Chapter 1
The Start-Up Location Decision and Regional Determinants

Frank Lasch, Frank Robert, Frédéric Le Roy, and Roy Thurik

1 Introduction

An important stream of literature in the past 20 years focuses on the impact of new firm formation, i.e., entrepreneurship, for the economic development of regions and nations. Addressing the importance of small business and new firm formation for economic growth (Audretsch 1995), a considerable outpouring of literature presented empirical evidence criticizing (Robson 1996) or confirming the "job generation process" theory and resulted in putting entrepreneurship at the forefront of research in an so-called "entrepreneurial" economy (Audretsch and Thurik 2000). The phenomenon of entrepreneurship is examined at various levels of analysis, such as individuals, firms, regions, or nations (Wennekers and Thurik 1999). Davidson and Wiklund (2001) argue that entrepreneurship research is dominated by micro-level analysis, mainly using the firm or the individual level of analysis. Reviewing nine peer-reviewed entrepreneurship journals, Chandler and Lyon (2001) find that only a small part of research designs focuses on the industry or macro-environment level. Davidson and Wiklund (2001) observe that the micro-level dominance increased over time, while the share of the aggregate level declined. Ucbasaran et al. (2001) call for more research on the existence of different and contrasting environmental conditions for entrepreneurship (see also Thurik 2009). But while the challenge of explaining how and why new firms emerge in

F. Lasch (✉) • F. Robert
Research Center, Groupe Sup de Co Montpellier Business School, 2300 Avenue des Moulins, 34185 Montpellier, France
e-mail: f.lasch@supco-montpellier.fr

F. Le Roy
ISEM/MRM-ERFI, University of Montpellier I, Espace Richter, Bât. E, Rue Vendémiaire, CS 19519, 34960 Montpellier, France

R. Thurik
Erasmus University Rotterdam, P.O. Box 1738, 3000 DR Rotterdam, Netherlands

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regions or socioeconomic contexts raised much debate and resulted in an increasing body of literature, a certain number of gaps prevail.

Johnson (2004) describes the literature on regional differences of entrepreneurship as fragmented and heterogeneous and claims for disaggregated studies to produce reliable results for specific sectors. The main reason for the observed heterogeneity lies in a strong variety of research designs. Authors operate with different spatial aggregate levels and sample sizes and analyze mostly cross-sectional data. In the same line, Chandler and Lyon (2001) argue for increased emphasis on reliability issues and recommend more longitudinal research to reduce common method variance.

New firm formation is a strategic asset in an entrepreneurial economy and economic policy is preoccupied by crafting and implementing measures to foster and stimulate entrepreneurship (Audretsch et al. 2007). But contrasting empirical evidence in measuring regional determinants of entrepreneurship leaves many questions of economic actors and actions unanswered and the valorization and application of research results for practice or policy remains complex (Van der Zwan et al. 2011).

This is precisely the gap this paper intends to fill. For this purpose, we identify and measure regional factors for cross-sectional new firm formation activities that we compare with the results of high-tech firms (HT) that we obtained earlier (Lasch et al. 2013).

This paper is structured as follows. In Sect. 2 we follow the setup of Lasch et al. (2013) and identify commonly used regional factors and we formulate general hypotheses for new firm formation. Sections 3 and 4 are concerned with method and presentation of results for both economy-wide entrepreneurship and high-tech entrepreneurship. Section 5 compares the results while Sect. 6 concludes.

2 Literature

Entrepreneurship literature is inspired by a variety of disciplines like economics, economic geography, and sociology (Wennekers and Thurik 1999). Hence, the literature provides many variables and proxies to measure the impact of regional factors on entrepreneurship. The early literature uses theories of localization economies: Marshall–Arrow–Romer (Marshall 1890; Arrow 1962; Romer 1986), Porter (1990), and Jacobs (1969). Endogenous growth theories focus on the role of regional human capital and innovation (Romer 1986, 1990; Arrow 1962; Nijkamp and Poot 1998). New economic geography introduces the concept of market forces (Krugman 1991) emphasizing circular logic as trigger for the formation of agglomerations (Krugman 1998). Cluster theories describe the emergence of geographic concentrations of firms (Porter 1998). Knowledge-based economy approaches explore interaction between firms based on geographical proximity to external knowledge and innovation sources, networks, and knowledge spillovers (Audretsch and Keilbach 2007).

In sum, we find four broad factor groups that are commonly used in regional studies on entrepreneurship: infrastructure and industry externalities, entrepreneurship capital, human capital, and knowledge spillovers.

2.1 Infrastructure and Industry Externalities

The literature seems to agree on competitive advantages for new firms in densely populated areas with well-developed infrastructures (Reynolds et al. 1994; Keeble and Walker 1994; Audretsch and Fritsch 1994; INSEE 2000; Armington and Acs 2002). But some studies point out that diseconomies in agglomeration arise when certain thresholds of density are attained (Bade and Nerlinger 2000; Folta et al. 2006).

Hypothesis 1a. Population density has a positive impact on new firm formation.

The concept of industry structure opposes two viewpoints. Some argue that high level of industry concentration drives innovation and growth (Marshall 1890; Arrow 1962; Romer 1986; Porter 1990; Tödling and Wanzenböck 2003; Okamuro and Kobayashi 2006) while others point to positive effects of diversity and competition occurring between industries (Jacobs 1969).

Hypothesis 1b. Industry diversity has a positive impact on new firm formation.

Hypothesis 1b′. Industry concentration has a positive impact on new firm formation.

Population growth is associated to both market opportunities and increasing numbers of potential entrepreneurs (Krugman 1991; Reynolds et al. 1994; Keeble and Walker 1994).

Hypothesis 1c. Population growth has a positive impact on new firm formation.

Industry structure can also be captured using the share of small versus large firms. Here, we observe different positions in the literature. Some authors identify value chain and incubation effects of large firms (Bellandi 2001; Cooper 1985; Almus et al. 1999; Garnsey and Heffernan 2005). Others stress higher managerial learning opportunities in small firms enabling former employees to accumulate entrepreneurial skills (Greenan 1994; Kangasharju 2000; O'Gorman et al. 2005). Keeble and Walker (1994) find an effect of incumbent large firms on entrepreneurship in the service sector and similarly small firms on entrepreneurship in manufacturing.

Hypothesis 1d. Employment in very large firms has a positive impact on new firm formation.

Hypothesis 1e. Employment in very small firms has a positive impact on new firm formation.

2.2 Entrepreneurial Capital

We associate entrepreneurship capital to the entrepreneurs' perception of overall conditions for entrepreneurship, such as high regional firm birth (Audretsch and Keilbach 2005) and survival rates.

Hypothesis 2a. High firm survival has a positive impact on new firm formation.

More recently, the literature includes the concept of regional entrepreneurial capital to explain different levels of entrepreneurship across regions (Feldman 2001; Audretsch and Keilbach 2004a, b; Audretsch and Keilbach 2007). But empirical findings remain scarce (Freytag and Thurik 2007). In line with Audretsch and Keilbach (2005), we argue that regional entrepreneurial capital or expertise (Feldman 2001) produces an effect of new generations of entrepreneurs.

Hypothesis 2b. Entrepreneurial expertise has a positive impact on new firm formation.

Audretsch and Keilbach (2005) also establish a relationship between regional economic performance and endogenous entrepreneurship capital. Following this concept, we use the regional dependence from outside controlled decision centers as further measure of endogenous entrepreneurial capital and "culture."

Hypothesis 2c. Endogenous entrepreneurship has a positive impact on new firm formation.

2.3 Human Capital

Human capital is a popular concept to explain regional levels of entrepreneurship and is associated to educational attainment, employment, private capital, and social diversity. We find strong evidence for high regional educational attainment as source of entrepreneurship in the literature (Audretsch and Fritsch 1994; Evans and Leighton 1990). This relationship is more evident in studies dealing with high-tech entrepreneurship (Bade and Nerlinger 2000) and may also apply to studies examining entrepreneurship across all sectors of the economy.

Hypothesis 3a. Educational attainment has a positive impact on new firm formation.

Another facet of human capital is the regional employment structure. While Evans and Leighton (1990) argue that unemployed are more likely to become entrepreneurs as compared to working population in employment, we find contradicting findings in literature. Some consider unemployment as an important hurdle to entrepreneurship (Foti and Vivarelli 1994); others present evidence of unemployment out of necessity

effects on entrepreneurship (Audretsch and Fritsch 1994; Guesnier 1994; Lasch et al. 2007; Okamuro and Kobayashi 2006; Thurik et al. 2008).

Hypothesis 3b. Unemployment has a positive impact on new firm formation.

Investment capacity, wealth, and private capital are also associated to human capital. Raising sufficient capital consists in one of the most important entry barriers to entrepreneurship (Jones-Evans and Thompson 2009). In consequence, we suggest a positive effect of high levels of regional private investment capacity on entrepreneurship.

Hypothesis 3c. Private capital capacity has a positive impact on new firm formation.

Lucas (1988) argued that locations (cities) should not be observed only as collectors of human capital but rather as places generating new ideas. More recently, the literature presents evidence on the value of creativity and diversity for innovation and entrepreneurship (Florida and Gates 2001; Lee et al. 2004; Smallbone et al. 2010).

Hypothesis 3d. Social diversity has a positive impact on new firm formation.

2.4 Knowledge Spillovers

Knowledge created endogenously results in knowledge spillovers, which allows entrepreneurs to identify and exploit opportunities (Audretsch and Feldman 1996; Carlsson et al. 2009; Acs et al. 2009; Simmie 2002). Important external knowledge sources are universities (Bade and Nerlinger 2000; Fischer and Varga 2003; Anselin et al. 2000a, b; Engel and Fier 2000; Fritsch and Slavtchev 2007; Audretsch et al. 2004; Huffmann and Quigley 2002; Garnsey and Heffernan 2005) and public or private nonuniversity research and development (Bade and Nerlinger 2000).

Hypothesis 4a. Universities have a positive impact on new firm formation.

Hypothesis 4b. Private R&D firms have a positive impact on new firm formation.

Production and innovation tends to be geographically bound and the literature acknowledges that geographical proximity and location matters (Audretsch and Feldman 1996; Meusburger 2000). Knowledge externalities mean also interaction and network activity between firms located in geographical proximity (Hansen 1995; Aldrich and Zimmer 1986; Johanisson 1998; Nijkamp 2003; Varamäki and Veslainen 2003; De Propris 2002; Knoben and Oerlemans 2006; Torre and Rallet 2005). Finally, tacit knowledge is regarded as a valuable asset for new firms (Porter and Stern 2001; Gertler 2003; Storper and Venables 2004).

Hypothesis 4c. Incumbent knowledge-based firms have a positive impact on new firm formation.

3 Methods

The data we use is not a sample or panel but a complete and extensive dataset of all existing and newly created firms in France ("SIRENE" database). Our data include information of every new firm founded between 1993 and 2001 [total manufacturing/trade/services (MTS)-sector number of new firms is 1,836,671 while that in high-technology (HT)-industry is 84,535]. High technology is defined as computer/software services and telecommunications and other knowledge-intense services (Lasch et al. 2013). In addition to this data, independent variables come from public economic and population statistics administered by the French INSEE institute (*Institut National de la Statistique et des Etudes Economiques*) like census data and labor statistics. Answering the demand for more disaggregated studies, we use the aggregate level of labor market areas (LMA). These LMA are aggregations of the 33,000 municipalities in France into 348 LMA. LMA cover the economic area of influence of agglomerations and small- and middle-sized towns (this differs from the less aggregated French "départements" or the "régions"). MTS entrepreneurship is defined as all new firms founded in MTS sector while HT entrepreneurship is defined as new firm formation in high-tech industries like computer/software services and telecommunications and other knowledge-intense services. As we focus on the comparison of firm birth intensity between areas, we calculate our rate using the ecological approach and the *location quotient* (Schmude 1994): the firm birth rate in an area is divided by the national firm birth rate.

Similarly, HT entrepreneurship is measured by the LMA firm birth rate in the HT sector (number of new HT firms divided by the number of all existing firms in a labor market area). The 21 independent variables (Table 1.1) are associated to the four groups of regional indicators (agglomeration and local industry descriptors, entrepreneurial and human capital measures, knowledge spillovers).

4 Results

The explanatory power for the MTS (total manufacturing/trades/services sector) and the HT sector is generally high (ICS sector: $R^2 = 0.851$, Table 1.2; HT sector: $R^2 = 0.890$, Table 1.3).

Table 1.2 presents the results obtained for each variable in the MTS sector. Nine variables are significant at the 1 % level while twelve obtain no significant result. Eliminating size or unit effects, the standardized regression coefficient enables us to compare directly the results for each variable. Ranking the variables of the four factor groups in descending order according to the value of the regression coefficient, we obtain the strongest influence for entrepreneurial and human capital measures (H2 and H3), followed by agglomeration descriptors (H1, particularly population growth). External knowledge indicators are not supported statistically. Having said this, we have to acknowledge that the results of firm survival rate (H2a)

Table 1.1 Independent variables

Infrastructure and industry externalities
Population density per km^2 in 1994; INSEE industry diversity index in 1994; number of large industrial firms over 200 employees in 1995; population growth between 1982 and 1990; share of large firms over 200 employees in 1994 (%); share of very small firms with 0 employees in 1997 (%)
Entrepreneurial capital
Survival rate of new firms of the 1990 generation 5 years after start-up (%); share of owner-entrepreneurs under 35 years age in 1997; share of self-employed craftsmen/commercials/managers at the active working population in 1990 (%); share of salaried employees at the active population in 1990 (%); employment in local firms depending on regional headquarters/decision centers in 1997 (%)
Human capital
Share of population holding only a baccalaureate (high school diploma) as highest diploma in 1990 (%); unemployment rate in 1994; share of population under 65 years living under the level of social minima in 1996 (%); share of household owners among residential population (primary residence) in 1990 (%); share of foreigners at the residential population in 1990 (%)
Knowledge spillovers
Number of students in universities in 1996/1997; share of employment of nonpublic R&D firms at the total employment in 1993 (%); share of employment held by HT firms in computer services/telecom at the total employment in 1993 (%); share of employment held by HT firms in knowledge-intense services at the total employment in 1993 (%); share of employment held by HT firms in high-tech industries at the total employment in 1993 (%)

and educational attainment (H3a) are opposed to what is hypothesized and significantly so.

H1a (population density) is statistically significant and H1a is accepted.

H1b (industry structure) uses two variables (industry diversification; large industrial firms). Neither measure is significant, so we find no support for H1b.

H1c (population growth) is statistically significant supporting H1c.

H1d is measured using employment in very large firms. We find no support for H1d.

H1e is measured using employment in very small firms. We find no support for H1e.

H2a (firm survival) includes one variable. The regression result is negative and significant and we have to reject H2a. This may be due to a crowding out effect.

H2b (entrepreneurial capital) includes three variables (share of owner-entrepreneurs; liberal and managerial professions; share of salaried employees). Owner-entrepreneurs and salaried employees are significant measures in contrast to liberal and managerial professions. We give partial support to H2b.

H2c (regional entrepreneurial autonomy) is measured by employment in local firms depending on regional headquarters and not significant. We find no support for H2c.

H3a (education level) tests the effect of relatively low qualified population for HT entrepreneurship (population holding only a high school diploma as highest education level) and is significant. We have to reject H3a. It may be that a high share level of the population with only a high school diploma goes together with a

Table 1.2 Regression results for economy-wide (MTS) entrepreneurship

Variable	Beta (standardized)	Sig.	Rank
Infrastructure and industry externalities			
H1a: Population density	0.102	0.000***	9
H1b: Industry diversity	0.001	0.983	ns
H1b′: Large industrial firms	0.005	0.877	ns
H1c: Population growth	0.372	0.000***	1
H1d: Employment in large firms	−0.004	0.890	ns
H1e: Employment in small firms	0.060	0.109	ns
Entrepreneurial capital			
H2a: Firm survival rate	−0.171	0.000***	4
H2b: Owner-entrepreneurs	0.175	0.000***	3
H2b: Liberal and managerial professions	0.011	0.807	ns
H2b: Employees	0.182	0.000***	2
H2c: Regional decision centers	0.014	0.626	ns
Human capital			
H3a: Educational attainment	0.106	0.023**	8
H3b: Unemployment rate	0.148	0.000***	5
H3c: Social minima	0.023	0.629	ns
H3c: House owners	0.110	0.003***	7
H3d: Diversity	0.139	0.000***	6
Knowledge spillovers			
H4a: University	0.028	0.369	ns
H4b: Nonpublic R&D firms	0.025	0.403	ns
H4c: Computer and telecommunication	0.082	0.071	ns
H4c: Knowledge-based services	0.020	0.555	ns
H4c: High-tech industry	0.000	0.990	ns

$R^2 = 0.851$ (adj. $R^2 = 0.842$). *ns* not significant
**sign. 5 %; ***sign. 1 %

high level of firm start-ups because of the necessity effect: one cannot find a job with relatively low qualifications.

H3b (unemployment) intends to analyze the effect of satisfying local employment opportunities resulting in a significant correlation. We find support for H3b.

H3c (private capital) tests the local private investment potential for entrepreneurship (share of householders, share of population living under social minima standards). Only the richness descriptor obtains a positive and a significant result. We give partial support to H3c.

H3d (social diversity) uses one variable (share of foreigners) and is confirmed by the regression result.

The variables for H4a (university knowledge spillovers), H4b (R&D knowledge spillovers), and H4c (geographical proximity to incumbent HT firms) are not statistically significant which does not lead to support for H4a–c.

Table 1.3 presents the results obtained for each variable in the HT sector (see also Lasch et al. 2013). The setup is identical to that of Table 1.2 with the exception that MTS new firm formation is used as a control. Ten variables are significant at the 1 % level, four at the 5 % level, and seven obtain no significant result.

Table 1.3 Regression results for high-technology (HT) entrepreneurship

Variable	Beta (standardized)	Sig.	Rank
Control variable: economy-wide firm formation rate	0.328	0.000***	1
Infrastructure and industry externalities			
H1a: Population density	0.003	0.900	ns
H1b: Industry diversity	0.054	0.019**	13
H1b′: Large industrial firms	0.012	0.666	ns
H1c: Population growth	0.028	0.393	ns
H1d: Employment in large firms	0.082	0.002***	10
H1d: Employment in small firms	0.024	0.460	ns
Entrepreneurial capital			
H2a: Firm survival rate	0.029	0.266	ns
H2b: Owner-entrepreneurs	−0.089	0.000***	8
H2b: Liberal and managerial professions	−0.162	0.000***	4
H2b: Employees	−0.097	0.007***	7
H2c: Regional decision centers	0.141	0.000***	5
Human capital			
H3a: Educational attainment	0.135	0.001***	6
H3b: Unemployment rate	−0.054	0.134	ns
H3c: Social minima	−0.020	0.624	ns
H3c: House owners	0.032	0.313	ns
H3d: Diversity	0.087	0.003***	9
Knowledge spillovers			
H4a: University	0.068	0.011**	11
H4b: Nonpublic R&D	0.057	0.028**	12
H4c: Computer and telecommunication	0.269	0.000***	2
H4c: Knowledge-based services	0.179	0.000***	3
H4c: High-tech industry	0.044	0.029**	14

$R^2 = 0.890$ (adj. $R^2 = 0.883$). *ns* not significant
**sign. 5 %; ***sign. 1 %

Ranking the variables of the four factor groups, we obtain the strongest influence for external knowledge sources (H4), followed by entrepreneurial and human capital measure (H2 and H3). Agglomeration descriptors (H1) are the weakest factor group.

For this specific sector, the control variable cross-sectional new firm formation rate was introduced to see if HT entrepreneurship is influenced by the overall entrepreneurship level. While we find significant support for this trend, the results of the four factor groups and the variables used provide a totally different picture and give support to the specific nature of HT entrepreneurship analyzed on a regional level.

H1a (population density) does not yield a significant coefficient and H1a is not supported.

H1b (industry structure) uses two variables (industry diversification; large industrial firms). Statistical support is given to industry diversification, but not to large firms in the industry. We give partial support to H1b.

H1c (population growth) is not significant. Hence there is no support for H1c.

H1d is analyzed using employment in very large firms. We find support for H1d.

H1e is analyzed using employment in very small firms. We find no support for H1e.

H2a (firm survival) includes one variable. The regression result is not significant and we cannot claim support for H2a.

H2b (entrepreneurial capital) includes three variables (share of owner-entrepreneurs; liberal and managerial professions; share of salaried employees). All are statistically significant. We give full support to H2b.

H2c (regional entrepreneurial autonomy) is measured by employment in local firms depending on regional headquarters and is significant. We confirm H2c.

H3a (education level) analyzes the effect of the share of modestly qualified population for HT entrepreneurship (population holding high school diploma as highest education level). We find a positive and significant effect and have to reject H3a. The same effect is found in the analysis for the total MTS sector.

H3b (unemployment) intends to analyze the effect of satisfying local employment opportunities resulting in a not significant result. We find no support for H3b.

H3c (private capital) tests the local private investment potential for entrepreneurship suggesting a positive relationship for richness (share of householders) and a negative one for poverty (share of population living under social minima standards). Neither measure is significant. We find no support for H3c.

H3d (social diversity) uses one variable (share of foreigners) and is confirmed by the regression result.

The variables for H4a (university knowledge spillovers), H4b (R&D knowledge spillovers), and H4c (geographical proximity) are all statistically significant. We find support for H4a–c.

5 Discussion

Comparing the results for the total MTS sector and the high technology, we obtain the following set of widely contrasting results.

5.1 Economy-Wide Entrepreneurship (Table 1.2)

Ranking the variables of the four factor groups we obtain the best result for entrepreneurship capital. Human capital measures fit second best to explain why entrepreneurship happens in certain LMA.

Compared to HT entrepreneurship, knowledge spillovers don't play a role in our model, which is a new result as the literature suggests the positive effect of this factor for entrepreneurship in general. Finally, we cannot confirm a strong contribution of agglomeration and local industry indicators. We measure some

competitive advantages for entrepreneurs in agglomerations, but the only other significant variable indicates local market opportunities as a main driver for entrepreneurship. In sum, when entrepreneurship support designs policy measures, a strong relationship between incumbent entrepreneurship and human capital is to be considered and knowledge spillovers appear to play only a secondary role (or existing policy measures call for improvement). Finally, new entrepreneurship emerges relatively independent from incumbent industry structure but appears to be especially sensitive to local market opportunities.

5.2 HT Entrepreneurship (Table 1.3)

Ranking the variables of the four factor groups, we obtain a completely different picture as compared to the MTS results. We measure the strongest influence for knowledge spillovers, followed by entrepreneurial capital indicators. Human capital measures figure next, but only two of the variables are significant and they rank somewhere in the middle (respectively, 6 and 9 out of 14).

Agglomeration and local industry descriptors rank lowest. Our results describe HT entrepreneurship as relatively independent from incumbent industry structure, overall entrepreneurship conditions (nonsignificant firm survival, negative results for overall entrepreneurship capital as proxied by share of owner-entrepreneurs and entrepreneurial/managerial expertise) and strongly linked to the geographical proximity to same or similar firms. Similar to this, human capital measures tend to indicate that we deal much less than expected with the educated high-tech entrepreneur and more with social diversity features. To our surprise, both measures for external knowledge sources from universities or private R&D firms (interaction, networking, cooperation, exchange of tacit knowledge and specialized skills, etc.) considered crucial for knowledge-based entrepreneurship in literature produce only weak regression coefficients and rank only 11 and 12 out of 14. Geographical proximity being the predominant regional factor seems to support the Krugman and Porter principles of location highlighting clustering, interaction of firms, circular loops, and cumulative effects (see Lasch et al. 2013 for more discussion).

6 Conclusion

The objective of the paper is to provide an answer to the question whether regional factors have potential for explaining new firm formation using data of French industries in the period 1993–2001. We identified and measured 21 regional factors explaining economy-wide entrepreneurship, which we compare with the results for the high-tech (HT) industry. Overall, our findings give support to the argument that regional factors for economy-wide entrepreneurship are not generalizable for specific types of entrepreneurship or industries. Hence, entrepreneurship support

should be tailored to specific industries. Our results also suggest that that HT entrepreneurship happens predominantly in entrepreneurial places. This can be concluded from the result that economy-wide new firm formation influences HT new firm formation. Economy-wide entrepreneurship is mainly driven by entrepreneurial capital effects like share of self-employed and share of salaried employment in the active working population and human capital effects like educational attainment, unemployment rate, share of house owners, and share of foreigners. Locally bound knowledge spillovers do not seem to play a role. HT entrepreneurship appears to be relatively independent of incumbent agglomeration factors (industry diversity or incumbent large firms) and incumbent entrepreneurial capital or expertise but depends much on locally bound knowledge spillovers from incumbent knowledge-based firms (see Lasch et al. 2013 for more results).

Our work is not free of limits that are mainly linked to the methodological choice of the level of analysis (aggregate regional level). Our findings call to be tested using variables on individual or organizational levels of analysis. A replication of this study using other sectors as control variable would in our eyes provide additional results on the stability and generalization of location factors. Surprising results, such as perverse effects for the influence of firm survival rates and educational attainment and weak results for knowledge spillovers, present other challenges for future research.

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