standard deviations, and correlation values are based on the baseline sample (3929 firms and 27,984 firm-year observations). Statistically significant correlations ($p < 0.05$), using two-tailed tests, are in bold.

values of below 0.15 (unconcentrated industry), between 0.15 and 0.25 (moderately concentrated industry) and above 0.25 (highly concentrated industry). Expectedly, when the industry is highly concentrated (i.e., low competition; HI > 0.25) and there is little pressure to adapt, we do not find any support for Hypothesis 2. Interestingly, however, we find strong support for Hypothesis 2 in industries with moderate concentration ($0.15 \leq HI \leq 0.25$), but not in industries with very low concentration (i.e., very high competition; HI < 0.15). We surmise that when HI < 0.15, the very high pressure on firms to adapt might be cancelled out by their inability to adapt, given the intense rivalry for resources, something that is not true in industries with only moderate concentration/competition. Overall, with strong support for four proxies and partial support for a fifth, Hypothesis 2 is supported.

Panel B of Table 3 tests Hypothesis 3, and we find that when firms are

young or small in size, and therefore have greater ability to adapt due to nimbleness, problemistic search enhances performance (the coefficients for the below-median sub-samples for firm age and size are large, statistically significant ($p \approx 0.000$) and in the right direction). Problemistic search also enhances performance when firms have higher levels of absorbed slack. For available slack, the results are less clear. We therefore conducted additional analysis using a quartile split. We find that there is a statistically significant difference between the coefficients of the sub-samples for the highest and lowest quartiles, indicating that problemistic search enhances performance only at very high levels of available slack. Finally, we find that problemistic search enhances performance for firms with both high and low potential slack, and the difference in coefficient size is not statistically significant ($p > 0.05$). We speculate that potential slack, which is based on the firm's borrowing capacity, may not be as

Table 2
Fixed effects & fixed effects-2SLS regression results for investment under performance discrepancy on Tobin's q.

Variable	Fixed effects model (1) (Controls & explanatory variables)		Fixed effects model (2) (Model (1) + interaction terms)		Fixed effects-2SLS model (3) (Main model)	
	Coeff.	p-Value	Coeff.	p-Value	Coeff.	p-Value
Intercept	1.688	0.000	1.675	0.000	Na	
Controls						
Lagged Tobin's q	0.385	0.000	0.388	0.000	0.400	0.000
Firm size	−0.323	0.000	−0.311	0.000	−0.362	0.000
Available slack	0.002	0.761	0.003	0.610	0.008	0.132
Absorbed slack	0.054	0.000	0.047	0.000	0.012	0.400
Potential slack	−0.482	0.000	−0.529	0.000	−0.721	0.000
Diversification	−0.066	0.169	−0.068	0.157	−0.075	0.123
Firm advertising intensity	−0.067	0.905	−0.069	0.902	−0.383	0.508
Firm growth	0.046	0.108	0.038	0.183	0.001	0.963
Institutional ownership	−0.061	0.308	−0.051	0.398	−0.056	0.438
Altman's Z	0.065	0.047	0.044	0.181	−0.037	0.315
Industry Tobin's q	0.190	0.000	0.193	0.000	0.189	0.000
Explanatory						
Investment	−0.097	0.000	−0.091	0.000	−0.053	0.331
Performance – aspiration (P-A)	−0.218	0.000	0.141	0.058	1.685	0.000
Performance > aspiration (P > A)	−0.036	0.606	−0.181	0.078	−1.682	0.000
Interactions						
Investment x P-A			−0.372	0.000	−1.933	0.000
Investment x P > A			0.312	0.000	1.877	0.000
First stage F statistic					13.460	0.000
Chi-square (d.f. = 1) p-value					0.258	
Number of instruments					2	
F-value	207.37	0.000	198.04	0.000	188.68	0.000
Firm fixed effects	Yes		Yes		Yes	
N	27,984		27,984		27,397	

Notes: The dependent variable is firm performance measured using Tobin's q. The variables firm size, firm growth, and investment are logged. Model 3, the fixed effects-2SLS model, is used as the baseline. Year fixed effects are not reported for brevity. Unstandardized coefficients and two-tailed tests are used. The first-stage F statistic denotes the joint significance of the instruments.
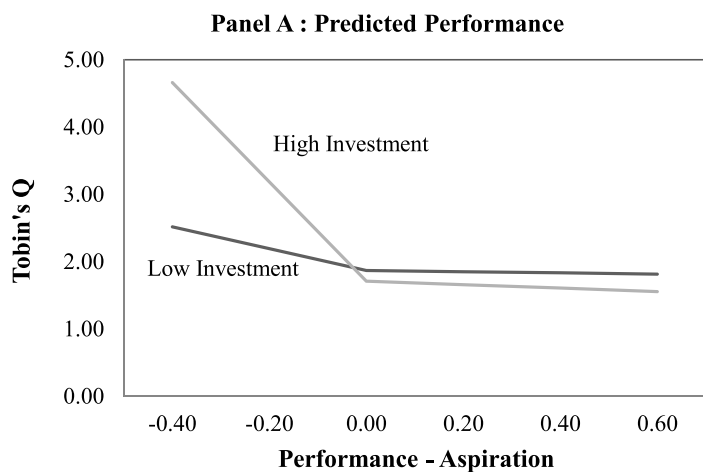
Table 3
The effects of moderators.

Panel A: How pressure to adapt moderates the performance effects of investment in search.

Variable	Interaction term	Regression 1 coeff. (high)	Standard error 1	Regression 2 coeff. (low)	Standard error 2	Z-stat (absolute value)	p-Value
Industry R&D intensity	P-A x Investment	−1.804	0.332	8.089	1.088	8.700	0.000
	P > A x Investment	1.720	0.345	−8.164	1.094	8.617	0.000
Industry growth	P-A x Investment	0.767	0.535	−5.257	0.718	6.731	0.000
	P > A x Investment	−0.869	0.542	5.238	0.728	6.728	0.000
Product market competition	P-A x Investment	0.901	0.237	0.417	0.164	1.680	0.093
	P > A x Investment	−0.945	0.239	−0.682	0.187	0.865	0.387
Industry stock price volatility	P-A x Investment	−1.147	0.409	0.157	0.160	2.974	0.003
	P > A x Investment	1.210	0.422	−0.197	0.162	3.114	0.002
Industry shareholder returns	P-A x Investment	−0.013	0.372	−3.600	0.550	5.406	0.000
	P > A x Investment	−0.050	0.378	3.550	0.555	5.363	0.000

Panel B: How ability to adapt moderates the performance effects of investment in search

Variable	Interaction term	Regression 1 coeff. (high)	Standard error 1	Regression 2 coeff. (low)	Standard error 2	Z-stat (absolute value)	p-Value
Available slack	P-A x investment	0.231	0.355	−0.689	0.345	1.858	0.063
	P > A x investment	−0.329	0.359	0.654	0.351	1.958	0.050
Absorbed slack	P-A x investment	−1.814	0.349	−0.031	0.151	4.695	0.000
	P > A x investment	1.802	0.366	0.002	0.153	4.538	0.000
Potential slack	P-A x investment	−1.097	0.327	−0.752	0.249	0.840	0.401
	P > A x investment	1.058	0.340	0.703	0.253	0.838	0.402
Firm age	P-A x investment	0.036	0.427	−2.790	0.344	5.153	0.000
	P > A x investment	−0.127	0.431	2.757	0.351	5.189	0.000
Firm size	P-A x investment	0.043	0.221	−1.852	0.339	4.679	0.000
	P > A x investment	−0.103	0.224	1.890	0.358	4.718	0.000

Notes: A median-split is performed. Regression 1 denotes 'above-median' values of the sample while regression 2 denotes 'below-median' values. Control variables are not reported for brevity.

	0	0	0	0.2	0.4	0.6	P>A
	-0.4	-0.2	0	0.2	0.4	0.6	P-A
Low Inv	2.5165	2.1928	1.8691	1.8505	1.8319	1.8133	
High Inv	4.6604	3.1851	1.7098	1.6578	1.6058	1.5538	

Fig. 1. In both panels, 'Low Investment' represents firms whose investments are in the 25th percentile while 'High Investment' represents firms that invested in search at the 75th percentile, and the y-axis depicts the predicted value of the dependent variable, as given by Model 3 of Table 2. In Panel A, the x-axis plots *Performance-Aspiration* from the 10th to the 90th percentile. In Panel B, only performance shortfalls are considered, and 'High Performance Shortfall' and 'Low Performance Shortfall' depict firms at the 10th and 90th percentiles of *Performance-Aspiration* for this truncated sample of firms with performance below aspiration. All other variables were held constant at their mean.

Panel A : Predicted Performance

beneficial to adaptation because a poorly performing firm may find it difficult to secure loans on satisfactory terms. Thus, with support for four of the five proxies, we find broad support for Hypothesis 3 that problemistic search enhances performance to a greater extent when firms have a higher ability to adapt.

6. Discussion

Research in economics views performance feedback as irrelevant to firm resource allocation. In contrast, BTF suggests that performance feedback acts like a "master switch" that regulates a range of organizational responses to problems, such as engaging in problemistic search (Greve, 2003a: 76). However, while the notion of performance feedback as an antecedent of organizational search processes remains popular, the consequences of performance-induced search have received limited scholarly attention. Conceptually, problemistic search (i.e., search under attainment discrepancy) could either facilitate adaptation and improve performance or it could result in revised goals based on lower aspiration levels, or attentional shifts, in which case it fails to improve performance (Cyert & March, 1963). BTF scholars have

therefore called for research that directly tests the performance implications of problemistic search (Iyer & Miller, 2008). Our study heeds this call and shows that investment in search, triggered by performance shortfalls, enhances firm value. We find that investment under performance discrepancies improves performance, presumably due to greater managerial awareness, attention, self-discipline and a renewed sense of urgency to find solutions to the problems. We drew on the AMC framework to highlight how the problemistic search-performance relationship can be differentially moderated by factors that exacerbate managers' pressure to adapt (as indicated by higher R&D intensity, lower growth, higher stock price volatility, etc.), and their ability to adapt (as indicated by firm age, size and slack resources). We find that the association between problemistic search and performance is strengthened in industries where R&D intensity and stock price volatility are high, product market competition is moderately high, and growth rates and shareholder returns are low. We attribute these findings to the enhanced pressure to adapt due to competitive, dynamic or volatile environments. Similarly, the relationship is also strengthened in young firms, small firms and (mostly) slack-rich firms. While nimbleness enhances the ability of firms to adapt, slack not only facilitates adaptation, but also provides a buffer for firms facing attainment discrepancy.

6.1. Contributions

This study contributes to the BTF literature by empirically testing its implicit assumption that problemistic search improves future performance. In doing so, it underscores the beneficial role of performance feedback as a benchmark that fosters a sense of urgency and brings greater discipline to strategic investments. It also extends prior work that looked at how aspiration gaps shape managers' decisions (such as risk-taking, innovation, new product introductions, and acquisitions) or alter the level of investments (Arrfelt et al., 2013), but nonetheless stopped short of examining the direct performance implications of these behaviors. We also explore boundary conditions of this effect by investigating environmental and firm characteristics that influence the efficacy of investments motivated by attainment discrepancy in impacting firm performance.

Although we cannot directly test the effects of attentional focus on firm performance, the hypotheses and findings allow us to infer the role of managerial attention in defining the relationship between attainment discrepancy and value-enhancing adaptive behaviors. Therefore, although implicitly, we add to the stream of research on when managers differ in their attention spans and how these differences have divergent strategic implications in terms of resource allocation and performance (Cyert & March, 1963).

6.2. Practical implications

Our study also has practical implications for organizations. For example, by showing that negative attainment discrepancy affects the performance consequences of strategic investments, our research indicates that aspirations could be used to motivate managers, align efforts, facilitate communication with various stakeholders, and establish boundary conditions in terms of what set of activities a firm can engage in and what strategic directions it could take to enhance value. It is therefore possible for a firm to design and change its benchmark aspiration level in a way that induces value-enhancing investment in search.

6.3. Future research

Our study opens up new avenues for future research. For example, future research may benefit from studying the effects of problemistic search on stakeholders. Our current research studies the financial performance consequences of problemistic search. More broadly, performance includes both financial performance (which is of direct concern to

the suppliers of financial capital, i.e., shareholders and lenders) as well as social performance (which relates to outcomes for other stakeholders such as employees, community, environment, etc.). The broader question in BTF is about how managers can hold together the coalition of various stakeholders that include both financial and non-financial stakeholders. It might therefore be worth exploring whether search activities only enhance shareholder value or whether, and to what extent, the benefits of search accrue to various stakeholder groups.

Second, while our research shows that, on average, problemistic search leads to higher performance as managers seek to meet aspirations, not all firms may be able to improve performance following problemistic search. Presumably, some firms may be unable to raise performance and are likely to lower their aspirations or shift attention instead, as predicted by the BTF (Cyert & March, 1963). Future research could benefit from exploring the circumstances under which firms are constrained to revise their goals in favor of lower aspirations, or engage in attentional shifts. Such research should also advance our understanding of the types of strategic responses made by firms to address performance shortfalls (Kuusela, Thomas, & Maula, 2017).

Third, it could also be worthwhile to explore other contingencies that moderate the performance effects of search. While we study a few in this paper, other contingencies could be top management team characteristics that impact strategic decision-making, or specific corporate governance mechanisms, especially in different institutional contexts. The latter could include, for example, different ownership types in Japan (David et al., 2010) or business group affiliations in India (Vissa, Greve, & Chen, 2010). One could also identify the search process by type (e.g., radical versus incremental R&D investment, explorative versus exploitative search, etc.). Together, these research initiatives should help us better understand how contingencies moderate the effects of problemistic search on future performance.

7. Conclusion

This study represents an important step towards understanding the performance implications of problemistic search and finds evidence of a value-enhancing strategic response triggered by performance feedback. Our findings reflect Greve's (2003a:158) assertion that "*(b)ecause of the uncertain value of new strategies, strategic change is likely to be beneficial for a low-performing organization....*". It appears that awareness, focused attention and motivation, along with associated capabilities, enable managers to make value-enhancing investment decisions under conditions of attainment discrepancy. Our work thus sheds new light on the primacy of performance feedback as the master switch that creates value from investment in search.

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