The geographical distance of relocation search
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On the basis of the extended resource-based view of firms, access to external resources can be argued to depend on a firm’s location. In this article, I test the notion that firms take the availability of these external resources at a given location into account in the distance of their relocation search. The results show that firms take the strength of, and distance to their interorganizational relationships, as well as regional characteristics, into account when determining the distance of their relocation search. They provide empirical validation of the importance of external resources in the resource-based view of firms. Moreover, they show how a particular type of dynamics, namely, location dynamics, can be used by firms to gain access to resources that can subsequently lead to competitive advantage.
Acknowledgments

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One of the dominant perspectives on the sources of the competitive advantage of firms is the resource-based view (RBV) of the firm. To relax the RBV's strong focus on internal resources (Dyer and Singh 1998), the extended resource-based view of the firm (ERBV) was developed (Lavie 2006; Arya and Lin 2007). The ERBV explicitly incorporates the characteristics of the region in which a firm is located (Wiewel and Hunter 1985; Boasson, Boasson, MacPherson, and Shin 2005) and the firm's level of organizational (Arya and Lin 2007) and territorial embeddedness (Bell and Zaheer 2007; Knoben, Oerlemans, and Rutten 2008) as external resources that influence a firm's performance.

With these extensions, geographic space is included in the ERBV in two distinct ways. First, differences between regions in terms of urbanization, specialization, and knowledge intensiveness provide firms in different regions with different endowments of resources (Wiewel and Hunter 1985; Beaudry and Schiffauerova 2009). Second, the geographic distance between collaborating organizations (i.e., territorial embeddedness) affects the type and amount of knowledge that can be transferred because short distances facilitate both planned and serendipitous face-to-face meetings, which, in turn, facilitate the generation of trust and the exchange of (tacit) knowledge (Weterings and Boschma 2009).

These notions regarding geographic space are especially interesting because firms are not geographically immobile. Firms can relocate and actually do so surprisingly often (Romo and Schwartz 1995; Knoben et al. 2008). If external resources are, as the ERBV argues, important for the performance of firms and a firm's access to them depends on its position in geographic space, firms should take the availability of external resources at a given location into account in their decisions to relocate. For example, ceteris paribus, one would expect firms in resource-deprived areas and/or firms that are located far from their main partners to search for new locations outside their home region, whereas firms in resource-rich areas and/or firms with their main partners close at hand are likely to confine their search for a new location to their current region.

However, even though there is a substantive literature on the determinants of the relocation of firms (for an overview, see Van Dijk and Pellenbarg 2000), there has been little research on the determinants of the geographic distances over which firms search for new
locations. Moreover, because most firms relocate over relatively short distances, differences in access to external resources in different locations have so far been largely neglected as potential triggers of relocation. This omission is especially striking because there are strong indications in the literature that firms that relocate over longer distances benefit from that decision in terms of higher levels of postrelocation performance (Stam 2007; Knoben et al. 2008). Gaining more insights into the effects of a firm’s access to external resources at different locations on its relocation-search behavior may help us understand the mechanisms underlying those positive performance effects. Therefore, I pose the following research question: What are the effects of the strength of a firm’s internal resource base, its level of organizational and territorial embeddedness, and the characteristics of the region in which it is located on the geographic distance of its relocation search?

On the basis of an analysis of survey data from automation service firms in the Netherlands and regional data on Dutch municipalities, I first show that high levels of embeddedness, particularly territorial embeddedness, lead to spatial inertia. In doing so, I provide insights into what types of firms are able to overcome local search and the risks of spatial lock-in (Boschma 2005). Earlier research investigated alliances and the mobility of personnel as methods of overcoming local search (Rosenkopf and Almeida 2003). On the basis of the importance of a firm’s location for its competitive advantage (Boasson et al. 2005), this research has conceptualized searching for a new location outside the home region as a method of overcoming a local search. By showing that high levels of territorial embeddedness lead to spatial inertia, it has flagged a potential downside of the often-heralded idea of territorial embeddedness (Gertler 2003).

Moreover, I show that some regional characteristics attract firms, whereas others repulse them. In particular, firms find highly urbanized and research and development (R&D)–intensive regions attractive but shun highly localized regions. On the one hand, this finding adds to the agglomeration literature by showing that not all types of concentration of economic activity are necessarily beneficial. As such, this study contributes to finding the balance between the positive and the often-neglected negative effects of different types of agglomerations (Arikan and Schilling forthcoming). On the other hand, it adds to the ERBV by shedding light on the role of a firm’s location strategy in getting access to external resources. Even though large theoretical advances have been made in this domain (Lavie 2006; Wiewel and Hunter 1985), many of these theoretical insights require empirical validation (Mowery, Oxley, and Silverman 1998; Arya and Lin 2007). I add to this empirical validation by showing that firms take differences in access to external resources in different locations into account during relocation searches. By showing that firms use relocation searches as a strategy to gain (access to) external resources, I bring a dynamic perspective into the ERBV, which has frequently been criticized for being static (Priem and Butler 2001).

Finally, I show that attribute (internal resources), relational (organizational and territorial embeddedness), and geographic variables (regional characteristics) have distinct effects on the geographic relocation–search behavior of firms. This finding underlines the value of taking into account these different groups of variables simultaneously. Even though the call to integrate these different groups of variables into explanatory models is often voiced (Brass, Galaskiewicz, Greve, and Tsai 2004; Arya and Lin 2007), most empirical studies still focus on either attribute, relational, or geographic variables to explain organizational behavior (Knoben and Oerlemans 2008). This study shows the importance of simultaneously investigating these groups of variables to understand the spatial behavior of organizations.
Theoretical Framework and Hypotheses

The first step in determining the effects of external resources on the distance of a firm’s relocation search is to examine how a firm’s environment, here defined as a set of external resources, influences its behavior. In this regard, it seems plausible that synergistic benefits can be obtained by combining insights from relocation research and the ERBV of the firm. To realize such synergistic benefits, I used insights from both theoretical perspectives to develop a theoretical framework that explains the geographic distance of relocation search.

The ERBV of the Firm

It has become common wisdom that many firms cannot muster alone all the resources that are required to reach the peaks of their performance. This being the case, a firm’s location and its relationships with other organizations are crucial to obtaining external resources. To incorporate more explicitly these insights into the RBV, the ERBV was developed (Arya and Lin 2007).

The ERBV draws from agglomeration theory in the sense that it argues that certain regional characteristics can act as resources that are available to firms inside a region but not to those outside the region (Brouthers, Brouthers, and Werner 2008). Furthermore, it draws from resource dependence theory and transaction costs economics to include interorganizational relationships giving access to external resources (Dyer and Singh 1998; Lavie 2006). The importance of organizational embeddedness (i.e., the amount and quality of a firm’s interorganizational relationships) is based on the idea that firms can overcome internal resource-based constraints by pooling and sharing their complementary resources and collaboratively performing tasks that neither of them could perform alone (Dyer 1996).

The growing importance of organizational embeddedness has triggered the development of another relational concept that is argued to act as a resource, namely, territorial embeddedness. Territorial embeddedness refers to the extent to which firms maintain localized interorganizational relationships and is argued to be important because the success of knowledge-intensive interorganizational collaboration is often argued to hinge on face-to-face contacts and therefore geographic proximity (Narula and Santangelo 2009). Given that the geographic position of a firm and its level of territorial embeddedness are conduits to valuable resources, it seems likely that firms use relocation strategies as a means of gaining better access to external resources.

Relocation Theory

Several forms of the relocation of firms are distinguished in the literature. Commonly, a difference is made between complete relocation and partial relocation. In this article, I focus on complete relocations, defined as “the move of an entire establishment from location A to location B” (Van Dijk and Pellenbarg 2000). It is important to note that given this definition, the relocation of firms includes both the relocation of single-site firms and of an establishment with multisite firms.

Given the strategic importance of a firm’s location, and therefore relocation, for its access to external resources, the dominant (re)location theories have surprisingly little to say about how the availability of external resources will influence the distance over which firms will search for a new location. According to neoclassical relocation theory, firms evaluate all possible alternative locations and pick the optimal one (Pellenbarg, van Wissen, and van Dijk 2002). This perspective, however, contradicts the empirical evidence that most firms relocate over short distances and take only a limited number of
possible alternative locations into account (Pellenbarg et al. 2002). This point suggests
that relocation decisions are strongly path-dependent satisfying decisions, rather than
optimization decisions. Behavioral relocation theory incorporates these ideas and posits
that firms are more likely to relocate to nearby locations because these locations are better
known to them. Some firms, however, relocate over larger distances. Moreover, they have
been shown to benefit more from their relocation in terms of performance than other
relocating firms (Knoben et al. 2008; Stam 2007). Little is known, however, about what
drives firms to search for new locations over longer distances. The positive relationship
between long-distance relocation and performance suggests that differences in the avail-
ability of external resources (both regional and relational) may play a role (Kalnins and
Chung 2004).

However, in most of the research on relocation, firms have been treated as atomistic
actors that move in geographic space without regard to their relationships with other
organizations (for some exceptions, see Romo and Schwartz 1995; Knoben and
Oerlemans 2008). This omission is striking because these relationships, particularly their
geographic dimension, are often argued to be of great importance for the performance of
firms.

Determinants of the Geographic Distance of Relocation Search

In the ERBV, different groups of resources that are of importance to the performance
of firms can be distinguished: relational resources generated by (1) the organizational and
(2) territorial embeddedness of the firm, (3) resources stemming from the region in which
a firm is located, and (4) the internal resources of a firm. The ERBV does not focus on all
resources that can be drawn from these different groups but only on resources that are
unique and difficult to imitate. In this regard, (tacit) knowledge is considered to be one of
the key resources in the ERBV (Kogut and Zander 1992). Therefore, I particularly focus
on the knowledge-related resources that can be obtained from each of the four distin-
guished resource groups. In the following sections, I relate these different resource groups
to the geographic distance of a firm’s relocation search, that is, the geographic distance
over which a firm searches for locations during a relocation process.

Organizational embeddedness. A firm’s participation in interorganizational rela-
tionships and networks is at the root of organizational embeddedness (Granovetter 1985).
In this context, interorganizational relationships are defined as the relatively enduring
links between a firm and external organizations with mutual knowledge exchange or
acquisition for its innovative activities as their primary goal (adopted from Oliver and
Ebers 1998). A firm’s level of organizational embeddedness is determined by both the
number and the characteristics of the relationships it maintains (Granovetter 1985). The
more relationships a firm maintains (Ahuja 2000) and the stronger these relationships
(McFadyen, Semadeni, and Cannella 2009) the higher the firm’s level of organizational
embeddedness.

Benefits accruing to the firm from its level of organizational embeddedness, such as
access to the knowledge and resources of the partners, can be easily disrupted since the
exchange of knowledge is facilitated by stable interorganizational relationships (Ahuja
2000). In this respect, there is evidence in the literature that sudden shocks—so-called
critical events—can severely hamper the functioning of interorganizational relationships
because they introduce organizational instability (Kim, Oh, and Swaminathan 2006).

I extend these insights by proposing that relocation can act as just such an instability-
introducing shock. If relocations indeed serve as critical events, they would disrupt a
firm’s organizational embeddedness. Relocations over longer distances are likely to have larger disruptive effects on organizational embeddedness than short-distance ones because long-distance moves create more prolonged organizational instability (Carter 1999). Therefore, firms with high levels of organizational embeddedness are expected to shun long-distance relocations in particular, resulting in the following hypothesis

*Hypothesis 1: The higher the level of organizational embeddedness of a firm, the shorter the geographic distance of the firm’s relocation search.*

**Territorial embeddedness.** Another important characteristic of a firm’s overall network that has been described extensively in the literature is the level of geographic localization of a firm’s interorganizational relationships (Weterings and Boschma 2009; Bell and Zaheer 2007; Narula and Santangelo 2009). If geographic proximity indeed facilitates the successful exchange of especially tacit knowledge through interorganizational relationships, dependence on the resources of other firms also leads to dependence on a certain geographic location and thus to spatial inertia (Romo and Schwartz 1995). In terms of the geographic distance of relocation search, such dependence implies that firms with high levels of territorial embeddedness are expected to refrain from searching in more distant areas because moving to such areas would imply increasing the distance to their partners and thus reducing the ease and quality of access to the resources of these partners.

*Hypothesis 2: The higher the level of territorial embeddedness of a firm, the shorter the geographic distance of the firm’s relocation search.*

**Geographic environment.** The characteristics of the geographic region in which a firm is located can act as a resource that provides a firm with a competitive advantage (Wiewel and Hunter 1985; Appold 1995). In this regard, different forms of agglomeration effects are often conceptualized as resource pools. Localization economies and urbanization economies are commonly distinguished (Beaudry and Schiffauerova 2009). Localization economies refer to the effects that are produced by having many firms from the same industry in a single area, such as a common pool of highly skilled labor, whereas urbanization economies refer to the effects of having firms from different industries in the same area, such as reductions in transportation costs.

Besides these tangible spatial externalities, more intangible benefits may arise from the spatial concentration of firms. These benefits are caused by the fact that knowledge is partially nonrival and not completely appropriable. As a result, unintended diffusions of knowledge (i.e., spillovers) among firms within a region are larger than those among geographically dispersed establishments. Through these spillover processes, tacit knowledge can be implanted in geographic regions, enabling firms within these regions to draw from this knowledge (Appold 1995).

On the basis of the conceptualization of these regional characteristics as resources that a firm can tap into only if it is located in the particular region, it can easily be argued that resource-rich regions are more attractive to be located in than are resource-deprived regions. So regions that are relatively rich in resources should lock firms in. By extension, firms in relatively resource-deprived areas should be more likely to search for a new location in resource-richer areas and therefore outside their home region. This line of reasoning results in Hypothesis 3:
Hypothesis 3: The lower the availability of external resources (in terms of urbanization, localization, and knowledge intensiveness) in the region in which a firm is located compared to the availability of those resources in other regions, the longer the geographic distance of the firm’s relocation search.

Internal resources. Being the backbone of the original RBV of the firm, the internal resource base of a firm is seen as one of the most important predictors of the firm’s behavior and performance (Sternberg and Arndt 2001; Becerra 2008). The internal resource base does not reflect all resources possessed by the firm, only the assets that positively distinguish the firm from others, that is, the firm’s unique resources (Maskell 2001).

Since internal resources are both owned and controlled by the firm in question, they can be taken along with relative ease when the firm relocates, even over longer distances. There are, of course, elements of a firm’s internal resources that are fixed in a certain location, such as specific investments in the firm’s building (i.e., site specificity) (Dyer 1996). In general, however, internal resources are easier to move in geographic space than are external resources because the firm is also the owner of the resources. Moreover, once a firm has decided to relocate, such site-specific investments are “lost” anyway, and the distance over which a firm searches for a new location should not be affected by them. Therefore, one would expect firms with stronger internal resource bases to search for new locations over larger distances. On the basis of this line of reasoning, the following hypothesis can be posed:

Hypothesis 4: The stronger the internal resource base of a firm, the larger the geographic distance of the firm’s relocation search.

Data and Methodology
In the following sections, I empirically scrutinize the hypotheses. First, I describe the data collection and nonresponse analysis. I then discuss the measurements of the theoretical concepts that I used in the research. Finally, I briefly discuss the method I used, an ordinal regression analysis.

Data
Early in 2006, I mailed questionnaires to all Dutch automation services firms with five or more full-time employees. There are large differences in the propensity to relocate and in the average relocation distance among industries. To reduce heterogeneity resulting from these differences, I decided to focus on a single industry. The Dutch automation services industry consists of about 17,500 firms, roughly 2.5 percent of all firms in the Netherlands, and employs some 123,800 persons, 1.5 percent of the total national workforce. With 2001 as the base year, the number of jobs declined by 16 percent in 2001 to 2003 but increased from 2003 to 2005. Still, the number of jobs in 2005 was 11 percent lower than in 2001. There was a strong growth in sales, especially between 2004 and 2006. From 2000 to 2004, sales increased 6 percent, and from 2004 to 2006, sales increased 22 percent.

I selected the automation services industry because relocations in this industry are more common than in manufacturing and wholesale industries, and it is characterized by high levels of innovativeness in both inputs and outputs. Almost 3 percent of the total value added is spent on innovative activities, as opposed to an average of 1 percent in other service sectors. Moreover, 52 percent of all the firms in this sector report that they
successfully innovate, compared to 23 percent of the firms in other service sectors. The magnitude of innovative collaboration is comparable to that in other service sectors: 32 percent for automation services and an average of 34 percent for the other service sectors (all data obtained from Statistics Netherlands). It is important to note that firms in the automation services industry focus almost exclusively on the domestic market. This was an important selection criterion for this research since international relocations are likely to have different determinants and consequences than do intranational relocations. In the Netherlands, however, firms in the automation services industry have a reputation for being relatively “footloose” (Van Dijk and Pellenbarg 2000). If spatial lock-in effects of embeddedness and regional characteristics could be found in such a sector, it would prove a strong test of the hypothesized effects.

The Dutch Chamber of Commerce provided the addresses of all the selected firms. Firms without economic activities, subsidiaries sharing the same address, and duplicates were eliminated, leaving 2,553 firms. The questionnaire was pretested to ensure that the questions would be understood as intended and was mailed via the Dutch postal service. Unfortunately, because of the limitations of the Chamber of Commerce database, no reliable names of contact persons were available. Therefore, the questionnaires were addressed to the “managing director” of each firm. Ultimately, usable questionnaires were received from 203 firms, a response rate of 8 percent. Even though similar response rates have been obtained in other microlevel studies, the response rate raises the possibility that the data may suffer from a sample bias. Therefore, I conducted a nonresponse analysis.

I contacted the managers of 179 of the firms from which I did not receive a response, 130 of whom were willing to cooperate (a response rate of 73 percent). I asked each manager several key questions from the original survey about the presence of knowledge-intensive interorganizational relationships, about whether their firm performed any innovative activities, and about the size of the firm, a variable that is likely to contain sampling bias. The data obtained from the telephone interviews with the 130 managers allowed for a detailed comparison of the respondents and nonrespondents to the questionnaire and provided valuable information on the representativeness of the data (see Table 1). For some other variables, such as the spatial distribution of firms and previous relocation behavior, the responding firms could be compared to the entire population of firms in automation services, since these variables are available in the Chamber of Commerce database.

Table 1 shows that there were no statistically significant differences in the variables between the questionnaire respondents and nonrespondents who were interviewed by telephone. There were also no statistically significant differences between the responding firms and the population as a whole. Both the spatial distribution and the past relocation behavior of the respondents’ firms seemed to be representative of the population as a whole. It can be concluded, then, that there were no structural differences between the respondents and the nonrespondents and hence no sample bias.

**Measurements**

**Geographic distance of the relocation search.** The geographic distance of the relocation search was measured by asking firms at which geographic distance they would search for a new location if they were to relocate. The response scale was ordinal with three possible categories: (1) within the municipality the firm is located in, (2) within the entire province the firm is currently located in, and (3) throughout the entire country.
Table 1

Nonresponse Analysis

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Nonrespondents</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average firm size (in full-time employees)</td>
<td>23.5</td>
<td>27.6</td>
<td>4.1</td>
</tr>
<tr>
<td>Share of firms with interorganizational relationships</td>
<td>56%</td>
<td>51%</td>
<td>–5%</td>
</tr>
<tr>
<td>Presence of innovative activities</td>
<td>84%</td>
<td>79%</td>
<td>–5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Total Sample</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial distribution (by province)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drenthe</td>
<td>1.0%</td>
<td>1.4%</td>
<td>–0.4%</td>
</tr>
<tr>
<td>Flevoland</td>
<td>2.5%</td>
<td>2.7%</td>
<td>–0.2%</td>
</tr>
<tr>
<td>Friesland</td>
<td>2.0%</td>
<td>1.6%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Gelderland</td>
<td>13.4%</td>
<td>11.6%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Groningen</td>
<td>1.5%</td>
<td>2.3%</td>
<td>–0.8%</td>
</tr>
<tr>
<td>Limburg</td>
<td>5.5%</td>
<td>3.5%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Noord-Brabant</td>
<td>20.9%</td>
<td>14.1%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Noord-Holland</td>
<td>14.4%</td>
<td>20.6%</td>
<td>–6.2%</td>
</tr>
<tr>
<td>Overijssel</td>
<td>5.0%</td>
<td>4.6%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Utrecht</td>
<td>10.9%</td>
<td>13.0%</td>
<td>–2.1%</td>
</tr>
<tr>
<td>Zeeland</td>
<td>0.5%</td>
<td>0.6%</td>
<td>–0.1%</td>
</tr>
<tr>
<td>Zuid-Holland</td>
<td>22.4%</td>
<td>24.1%</td>
<td>–1.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Total Sample</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous relocation behavior</td>
<td>% Movers (last 2 years)</td>
<td>23.9</td>
<td>23.2</td>
</tr>
<tr>
<td>% Movers (last 5 years)</td>
<td>40.8</td>
<td>39.3</td>
<td>–1.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respondents (reported search distance)</th>
<th>Total Sample (actual relocations in 2005)</th>
<th>Difference</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported geographic search distance versus actual relocations</td>
<td>Same municipality</td>
<td>51%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>Same province</td>
<td>32%</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>Whole country</td>
<td>17%</td>
<td>13%</td>
</tr>
</tbody>
</table>

<sup>a</sup>: t test  
<sup>b</sup>: phi test  
<sup>c</sup>: chi square test
This “intentional” form of measurement was chosen because real relocation distances can be calculated only after the actual relocations have taken place. Using actual relocation distances therefore implies that the independent variables have to be collected retrospectively or that panel data have to be used. The former approach imposes large reliability problems, whereas the latter has the disadvantage that relocating firms have a strong tendency to drop out of panel data sets because of the relocation. To remedy these issues, previous research on the likelihood of relocation has used intentional measures of relocation (Brouwer, Mariotti, and van Ommeren 2004; Van Dijk and Pellenbarg 2000; Knoben and Oerlemans 2008). I extended this approach from the likelihood that a firm will relocate to the distance over which firms will search for a new location.

To assess the validity of this measure of the geographic distance of relocation search, I compared the aggregated responses and the actual relocation distances of all firms in the automation services sector in 2005. The actual relocation data that I used for this comparison were available only at an aggregate level and were obtained from the Netherlands Institute for Spatial Research (Van Oort et al. 2007). This comparison showed no significant differences between the reported intentional search distances and the actual distances over which firms relocate. This finding provides strong confidence in the validity of the measurement of the dependent variable.

Organizational embeddedness. The chosen indicator of the structural dimension of a firm’s level of organizational embeddedness is the self-reported number of knowledge-intensive interorganizational relationships that it maintains. The respondents were asked the following question: “knowledge-intensive interorganizational relationships involve working together actively with other partners on the development of technologically new or strongly improved products, services, and processes. In how many of such interorganizational relationships is your firm currently involved?”

Following the Community Innovation Survey, each respondent was asked how important (on a scale of 1 to 3) the resources that were obtained through each of these interorganizational relationships were to the firm. The average value of this question over all a firm’s relationships was used as a measure of the strength of ties. Even though this measurement is clearly a proxy for the concept of the strength of ties proposed by Granovetter (1985), it is frequently used as a measurement of this concept (e.g., Laursen and Salter 2006). Moreover, using the self-reported importance of ties sticks closely to the conceptualization of the strength of ties as an indicator of the level of dependence on external resources, as was used in the theoretical part of this article. Moreover, to take into account that only relatively important ties exert a spatial lock-in effect on firms, an interaction term between the measure of the strength of ties and the number of a firm’s interorganizational relationships was included as well.

Territorial embeddedness. The level of territorial embeddedness was measured by asking firms whether each of their aforementioned partners was located within 20 kilometers (about 12 miles). If it was, it is treated as a localized partner. The percentage of all a firm’s partners that were considered localized was used as a measure of territorial embeddedness. Even though 20 kilometers seems like a relatively short distance, earlier research showed that in the Netherlands, which is small and congestion plagued, this is an applicable measure of distance (Van Oort 2004). Moreover, to take into account the fact that only relatively important localized ties exert a spatial lock-in effect on firms, an interaction term between the measure of the strength of ties and a firm’s level of territorial embeddedness was included as well.
Geographic environment. Following Hypothesis 3, measures of the relative resource richness, in terms of urbanization, localization, and knowledge intensity, of the region the firm was located in had to be constructed. In this study, the region was defined as the municipality in which the firm was located. Not only does this definition correspond to the most frequently used spatial level of analysis in earlier research on firm-level agglomeration (Beaudry and Schiffauerova 2009), it has also been shown to be the most relevant level of analysis for agglomeration research in the Netherlands (Van Oort 2004).

First, I obtained indicators of urbanization, localization, and knowledge intensity for each individual municipality. Economies of urbanization were measured by the population density in a region (Equation 1), whereas economies of localization were measured by the location quotient for the automation services (Equation 2). I obtained these data from Statistics Netherlands. The knowledge intensity of the region, measured as the average amount of R&D expenditures per employee in a region (Equation 3), was used as an indicator of the amount of available knowledge spillovers within a region (data from Van Oort 2004). In these equations $i$ denotes the region, $j$ denotes the industry, and $E$ denotes employment. Note that the localization measure is, in principle, region and industry specific, whereas the other two measures are region specific only. Because this study focused on a single industry, however, the localization measure was region specific only as well.

$$Urbanization_i = \frac{Population_i}{Km_i^2} \quad (1)$$

$$Localization_{ij} = \frac{E_{ij}}{\sum_j E_{ij}} \left/ \frac{\sum_i \sum_j E_{ij}}{\sum_j E_{ij}} \right.\quad (2)$$

$$R & D - Intensity_i = \frac{R & D_i}{E_i} \quad (3)$$

Subsequently, I constructed two sets of variables that capture the relative resource richness of each municipality. Each set corresponds to one of the threshold levels of the geographic distance of location search distinguished in the dependent variable. The first set of variables reflects the relative attractiveness of the other municipalities within the province in which the firm is located. I calculated these variables by taking the average score (for each regional characteristic separately) of the other municipalities in the province and subtracting the score for the home municipality of the firm. A positive score for these variables indicates that the municipality that the focal firm is in is relatively deprived of resources compared to the other municipalities within the province.

The second set of variables reflects the relative attractiveness of municipalities outside the province in which the firm is located. I calculated these variables by taking the average score (for each regional characteristic separately) of all the municipalities outside the province in which the firm is located and subtracting the score for the home municipality of the firm. A positive score for these variables indicates that the municipality the focal firm is in is relatively deprived of resources compared to the other municipalities outside the province.
**Internal resource base.** The strength of a firm’s internal knowledge base was measured by looking at the percentage of total turnover used for R&D. Furthermore, since small firms are less likely to have formal R&D activities (Brouwer and Kleinhekt 1996), the percentage of employees with an advanced education, that is, who have degrees from polytechnic institutes or universities, was used as a proxy as well. These operationalizanations reflect the fact that the strength of the internal knowledge base of a firm is predominantly shown by the unique knowledge resources that it possesses (Zhang, Baden-Fuller, and Mangemartin 2007).

**Controls.** I included several control variables in the analyses as well: (1) the size of the firm, (2) whether the firm was stand-alone or multisite, (3) previous experience with long-distance relocation, (4) the propensity of the firm to relocate, (5) the growth rate of the firm, and (6) the strength of the link of the firm to the local market.

The size of a firm is generally found to have a large impact on the firm’s relocation behavior. Smaller firms relocate more often mainly because the absolute costs of moving for small firms are much lower than are those for large firms (Van Dijk and Pellenbarg 2000). Even though this line of reasoning seems less applicable to the distance of the relocation because smaller companies generally have smaller market areas and fewer resources to search for (more distant) alternative locations, it seemed fruitful to take the size of a firm measured by the natural logarithm of its amount of full-time employees into account as a control variable.

A dummy variable was given the value of 1 if the firm was part of a multisite firm. This measure was included as a control variable because it is likely that the relocation behavior of a stand-alone firm is different from that of a multisite firm.

Research has shown that firms that relocate tend to do so periodically and that there is a group of firms that are spatially immobile (Knoben and Oerlemans 2008). Extending this finding to the distance of the relocation search, whether a firm has previously relocated over longer distances (i.e., across municipal borders) was taken into account as a control variable. This information was based on a self-reported spatial history of the firm.

Given that the dependent variable of this research was an intentional, or stated-preference, measure, it is likely that some of the responding firms were actually in the middle of a relocation process, whereas others were not. To prevent such heterogeneity from influencing the results, the propensity of the firms to relocate was included as a control variable. These data were collected in the questionnaire with a question and eight-category ordinal answering scale identical to the one used by van Dijk and Pellenbarg (2000) and Brouwer et al. (2004). On the basis of this information, I created two dummy variables that distinguished firms that certainly would not relocate in the next two years (31 percent of the cases) and firms that certainly would relocate within this period (12 percent of the cases). Firms that did not fall into one of these extreme cases were used as the reference category.

The growth rate of a firm was introduced as a control variable as well. An expanding firm is likely to need more room, for example, to accommodate its employees, and therefore is more likely to relocate. Moreover, fast-growing firms are more likely to access new markets to realize their growth and may therefore relocate over longer distances to obtain a more strategic position (Stam 2007). The growth rate of a firm was measured by the percentage growth of its amount of full-time employees over the two prior years.

The link to the local market was the final control variable. This concept refers to the spatial scale within which the firm buys and sells its products or services. Previous
research showed that firms in industries with a tendency to buy and sell many products or services in their home region are less likely to move out of the region than are firms that sell products throughout the country or even throughout the world (Schmenner 1980). The main reason is that the former group of firms is dependent on the local market and has much to lose upon relocation. Therefore, the respondents were asked what percentage (in five equal brackets) of their firms’ turnover was generated within 20 kilometers of the firms.

Methodology

Descriptive statistics of all the variables just discussed are presented in Table 2. A distinction is made between the full data set and the firms with interorganizational relationships only because the latter subset of the data was used to estimate several models that are presented in the next section.

The Variance inflation factors (VIF) reported in Table 2 are all well below 2, whereas common problematic threshold values mentioned in the literature are 5 or even 10. This is a strong indication that the data do not suffer from any collinearity problems. To reduce any potential collinearity problems resulting from including interaction effects, all the variables that are included in interaction effects were mean centered before the interaction variable was calculated.

The structure of the measurement of the dependent variable has some implications for the methodology that can be used to analyze these data. The dependent variable consists of three categories. Even though these categories represent subsequent categories of the geographic distance of relocation search, the unit distance between the different categories is not significant. For this type of data, ordered logit models are the most suitable methodology (Norušis 2004). When fitting an ordinal regression model, it is assumed that the relationships between the independent variables and the logits are the same for all logits. This assumption can be tested with the so-called test of parallel lines. Ordinal regression is an appropriate methodology when the value of this test is more than 0.10 (Norušis 2004). The outcome of this test is reported in the next section and is used to judge the applicability of the applied method.

The distribution of the dependent variable that was used in the study is skewed to the left, so lower scores are more probable. Therefore, I used a negative log-log link function between the independent variables and the dependent variable. A negative log-log link function models the dependent variable as $-\ln(-\ln(p))$, where $p$ is the cumulative likelihood of a certain score. This specification corrects for the skewed probability distribution of the dependent variable. To correct for potential heteroskedasticity problems, I used a Huber and White robust specification of standard errors.

A different method had to be utilized to test Hypothesis 3. Given the hypothesized attractiveness of resource-rich regions, positive scores on both sets of regional variables should be associated with larger geographic search distances. However, whereas the first set of variables should be positively associated with search inside the home province only, the second set of variables should be positively associated with search outside the home province only. This assumption is fundamentally at odds with the assumptions of ordinal regressions that the relationships between the independent variables and the logits are the same for all logits. To remedy this problem and validly test Hypothesis 3, I recoded the dependent variable into two binary variables: one that captures whether the firm searches outside the home municipality (identical to scoring a 2 or 3 on the initial ordinal dependent variable) or not and one that captures whether the firm searches outside the home province (identical to scoring a 3 on the initial ordinal dependent variable) or not.
## Table 2

Descriptive Statistics and Collinearity Diagnostics

<table>
<thead>
<tr>
<th>Variable</th>
<th>All Respondents (N = 203)</th>
<th>Respondents with Interorganizational Relationships Only (N = 105)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Geographic distance of relocation search</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>% Highly educated personnel</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Number of IORs</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Importance of IORs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of IORs localized</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Urbanization (intraprovincial pull)</td>
<td>-2191.89</td>
<td>532.63</td>
</tr>
<tr>
<td>Localization (intraprovincial pull)</td>
<td>-4.24</td>
<td>1.30</td>
</tr>
<tr>
<td>Regional R&amp;D intensity (intraprovincial pull)</td>
<td>-3.36</td>
<td>29.66</td>
</tr>
<tr>
<td>Urbanization (interprovincial pull)</td>
<td>-2449.00</td>
<td>310.18</td>
</tr>
<tr>
<td>Localization (interprovincial pull)</td>
<td>-5.45</td>
<td>0.48</td>
</tr>
<tr>
<td>Regional R&amp;D intensity (interprovincial pull)</td>
<td>-3.00</td>
<td>1.16</td>
</tr>
<tr>
<td>Size (ln)</td>
<td>0.69</td>
<td>5.64</td>
</tr>
<tr>
<td>Multisite firm</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Previous long-distance relocation</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Relocation propensity 100%</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Relocation propensity 0%</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Firm growth rate</td>
<td>-0.45</td>
<td>5.00</td>
</tr>
<tr>
<td>Link to local market</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>
Subsequently, I used binary logistic regressions to assess the effect of the intra- and interprovincial pull variables on the propensity to search over different distances.

A potential source of bias in these analyses originates from the fact that some of the explanatory variables were measured at the municipal rather than the firm level. As a result, error terms are likely to be correlated between firms within the same municipality. To account for this possible bias, I ran the logistic regressions with clustered standard errors at the municipal level (Steenbergen and Jones 2002).

Results

The results of the estimations of the ordered logit models are reported in Table 3. Three models were estimated. The first model includes all the respondents. The second model is identical to the first but includes only firms with at least one interorganizational relationship. This model was estimated to assess whether there were any significant differences between the full data set and this subsample. This information is important to know

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Results of the Ordered Logit Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
</tr>
<tr>
<td></td>
<td>All Respondents</td>
</tr>
<tr>
<td>Internal resource base</td>
<td></td>
</tr>
<tr>
<td>R&amp;D intensity</td>
<td>-0.12</td>
</tr>
<tr>
<td>% Highly educated personnel</td>
<td>0.33**</td>
</tr>
<tr>
<td>Organizational embeddedness</td>
<td></td>
</tr>
<tr>
<td>Number of interorganizational relationships</td>
<td>-0.15</td>
</tr>
<tr>
<td>Importance of interorganizational relationships</td>
<td></td>
</tr>
<tr>
<td>Number of interorganizational relationships * Importance of interorganizational relationships</td>
<td></td>
</tr>
<tr>
<td>Territorial embeddedness</td>
<td></td>
</tr>
<tr>
<td>% of interorganizational relationships localized</td>
<td>-0.35***</td>
</tr>
<tr>
<td>% of interorganizational relationships localized * Importance of interorganizational relationships</td>
<td></td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
</tr>
<tr>
<td>Size (ln)</td>
<td>0.26</td>
</tr>
<tr>
<td>Multisite firm</td>
<td>0.20</td>
</tr>
<tr>
<td>Previous long-distance relocation</td>
<td>0.33***</td>
</tr>
<tr>
<td>Relocation propensity 100%</td>
<td>-0.01</td>
</tr>
<tr>
<td>Relocation propensity 0%</td>
<td>-0.02</td>
</tr>
<tr>
<td>Firm growth rate</td>
<td>0.17**</td>
</tr>
<tr>
<td>Link to local market</td>
<td>-0.06</td>
</tr>
<tr>
<td>Significance</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>203</td>
</tr>
<tr>
<td>Test of parallel lines</td>
<td>0.668</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td>13.1%</td>
</tr>
</tbody>
</table>

Note: All significance levels are based on a Huber/White robust specification of standard errors. All coefficients have been standardized to facilitate the comparison of effect sizes.
* p < .10
** p < .05
*** p < .01
because in the third model, the interaction effects with the importance of interorganizational relationships are included. Since only firms with interorganizational relationships have a valid score on this variable, the other firms had to be excluded. To prevent the attribution of effects found in Model 3 to systematic differences between the full data set and this subsample, I estimated Model 2.

Table 3 reveals that all models are highly significant and that the test of parallel lines is insignificant. This finding indicates that the assumptions of an ordered logit approach are not violated and that the models significantly fit the data. The Nagelkerke’s pseudo $R^2$, whose interpretation is closest to that of a $R^2$-squared in an ordinary least-squares analysis, is between 13 percent and 21 percent, which is more than acceptable for firm-level models.

Although some support was found for Hypothesis 1, simply having many interorganizational relationships or having important relationships is not sufficient to exert any effect on the geographic distance of a firm’s relocation search. This finding is consistent for all estimated models. However, Model 3 shows that a combination of a large number and a high importance of interorganizational relationships is required before a negative effect on the distance over which firms search for new locations is found. This finding implies that there is a relatively high threshold level of organizational embeddedness before the need for stability becomes a constraining factor. With this relatively high threshold taken into account, Hypothesis 1 is confirmed.

Territorial embeddedness also has a strong negative effect on the distance over which firms search for new locations. In all three models, there is a negative significant effect of the level of territorial embeddedness, which indicates the robustness of this effect. No additional effect was found for firms with important localized interorganizational relationships. So contrary to the findings for organizational embeddedness, simply maintaining a relatively large number of localized relationships is sufficient to influence the geographic distance of a firm’s relocation search. On the basis of these findings, Hypothesis 2 is confirmed.

The results presented in Table 3 also provide support for Hypothesis 4. Firms with stronger internal resource bases, in terms of highly educated personnel, are indeed more footloose than are firms with weaker internal resource bases. The positive effect of the strength of human capital on the mobility of firms may seem counterintuitive at first glance because relocation often leads to a turnover of personnel, which companies with a strong human capital base want to prevent. However, prior research showed that highly educated employees are more willing to commute or relocate with the company than are less educated employees (Otto and Dalbert 2010). So even though relocations often go together with the loss of personnel, this is not the type of personnel captured with this measurement of the strength of the internal resource base.

A caveat to be made is that the measure captures the presence of highly educated employees within a firm but not their importance in the production process or the ease with which the employees can be replaced. Even though the single-industry design of this study limits the heterogeneity among firms on such variables, I cannot exclude the possibility that firms that are highly dependent on their human resource base refrain from long(er) distance relocation searches to prevent the turnover of personnel. As such, the interpretation of this finding is limited to the presence of high levels of human capital as an indicator of a strong internal resource base and does not provide any insights into how the utilization of that human capital influences the relocation-search behavior of firms.

That no effect of R&D intensity was found may have been caused by the moderate role that formal R&D plays in this service-oriented sector. However, another possible interpretation is that human capital reflects a type of internal resource that is inherently more
footloose than the knowledge generated by R&D (Faulconbridge 2006). In all, because the predicted effect was found for human capital, which is by far the most important production factor in this sector, Hypothesis 4 is cautiously confirmed.

The results of the estimations of the binary logit models that were used to test Hypothesis 3 are reported in Table 4. Model 4 assesses the likelihood that firms search outside their own municipality but within their home province, whereas Model 5 assesses the likelihood that firms search outside their home province. All the other independent and control variables were included in these models to prevent omitted variable bias.

Table 4 reveals that each of the three distinguished regional characteristics has an influence on the geographic distance of relocation search. However, both the directions of the effects and the spatial scale over which the effects operate differ. Being located in a relatively rural municipality compared to other municipalities in the same province induces firms to search outside their own municipality. In other words, the presence of relatively urbanized regions inside the province lures firms out of their own municipality in terms of relocation search. This finding is in line with Hypothesis 3. However, this
effect operates only at the intraprovincial level. Differences in urbanization are not sufficient to make firms search outside the province.

Contrary to urbanized regions, firms shun searching in highly localized regions. The presence of highly localized regions relative to the home municipality of the firms makes firms less likely to search outside their home region. This effect is found for searches within the province (Model 4) and those outside the province (Model 5). In other words, if firms are located in a relatively unlocalized region, they are more likely to restrict their search area to that region. For the interpretation of this finding, it is important to note that high levels of localization mean high levels of specialization in the sector in which the firm is active and therefore high levels of local competition (Staber 1998). The findings seem to illustrate that when a firm is in a region surrounded by regions with relatively high levels of localization, the firm does not search for locations outside its own region because the most likely locations outside its own region are characterized by high levels of competition (Kalnins and Chung 2004).

Highly R&D-intensive regions, on the other hand, are attractive to firms, as is indicated by the positive and significant coefficient in Model 5. It is interesting that the pull effect of R&D intensity materializes only at the interprovincial level, where the effect has the predicted sign but is insignificant. A possible explanation may be that the spatial scale over which R&D expenditures create spillover effects exceeds the municipal level. If R&D expenditures create spillovers that are available in a wider area, such as the province, searching only for a location outside that wider area would give access to substantially different amounts of R&D spillovers. In all, Hypothesis 3 is supported for urbanization effects and R&D intensity with the caveat of the different spatial scales in mind. For localization effects, the exact opposite of Hypothesis 3 was found.

Regarding the control variables, the most interesting finding is that previous long-distance relocation is strongly associated with larger distances over which firms search for new locations. This finding implies that firms that previously moved over longer distances are more likely to do so again. In other words, there seems to be a specific group of highly footloose firms within the automation services sector. Furthermore, the growth of firms is positively associated with larger search distances for new locations as well.

Checks of Robustness

To assess the robustness of the results, I performed three additional analyses. First, the structure of my dependent variable deviates somewhat from a standard ordinal variable because the higher categories fully encompass the lower ones. There is some debate in the literature whether an ordered logit is the most appropriate method for this variable structure (Greene and Hensher 2010). To assess the sensitivity of the results to the method I used, I estimated three separate logistic regressions: one for response category 1 versus 2, one for 1 versus 3, and one for 1 versus 2 and 3. The effects for all models were highly consistent and virtually identical to those reported in Table 3. Therefore, I conclude that the results are highly robust to changes in the statistical method that I used.

Second, not all provinces are equal in size, and some are coastal whereas others are landlocked. As a result, firms in some provinces can more easily search beyond their provincial borders than can others. To assess whether these differences may have biased the results, I reran the analyses including provincial-level fixed effects. Even though some of the provincial dummy variables were significant, the results for all the variables of interest did not change, indicating the robustness of the results.

Finally, one could argue that instead of having a direct effect on the distance of relocation search, multisite firms are at an advantage with regard to maintaining
organizational and territorial embeddedness in the face of relocation. To check for this effect, I reran all the models using interaction terms between the multisite dummy variable and the embeddedness variables. None of these interaction terms, however, was significant, whereas all the main effects of the embeddedness variables were extremely robust to the addition of these interaction effects.

Discussion and Conclusion

The findings of this study illuminate the impact of geographic differences in the availability of external resources on the location-search behavior of firms. They add to the empirical validation of the ERBV by showing both that the presence, strength, and distance of a firm’s interorganizational relationships and the characteristics of the firm’s region are related to the geographic distance of a firm’s relocation search. The analyses indicate that the availability of external resources affects the relocation decisions of firms. In this regard, a mechanism is provided that may explain why relocations over different distances exert different effects on the performance of firms (Stam 2007; Knoben et al. 2008). Moreover, it shows how a particular type of dynamics, namely, location dynamics, may be used by firms to gain access to resources that can subsequently lead to competitive advantage.

It is interesting that firms do not perceive all types of agglomeration as desirable. Firms particularly shun regions with high levels of localization. This finding has important implications for both the agglomeration literature, as well as the ERBV. Regarding the agglomeration literature, it illustrates the underemphasized notion that high levels of agglomeration imply several disadvantages for firms. Even though downsides of the other types of agglomeration can be identified as well, these downsides only outweigh the benefits (at least in the perceptions of firms) for localization. Regarding the ERBV, this finding stresses that agglomerations should not simply be included as pools of external resources. Being located in such areas also comes at a cost, and sometimes these costs outweigh the benefits (Arikan and Schilling forthcoming). Thus, a nuanced view of the value of these external resource pools is required.

Furthermore, the negative effects of maintaining many strong and/or localized interorganizational relationships on the geographic distance of relocation search points in an interesting direction. These findings are strong indications that even though maintaining interorganizational relationships has enabling effects, these relationships can also constrain the behavior of actors. The constraining effects of interorganizational relationships are acknowledged in most theoretical work, but the vast majority of the empirical work has focused on the enabling effects of the relationships (Kim et al. 2006). Notwithstanding the fact that external resources are important for the performance of firms, my findings also point to a potential downside of relying on external rather than internal resources, namely, a lower level of spatial mobility of firms (i.e., confinement to a local search). In this regard, it is especially interesting to note that firms with strong internal resource bases are more spatially mobile. Therefore, there seems to be a trade-off between spatial mobility and a firm’s relative reliance on external versus internal resources.

The analyses also show that attribute (i.e., the internal resource base), structural (i.e., the localization of relationships), relational (i.e., the importance of relationships), and contextual (i.e., regional characteristics) factors are simultaneous yet differently related to the relocation search behavior of firms. Hence, incorporating these different types of variables into a single explanatory model is a fruitful approach. The findings in particular point to the intertwining of the interorganizational and the spatial behavior of firms. The spatial dimension of interorganizational relationships influences not only a firm’s
performance (Bell and Zaheer 2007) but also its relocation behavior. Thus, strong path-dependent processes are at play in which a firm’s location, interorganizational relationships, and performance reinforce each other (Sydow, Lerch, and Staber 2010). Therefore, often-called-for insights into the spatial dimension of interorganizational relations have been presented in this article (Brass et al. 2004).

Finally, the positive effects of both previous long-distance relocations and the growth of firms on the distance over which firms search for new locations have some interesting implications. Earlier research showed that firms that relocate perform better than do firms that do not and that firms that relocate over larger distances perform better than do short-distance movers. Combining these insights leads to the conclusion that there is a group of firms that grow relatively fast and relocate periodically over relatively long distances. These findings corroborate the idea that there is a relatively small group of fast-growing (Acs and Mueller 2008) and highly mobile (Stam 2007) firms that are sometimes labeled “gazelles.” These gazelles are highly interesting firms from both an economic (they generate high employment growth) and a scientific perspective. Finding out more about these firms and their (re)location behavior therefore seems a fruitful avenue for future research.

References


