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## SEARCHING WIDE OR DEEP? ABSORPTIVE CAPACITY, SLACK RESOURCES AND THE ROLE OF EXTERNAL SEARCH IN SMALL FIRM GROWTH

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## SEARCHING WIDE OR DEEP? ABSORPTIVE CAPACITY, SLACK RESOURCES AND THE ROLE OF EXTERNAL SEARCH IN SMALL FIRM GROWTH



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### ABSTRACT

Firms often conduct external search for new opportunities, but not all search leads to growth. Integrating traditional explanations of search from behavioral theory with biological foraging models, we explain how absorptive capacity together with financial slack influence breadth or depth of search. Our findings from 291 small Swedish technology firms indicate that higher absorptive capacity increases search. Absorptive capacity had a stronger effect on breadth of search than for depth of search. We find that only depth of search leads to higher growth for small firms. Further, financial slack strengthened the absorptive capacity and search depth relationship of search relationship, but weakened the relationship between absorptive capacity and breadth of search. The findings are consistent with foraging models that account for resource availability.

### INTRODUCTION

Search is a central concept in understanding a firm's exploration or exploitation of growth opportunities (March, 1991; Gupta et al., 2006) and learning (Grant, 1996). In general, organizations search by developing alternatives or additions to their current activities towards innovation. Exploration, or external search, is often conceptualized in terms of its distance from current knowledge or activities (Levinthal, 1997). An extension of Cohen and Levinthal's (1990) work is the notion of breadth and depth of search (Laursen and Salter, 2006; Katila & Ahuja, 2002). The former refers to the variety of sources used in the search process while the latter refers to the depth of external sources used in innovation efforts. Prior findings suggest that intermediate levels of breadth and depth from external sources for search lead to higher innovation rates in industrial firms (Laursen & Salter, 2006). Distant search is likely to be valuable for small firms as well, but it is unclear from current research whether the underlying mechanisms for search, the types of search or the outcomes for search match those of larger firms. Smaller firms are more limited in available resources and managerial capacity to assimilate and replicate new knowledge from distant sources (Cohen & Levinthal, 1990; Penrose, 1959). Furthermore, innovation from search efforts may be futile for small firms if they cannot be converted to growth or performance.

Search is often addressed from behavioral (Cyert & March, 1963), learning (Huber, 1991) or risk (Wiseman & Bromiley, 1996) frameworks. The behavioral approach expects firms to search for problem solving when performance falls below aspiration levels, but is more likely to maintain current strategies when performance meets expectations. Another possible logic of firms is that they are seeking to optimize outcomes, making decisions about the use of time and resources they have towards a goal. Biological foraging theory (Stephens & Krebs, 1986) uses this logic to predict

decision making and outcomes of search efforts. In these models, the environment has a “patchy” structure in which necessary resources (e.g. information, food, resources, etc.) are concentrated with space between these localized areas. The forager must make a decision between continuing to forage within the same patch in which depletion occurs or expend time and energy moving to a new patch in which to forage.

By analogy, firms face the same decision to concentrate their search in a localized area or expend time and resources looking broadly for more optimal opportunities (Levinthal, 1997). The two views on search share some common assumptions, but the distinctions can lead to different predictions of behaviors and outcomes. Integrating the two views adds a broader understanding of organizations and their growth.

In this study, we test a mediated model in which breadth and depth of search is predicted, in part, by two key internal variables of the firm - the financial slack available as well as the firm’s absorptive capacity. Financial slack provides resources for firms to look beyond their current obligations and experiment or search for new opportunities (Cyert & March, 1963). Absorptive capacity is the ability to acquire, assimilate, transform and exploit knowledge about opportunities in the market (Zahra & George, 2002; Jansen, Van Den Bosch & Volberda, 2005; Lane, Koka, & Pathak, 2006). In turn, these internal characteristics as well as the type of search pursued influences firm growth (Davidsson & Wiklund, 2003; Wiklund & Shepherd, 2003). Building our arguments from foraging theory, in addition to behavioral theory, we find distinct insights that predict small firm search and growth.

### Conceptual Development

Organizational search is a regular phenomena in organizations in which there is a generation of alternatives to the current set of activities. Behavioral theory offers three categories of search: institutional, problemistic and slack search. Institutional search includes planned activities such as research and development that lead to regular and long term change in response to short-term feedback. Problemistic search is enacted in response to problems that causes firm performance to fall short of aspirations (Cyert & March, 1963). Slack search results from extra time and available resources that can be used for experimentation (Greve, 2003).

Search is also a central theme in evolutionary biology and anthropology in which animals develop patterns for food acquisition and survival. Specifically, optimal foraging theory (Stephens & Krebs, 1986) considers the decision making process of staying in a certain location and eating from a depleting source or expending energy seeking out new and potentially richer areas for consumption. Pirolli and Card (1999) have drawn from this literature to examine how humans forage for information which is closer to the organizational literatures’ interest in knowledge acquisition and use. They note that, in general, all activities can be analyzed according to resources gained and the costs which are incurred in the process – both resource costs and opportunity costs. While optimization models of foraging may sound close to assumptions of neoclassical economics, Pirolli and Card (1999: p.7) state the following:

*“The use of optimization models should not be taken as a hypothesis that human behavior is classically rational, with perfect information and infinite computational resources. A more successful hypothesis about humans is that they exhibit bounded rationality or make choices based on satisficing (Simon, 1955). However, satisficing can often be characterized as localized optimization (e.g. hill-climbing) with resource bounds and imperfect information*

*included in the constraints. .... Optimization models do not imply that animals or information foragers will necessarily develop so as to embrace the simple global optimum. Rather, they describe the possibility of a niche, a possible advantageous adaptation if not blocked by other forces.”*

For the purposes of this paper, let us start with the assumption that a small firm has the goal to optimize growth. By optimize, we mean that the firm’s management recognizes that increasing sales volume is positive for firm valuation (and hopefully profits), but also that there is some rate at which it will reach the capacity of the firm to manage growth, thus becoming detrimental or impossible (Penrose, 1959). The firm has a choice to grow by increasing efforts at what it is currently doing or to expend energy looking elsewhere where there may be greater payoff towards growth. The growth rate (R) can be expressed as a function of the Gain (G), which in our case is sales, divided by the time spent searching deeply for opportunities nearby ( $T_D$ ) and the time spent searching more broadly ( $T_B$ ). This growth rate relationship which is the basis for the Holling disc equation in foraging theory can be expressed as:

$$R \propto \frac{G}{T_D + T_B} \quad (1)$$

The purpose of this study then is to theorize and empirically test how small firms make this decision regarding search and growth applying the foraging model logic. First, we examine the type and extent of search under absorptive capacity. Second, we examine the role of slack in influencing search choices and its role in enhancing the role of absorptive capacity in promoting search capabilities (Figure 1).

### **Absorptive Capacity and Search**

Absorptive capacity is central to firm search and growth as it explains how firms acquire and use knowledge. According to Cohen and Levinthal (1990) absorptive capacity is a fundamental learning process in which firms identify, assimilate, and exploit knowledge from the environment. Firms vary in their abilities in capturing and using knowledge. In some cases, firms could identify useful information, but it may not be able to integrate acquired information in its existing knowledge base. Conversely, some firms may have internal capabilities that optimize current knowledge base but paying lesser attention to outside knowledge. Zahra and George’s (2002) conceptualization captures this distinction by separating absorptive capacity into potential and realized absorptive capacity. Potential absorptive capacity relates to acquisition and assimilation of external knowledge. Realized absorptive capacity is the capability to transform and exploit acquired knowledge. Fiol (1996) provides a helpful metaphor of considering organizations like sponges. She states, “[Organizations] have more or less capacity to absorb new knowledge, not unlike sponges that have differing capacities to absorb a liquid. Depending on their absorptive capacity and on their ability to reconfigure what they have absorbed, organizations also have more or less potential to generate outcomes, not unlike sponges that are limited by the amount and the nature of what they have absorbed.” (Fiol, 1996: p. 1013).

If a firm is adept at acquiring new knowledge and is searching external to the firm, it is quite likely that they will be gathering as much information as possible. In an effort to be comprehensive, firms higher in absorptive capacity may collect information from a wide number of sources with the assumption that this can be filtered through for what is significant later. In contrast, external search depth is almost by definition likely to be confined to a few close contacts (Laursen

& Salter, 2006) – especially for small firms. Returning to the foraging model, searching widely increases the amount of new information to be processed and integrated to current knowledge. Searching deeply in a particular location also provides gains, but is subject to diminishing returns. The necessity of absorptive capacity may be diminished or underutilized if search is incremental to current knowledge. Therefore we expect that:

*H1: For small firms, absorptive capacity will be positively associated with search and this relationship will be greater for (a) breadth of search than (b) depth of search.*

### **Absorptive Capacity, Financial Slack and Search**

In addition to the capability to acquire and assimilate knowledge, resources are required to facilitate the search process. Firms have a limited managerial capacity at a given time (Ocasio, 1997). Part of those resources are required to plan for current operations while the rest can be expended on expansion programs. Acquiring new knowledge for expansion entails a certainly level of risk and uncertainty. To overcome this uncertainty, firms must use a certain level of their resources to gather information and make decisions about the possibility of action (Penrose, 1959). Therefore, it would seem that slack resources, or those in excess of what is needed to meet current obligations, would fuel greater search as the capacity limit is expanded (e.g. by hiring additional management). There is certainly evidence that slack provides opportunities for innovation (Nohria & Gulati, 1996). The question here is: where do firms search for those opportunities and how does financial slack alter search behavior in this process?

There are two distinct views regarding the influence of slack (Steensma & Corley, 2001; Wiseman & Bromiley, 1996). According to the abundance-driven view, increasing levels of slack lead to greater willingness to experiment and take risk (Cyert & March, 1963). As slack decreases, firms become more risk-averse. The abundance-driven view suggests that slack absorbs variation in the environment and increases opportunities for risk-taking (Singh, 1986), experimentation and innovation. When slack levels drop, it is assumed that prior risk-taking or experimentation has been ineffective leading to greater commitments to actions with low uncertainty.

Alternatively, a hunger-driven view suggests that lower levels of slack resources cause firms to accept more risk. Lower prior performance and reduced slack increase the search to correct problems leading to higher variance innovations. Firms with higher levels of slack are often complacent about their mismatch with the environment (Litschert & Bonham, 1978) and have limited incentive to experiment (Sinclair, Klepper, & Cohen, 2000). Stevenson and colleagues (e.g. Stevenson & Jarillo, 1990) entrepreneurial management captures this notion of pursuing opportunities without regard to resources currently controlled (low slack). Bradley and colleagues (2010) applied Stevenson's view of entrepreneurship to a study of SME's finding that financial slack had a negative effect on entrepreneurial management behaviors and caused firms to be more administrative and protective of their current resources in pursuit of growth. Other work has shown that lower levels of slack increase the likelihood of forming alliances in biotechnology firms (Patzelt, Shepherd, Deeds, & Bradley, 2008) as well as higher-risk acquisitions versus lower-risk licensing agreements (Steensma & Corley, 2001).

Foraging theory follows the hunger-driven logic where species are more likely to continue to search in a local patch if there are surplus resources. Only when the resource (energy) required to search locally meets or exceeds the resources required to searching broadly will expansion of search occur. By analogy, while absorptive capacity increases the capability to search with greater breadth,

financial slack decreases the incentive to do so. In contrast, search in which opportunities with current external transaction partners are deepened is likely facilitated by financial slack resources allowing greater optimization of current processes and products lines. Therefore we expect that:

*H2a: Financial slack negatively moderates the relationship between absorptive capacity and breadth of search for small firms.*

*H2b: Financial slack positively moderates the relationship between absorptive capacity and depth of search for small firms.*

### **Absorptive Capacity, Search and Growth: The Partial Mediation Effect**

One goal of acquiring and assimilating new knowledge is the growth of the firm. Search is a means by which firms use the capability of absorptive capacity to achieve this end. While we have argued that absorptive capacity has a positive effect on both breadth and depth of search, it does not necessarily follow that both types of search will lead to growth. In some instances, there will be resources and energy expended on projects that do not come to fruition.

Managers of firms differ in their ability recognize opportunities because they possess different prior information. "Prior knowledge provides an absorptive capacity that facilitates the acquisition of additional information about markets, technologies and production processes, which enhances the ability to formulate new means-ends frameworks in response to new information." (Shane, 2003: p. 51). Prior knowledge makes the interpretation of new information more meaningful if it is related. The ability to convert that new information into a solution that leads to growth is also greater if the firm or its partners have solved similar problems. Prior work has shown that knowledge of a particular market leads to increases in discoveries of additional opportunities that may lead to growth in serving those markets (Shane, 2003).

Small firms have less capacity to search than larger firms due to resource and managerial limits. Search with a smaller set of external partners in which social relationships are already established reduces resources and time expended. Further, established relationships include prior knowledge of past deals and shared information that may be related to the search for new opportunities. A broad external search requires the expenditure of more time and energy to develop and maintain a wider network of relationships. This is likely to challenge the capacity of small firms to maintain these relationships and assimilate the greater amount of information acquired. The likelihood that small firms choose the right opportunities decreases and the probability of missteps increases creating a negative relationship with growth.

A particular approach in foraging theory is applicable here. McNair (1983) has proposed an overlapping encounter model in which a species loses less opportunity by staying in patches, precisely because more patches can be encountered while the forager exploits the current patch (e.g. a spider web can capture another prey while the spider is eating a captured prey item). By analogy, related opportunities are more likely to be encountered while a firm is exploiting a current opportunity. This gain requires less overall expended resources than searching more widely for better growth opportunities. Therefore we hypothesize:

*H3: (a) Breadth of search is negatively associated with growth and (b) partially mediates the relationship between absorptive capacity and growth for small firms.*

*H4: (a) Depth of search is positively associated with growth and (b) partially mediates the relationship between absorptive capacity and growth for small firms.*

## METHODS

### Data description

To test the role of slack in enhancing effects of absorptive capacity on performance through increased search depth and search depth, lagged effects of independent, mediating, and moderator variables are required. Because slack provides resources that can be easily deployed, effects of such discretionary resource allocations must be assessed over time. Therefore, time-lag between presence of slack and its effects on growth are necessary.

The study uses two different data sources –survey and archival – of firms in Sweden. The country requires all firms to file financial reports approved by a chartered accountant. This provides a unique and reliable set of objective performance data for small and young firms that are not typically available in most countries outside of publicly traded firms.

In the first step, we conducted a mail survey directed to venture CEOs. We examined ventures in technology based industries in the Swedish industry index code 72 200. Compared to ventures in low-tech and medium-tech industries, the technology sector has greater necessity for the acquisition and assimilation of external knowledge making it a relevant context for examining absorptive capacity as an antecedent to search and firm growth. In addition, by focusing on one industry we limit the effects of industry specific heterogeneity.

To identify the sampling frame, we queried the Swedish business database *Affärsdata*. We identified 9000 active firms that had fewer than 50 employees and had more than 1 million SEK (approximately 100 000 euros) in sales. We then stratified our sampling frame based on firm size. The resulting stratified sample consisted of 885 ventures (1 employee), 983 ventures (2 employees), 473 ventures (3-5 employees), 698 ventures (6-9 employees), and 698 ventures (10-49 employees). To manage costs of surveying, we selected 1471 ventures from each of the stratification cells.

A self-administrated questionnaire was subsequently developed. To enhance external validity, the questionnaire was checked for any problems or irregularities through pre-testing with five chief executive officers (CEOs) of small firms in a similar industry. Furthermore, to minimize common method bias, we followed survey design criteria from Podsakoff et al. (2003). The definitive questionnaires were then mailed from May to July 2007. The questionnaire was addressed to the CEO of the firm, accompanied by a descriptive letter explaining the purpose of the study. As the unit of analysis is at the firm level, it was deemed most appropriate to send the questionnaire directly to the CEO to capture a holistic view of firm operations. From the sample of 1,471 firms, 93 questionnaires were removed since they did not meet at least one of the three aforementioned sampling criteria, i.e. having fewer than 50 employees, 100,000 euro in sales, or dealing with technology-based product and services. Furthermore, six questionnaires did not reach the identified firms and it was not possible to contact them. This reduced the sample size to 1,372 firms. We received 306 replies to our survey. Of these four were filled in incorrectly, one was a duplicate, and ten came from firms where the CEO addressed another entity than the one targeted (for example a group of firms instead of a single firm). Thus, the workable questionnaires were reduced to 291, giving us an effective response rate of 21%. Although this is not an extremely high response rate, it is sufficient for the statistical analysis and in line with the response rates in small firm research (Dennis, 2003).

Finally, a non-response analysis was performed by comparing different variables for all the sample firms, such as the firm's age (year of establishment), size (number of employees), sales, sales per employee, profit, and solidity (i.e. the degree of internally funded capital). The analysis showed no significant differences between respondents and non-respondents.

To avoid any issues with common method bias, we collected objective firm performance data and slack measures from business registers. All businesses in Sweden, irrespective of size, are required to report performance information every year. We collected secondary data on the performance variables, such as sales growth, operating profit growth, and return on assets from the Swedish business database Affärsdata. We collected third year performance (2009) data on the 291 firms based on their unique organization codes from the initial sampling frame.

### Dependent variable

The dependent variable is venture growth. Measuring venture performance has been a central debate in recent years (Gilbert, McDougall, & Audretsch, 2006). Although numerous outcomes such as survival, sales, profits, owner satisfaction etc. have been proposed over the years, growth remains a key measure of venture viability (Helfat, 2007). Sales growth is compounded sales growth for three years (2007 to 2009). This approach dampens the volatility resulting from yearly returns often making arithmetic means unreliable.

### Key variables

*Absorptive capacity* was adapted from the scale developed by Jansen, van den Bosch, and Volberda (2005). The questions were originally based on a business unit level and were modified to fit the context of ventures. Absorptive capacity included two dimensions: potential and realized absorptive capacity, as originally proposed by Zahra and George (2002). Potential absorptive capacity consists of acquisition (4 items) and assimilation (3 items) of new external knowledge (Acquisition ( $\alpha=0.87$ ; CR=0.81; AVE=0.71); Assimilation ( $\alpha=0.74$ ; CR=0.77; AVE=0.66)). Realized absorptive capacity includes transformation (4 items) and exploitation (5 items) of new external knowledge (Transformation ( $\alpha=0.90$ ; CR=0.85; AVE=0.68); Exploitation ( $\alpha=0.86$ ; CR=0.82; AVE=0.71)). The measures showed acceptable convergent and divergent validity.

*Search depth and search breadth* in the external environment were operationalized using an approach similar to the one used by Laursen and Salter (2006). The respondents were asked the extent to which one or more of 13 source was used for knowledge and information for innovation (0 = not used; 1 = used; 2=low; 3=medium; 4=high). The 16 sources are – (i) suppliers of equipment, materials, components or software (ii) clients or customers (iii) competitors (iv) consultants (v) commercial laboratories/R&D enterprises (vii) university or higher education institutes (viii) government research organizations (ix) other public sector, e.g. business links, government offices (x) Private research institutes (xi) Professional conferences, meetings (xii) trade associations (xiii) technical/trade press, computer databases.

Search breadth is constructed as a simple addition of whether (0 or 1) one or more of 13 different sources were used. The measure has higher internal consistency ( $\alpha=0.91$ ). Search depth explains the extent to which firm intensively draws on different knowledge and information sources. Based on Laursen and Slater (2006) we coded high intensity use of a source if the response was '4,' and '0' otherwise. We added up the coding, with 0 representing no search depth, while 13 representing highest search depth. Search depth showed acceptable internal consistency ( $\alpha=0.83$ ).



*Financial slack* measures were drawn from recent work related to new ventures (Bradley, Wiklund et al., 2010; Mishina, Pollock, & Porac, 2004) measuring working capital available minus working capital required (current assets – current liabilities). Compared to traditionally used measures of slack such as absorbed slack or potential slack (Bourgeois, 1981), financial slack is highly discretionary and is specifically relevant in context of absorptive capacity. As new knowledge is absorbed within the firm, discretionary slack is necessary to develop new capabilities. We measured financial slack for year 2007. Although slack could be contingent on size, normalizing venture slack with venture size could confound results with sales growth as an outcome variable. Therefore similar to recent work on slack (George, 2005), we use venture size as a control. In the post-hoc analysis we ran additional regressions on slack normalized by venture size. Our inferences did not change.

### Controls

We use eight control variables. Ventures face liabilities of newness during the initial years. As the venture grows, it establishes more reliable routines and processes to engage in exchanges with the task environment. Therefore, we control for *age*. In addition to role of *size* in controlling extent of available slack, larger ventures may have well developed capabilities, and are subject to fewer constraints in search and knowledge absorption efforts.

We also use three industry-level measures - *environmental dynamism*, *environmental complexity*, and *environmental munificence*. Measures of munificence and dynamism are based on Dess and Beard's approach (1984). Munificence was measured by averaging the regression coefficients of a given industry's net sales and operating income over a five-year period (2003-2007). Dynamism is average of the standard errors of the regression slopes for the net sales and operating income regression equations used in calculating industry munificence. Net sales and operating income figures were derived from Affarsdata database. Environmental complexity is derived by regressing market shares of firms in an industry in 2009 on firms' market shares in 2005. Complexity indicates the trend towards or away from large firm market dominance in an industry. To ease interpretation, in line with Heeley et al. (2006), we multiply the coefficient by -1 so that higher number indicates greater complexity. We also control for *potential slack* (equity to debt) and *absorbed slack* (ratio of selling, general and administrative costs [SGA] to sales). Finally, we control for *sales growth* from 2005-2007.

### Common method variance and measurement properties

The measure of absorptive capacity shows acceptable loadings, high internal consistency among the four sub-constructs, and significant discriminant validity. Furthermore, the third order factor shows acceptable fit. Although the slack measure and sales growth are derived from archival sources, common method variance could be an issue in reporting search strategies and absorptive capacity. Although we took precautions in survey design such as respondent anonymity, unambiguous scale items, and separated scale items to limit effects of common method bias, additional tests are in order. Harmon-factor analysis resulted in six factors explaining % variance in the following order: 19.525, 17.369, 14.323, 11.839, 9.563, 8.149%.

### Analytical Approach

As our model exhibits convergent and discriminant validity, we proceed to test that structural model. The structural model proposed here, requires testing of moderated relationship. Such models with non-linear latent variable structures are products of normal variables and do not

exhibit a normal distribution. Incorporating interaction terms result in low communality, multicollinearity problems, and nonnormal error terms (A. Klein & Moosbrugger, 2000).

Drawing on robust recent developments in SEM, we use latent moderated structural equations (LMS) method, proposed initially by Klein and Moosbrugger (2000). Based on maximum likelihood in the LMS method, the latent independent variables and the error variables are assumed to be normally distributed, and non-normality resulting from latent product terms is modeled explicitly. In addition, using likelihood ratio tests, LMS allows for simultaneous testing of various interaction and direct relationships. Simulation studies of LMS indicated that compared to other approaches, it provides unbiased standard errors, reliable likelihood ratio test, and efficient parameter estimates (A. Klein & Moosbrugger, 2000; Schermelleh-Engel, Moosbrugger, & Müller, 2003).

We begin by comparing proposed model with alternative models (Table 2). We find that the proposed model exhibits the lowest AIC and BIC criterion. The overall model fit for the proposed model was within recommended values ( $\chi^2/df=1.772$ ; CFI=0.931; TLI=0.927; RMSEA=0.052). The analysis was conducted in two steps. First, we created a residual covariance matrix from the control variables. In the next step, residual covariance matrix was used as an input for estimating the final model. We used 1000 bootstrap samples to estimate standard errors using a Monte Carlo approach (A. Klein & Moosbrugger, 2000; Schumacker & Marcoulides, 1998).

## RESULTS

Table 1 presents means and standard deviations of the variables and their correlations. Table 2 shows that the full model with both mediation and moderation has better fit than direct effects alone. Table 3 presents the proposed model LMS results. Absorptive capacity has a general positive relationship with firm growth ( $p<.001$ ). Absorptive capacity also had a positive relationship with both search breadth ( $p<.001$ ) and search depth ( $p<.01$ ) providing support for H1a. A Z-test comparison of coefficients for the absorptive capacity search relationships show that the relationship for search breadth is significantly greater than search depth ( $p<.01$ ) supporting H1b. Financial slack had a negative relationship with search depth ( $p<.001$ ) and a positive relationship with search depth ( $p<.01$ ). As a moderator, financial slack negatively moderated the absorptive capacity-search breadth relationship ( $p<.05$ ) and positively moderated the absorptive capacity-search depth relationship ( $p<.05$ ) supporting H2a and H2b. Search depth had a positive relationship with firm growth ( $p<.05$ ) and search breadth had a negative relationship with firm growth ( $p<.05$ ) providing support for H3a and H4a. We used a Sobel test to confirm a partial mediating effect of breadth and depth of search for the absorptive capacity-firm growth relationship. The tests revealed that both forms of search act as a partial mediator ( $p<.05$ ) supporting H3b and H4b. In Table 4, we test the joint importance of mediating effects, individual moderated mediation effects, and joint-moderated mediation effects. We find that mediation and moderated-mediated relationships are supported ( $p<.05$ ).

### Tests for Robustness

To test whether our results changed under alternative specifications, we use three different alternative approaches: (a) product indicator approach (Jaccard & Wan, 1996), (b) Quasi-ML approach (A. G. Klein & Muthén, 2007), (d) Partial Least Square (Chin, Marcolin, & Newsted, 2003), and (e) orthogonalization (Little, Bovaird, & Widaman, 2006). In alternative specifications, our inferences did not change. The estimations using LMS were almost identical to

Quasi-ML approach and the orthogonalization approach. However, estimations for PLS and Product Indicator approach were significantly higher.

Second, to test the power of the overall model, we use a bootstrap method (Nevitt & Hancock, 2001). We use the Satorra-Bentler's rescaled  $\chi^2$  test to assess the level of power. The estimated power .84 is above the norm, i.e., 0.8. Third, in addition to current measure of growth, we used employee growth, asset growth, and profit growth. Our inferences did not change under these different operationalizations of growth.

## DISCUSSION AND CONCLUSION

Small firms often use search for new growth opportunities. Their ability to discover these opportunities is, in part, a function of their absorptive capacity to acquire and assimilate this information as well as transform and exploit acquired knowledge. Our findings for Swedish technology firms suggest higher absorptive capacity might lead to greater breadth of search, but depth of search actually leads to higher growth rates. The hunger-driven view of financial slack was supported with greater availability diminishing the absorptive capacity- breadth of search relationship, but strengthening the absorptive capacity-depth of search relationship.

Behavioral theory and learning models explain that firms will conduct problemistic search if performance falls below aspiration levels. Foraging models also assume shifting efforts when there are diminished returns, but the focus is on optimization. Growth as an organizational outcome often means that firms will operate at the limits of both available resources and the capacity of managers (Penrose, 1959). Consistent with foraging theory, we find that greater absorptive capacity increases the growth rate of firms. Foraging theory also provides greater specificity to where search is conducted. Because search further from current activities is more uncertain, it consumes greater time and resources in the collection of information. Therefore, a higher absorptive capacity provides more gains to breadth of search than depth of search as we found. This finding is important because it offers evidence of capabilities driving strategy and adds to our understanding of search efforts.

Behavioral theory makes a distinction between problemistic search and slack search considering them mutually exclusive efforts (Greve, 2003). Previous work has questioned this assumption showing that slack and problemistic search may act in concert in acquisition decisions (Bradley, Green, & Holcomb, 2010). Foraging models assume that search is a function of current performance and the resources available together. Slack search in behavioral theory assumes an abundance-driven view. Additional resources will be used for experimentation and additional risk-taking, which here, might include a wider search. Our finding that slack is negative with breadth of search and positive with depth of search supports a hunger-driven view of slack. Firms will search more widely when current available resources become thin. Foraging theory is consistent with this logic as foragers use current abundant resources as a signal that the current patch has not reached diminishing returns. Similarly, if slack is available and a firm chooses to search, it increases the strength of doing so with current transaction partners.

This study offers several valuable insights. First, foraging theory provides another logic for firm search that is compatible with, but offers unique insights from behavioral theory of search. Second, we add the role of resources (slack) and capabilities (absorptive capacity) to explain where external search is conducted. Third, we provide a cautionary note that, while small firms may have

capabilities for breadth of search, it may not be in their best interest with relation to firm growth. Small firms growth was greater through depth of external search and the slack resources available strengthened this process.

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Table 1  
Means, Standard Deviations and Correlations of Key Variables

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1 Venture Growth	0.17	1.55												
2 Financial Slack	0.18	2.84	0.14											
3 Search Depth	6.18	3.04	0.14	0.14										
4 Search Breadth	5.59	2.83	0.10	-0.19	0.28									
5 Absorptive Capacity	3.63	0.84	0.11	0.13	0.13	0.09								
6 Size (# of employees)	3.16	4.67	-0.05	0.03	0.11	0.07	0.13							
7 Age	17.03	11.02	0.09	0.11	0.16	0.05	0.08	0.08						
8 Equity/Debt	11.06	45.30	0.03	0.06	0.09	-0.07	0.06	0.04	0.06					
9 Absorbed Slack	1.43	2.71	0.02	0.04	0.08	-0.04	0.04	0.05	0.04	0.15				
10 Previous Venture Growth	0.16	1.03	0.84	0.08	0.11	0.04	0.18	-0.04	0.02	0.04	0.02			
11 Environmental Dynamism	1.09	0.08	-0.13	-0.08	0.08	0.07	0.14	-0.06	-0.05	-0.05	-0.03	-0.08		
12 Environmental Complexity	-0.95	0.48	-0.02	-0.02	0.02	0.04	0.12	0.02	0.01	0.02	0.01	0.03	0.14	
13 Environmental Munificence	1.03	0.29	0.16	0.09	0.02	0.05	0.03	0.08	0.02	0.07	0.01	0.12	0.11	0.26

Correlations above .07 are significant at  $p < .05$  (two-tailed).

Table 2

Model Comparisons	Fit Statistic	AIC	BIC
Proposed Model		16414.61	14159.05
Direct Effects – no mediation and moderation		21763.27	20007.02
Partial Mediation model, with no moderation		29487.27	26970.27
Proposed model, with no moderation for Absorptive Capacity → Search Depth and Search Depth → Venture Growth		22616.6	21484.84

Table 3

Latent Moderated Structural Equations of Small Firm Growth	Beta	S.E.	t-value	p
Absorptive Capacity → Venture Growth ( $\gamma_1$ )	0.253	0.074	3.419	0
Absorptive Capacity → Search Depth ( $\gamma_2$ )	0.141	0.042	2.274	0.011
Absorptive Capacity → Search Breadth ( $\gamma_3$ )	0.152	0.043	3.535	0
Slack → Search Depth ( $\gamma_4$ )	0.107	0.04	2.675	0.004
Slack → Search Breadth ( $\gamma_5$ )	-0.159	0.049	-3.245	0.001
Absorptive Capacity × Slack → Search Depth ( $\gamma_6$ )	0.052	0.023	2.261	0.012
Absorptive Capacity × Slack → Search Breadth ( $\gamma_7$ )	-0.041	0.022	-1.864	0.031
Search Depth → Venture Growth ( $\gamma_8$ )	0.102	0.039	1.729	0.042
Search Breadth → Venture Growth ( $\gamma_9$ )	-0.147	0.061	-2.07	0.019
Absorptive Capacity → Search Depth → Venture Growth	0.014	Sobel Test - two tailed		0.039
Absorptive Capacity → Search Breadth → Venture Growth	-0.022	Sobel Test- two tailed		0.046
Age → Venture Growth	0.032	0.041	0.78	0.218
Size → Venture Growth	0.071	0.046	1.543	0.061
Dynamism → Venture Growth	-0.084	0.035	-2.4	0.008
Munificence → Venture Growth	0.229	0.127	1.803	0.036
Complexity → Venture Growth	0.041	0.048	0.854	0.197
Debt/Equity → Venture Growth	0.027	0.031	0.871	0.192
Absorbed Slack → Venture Growth	0.099	0.042	2.357	0.009
Venture Growth <sub>2003-2005</sub> → Venture Growth	0.116	0.028	4.143	0

Model Fit -->  $\chi^2/df=1.772$ ; CFI=0.931; TLI=0.927; RMSEA=0.052

Table 4

Likelihood Ratio Test for Estimated Parameters			
Proposed Effects	$\chi^2$	df	p
Search Depth Mediation Effect: ( $\gamma_2 = \gamma_8 = 0$ )	6.442	2	<0.05
Search Breadth Mediation Effect: ( $\gamma_3 = \gamma_9 = 0$ )	8.057	2	<0.05
ACAP $\times$ Slack $\rightarrow$ Search Depth $\rightarrow$ Growth: ( $\gamma_2 = \gamma_6 = \gamma_4 = \gamma_8 = 0$ )	12.493	4	<0.05
ACAP $\times$ Slack $\rightarrow$ Search Breadth $\rightarrow$ Growth: ( $\gamma_3 = \gamma_7 = \gamma_5 = \gamma_9 = 0$ )	14.057	4	<0.05
Total Moderated-mediation Effects ( $\gamma_2 = \gamma_6 = \gamma_4 = \gamma_8 = \gamma_3 = \gamma_7 = \gamma_5 = \gamma_9 = 0$ )	23.762	8	<0.05

Figure 1: Proposed Model

