Journal of Rural Studies 65 (2019) 143–151

Contents lists available at ScienceDirect

Journal of Rural Studies

journal homepage: www.elsevier.com/locate/jrurstud

Enterprise-related social capital as a driver of firm growth in the periphery?

Antoine Habersetzer[a,*], Sandra Grèzes-Bürcher[b], Ron Boschma[c,d], Heike Mayer[a]

[a] Institute of Geography, Center for Regional Economic Development, University of Bern, Hallerstrasse 12, 3012, Bern, Switzerland
[b] Institute of Tourism, HES-SO Valais Wallis, Rue de la Technopôle 3, 3960, Sierre, Switzerland
[c] Department of Human Geography and Planning, University of Utrecht, Heidelberglaan 2, 3584 CS, Utrecht, the Netherlands
[d] UiS Business School, Stavanger Centre for Innovation Research, University of Stavanger, Stavanger, Norway

ARTICLE INFO

Keywords:
Social capital
Periphery
Survey data
Switzerland

ABSTRACT

Social capital plays an important role in firm competitiveness and firms located in peripheral regions may benefit from different types of social capital such as that gained from contacts to other business partners (production-related) or that gained from contacts with external actors like policymakers and politicians (environment-related). We investigate production-related and environment-related social capital of firms located in Swiss peripheral regions and fill a research gap by empirically testing the influence of those two types of social capital on firm performance. Using a unique matched dataset (survey data and register data), we investigate if and how different kinds of networks, and their geography, influence firm growth in peripheral regions. We find that environment-related social capital has, in most cases, positive effects on firm growth. This holds especially for extra-regional social capital. For production-related social capital, however, a positive effect is only significant for geographically proximate clients and suppliers. Consequently, conclusions about what drives firm growth in the periphery have to be nuanced and need to encompass different approaches and explanations.

1. Introduction

Many studies show the positive influence of social capital on firm growth and regional development (Malecki, 2012; Luo et al., 2004; Neira et al., 2009). Especially so-called enterprise-related social capital and the corresponding networks seem to have significant influence on firm performance, as it facilitates knowledge exchange (Westlund, 2006; Tregear and Cooper, 2016). This type of social capital could be particularly important in peripheral regions where local knowledge spillovers are limited (Grillitsch and Nilsson, 2015), and organizations (e.g. innovation facilities) and institutions (e.g. innovation culture) favouring innovation are weakly developed (Trippl et al., 2016; Tödtling and Trippl, 2005). Consequently, firms in the periphery might compensate local organizational and institutional thinness by establishing enterprise-related social capital at various geographical scales.

The importance of social capital for firms in peripheral regions has been increasingly stressed by economic geographers (Tödtling et al., 2012; Rodríguez-Pose and Fitjar, 2013; Flåten et al., 2015; Grillitsch and Nilsson, 2015). However, social capital has often been understood in a narrow sense, only encompassing production-related networks such as ties to suppliers, customers and research institutions (Westlund, 2006). These are surely important to compensate limited local knowledge spillovers and organizational thinness in the periphery. However, as Westlund (2006) underlines, other types of internal and external enterprise-related social capital also seem to play a crucial role for firm performance. External environment-related social capital that, for example, goes beyond technical-financial aims seems to be of particular importance as well, as it can connect firms to other actors, such as political decision-makers or lobbying groups (Westlund, 2006). This is especially important for firms in peripheral regions often characterized by a weakly developed cooperation culture and difficulties to sensitize political decision makers for the challenges of conducting business in the periphery (Trippl et al., 2016; Tödtling and Trippl, 2005). We argue that networks to political decision-makers at the regional and extra-regional level also positively influence firm growth, as firms have access to (political) knowledge that might be relevant for their business and can lobby for their specific interests in order to improve the conditions of doing business in the periphery.

Therefore, we investigate two of the components Westlund (2006) suggests in his theoretical framework, namely production-related social capital and environment-related social capital of firms. There is a lack of studies empirically testing the influence of those two types of social capital on firm performance. Hence, our empirical strategy consists of analysing different types of networks, which we attribute to specific

* Corresponding author.
E-mail addresses: antoine.habersetzer@giub.unibe.ch (A. Habersetzer), sandra.grezes@hevs.ch (S. Grèzes-Bürcher), r.boschma@geo.uu.nl (R. Boschma), heike.mayer@giub.unibe.ch (H. Mayer).

https://doi.org/10.1016/j.jrurstud.2018.10.009
Received 28 April 2017; Received in revised form 28 October 2018; Accepted 29 October 2018
Available online 13 November 2018
0743-0167/

types of social capital. We investigate if and how different kinds of networks influence firm growth in peripheral regions.

The aim of this article is to contribute to the understanding of the importance of social capital for firm growth in peripheral regions, where doing business is particularly challenging. We aim to give a more nuanced picture of social capital and firm growth in the periphery by distinguishing between production-related and environment-related networks at different spatial levels. Our empirical material is based on 441 responses (corresponding to a rate of return of 45%) from a survey sent to all manufacturing firms in six Swiss peripheral regions. The survey gives unique insight into enterprise-related social capital of firms in the Swiss periphery. The survey data was further enhanced by matching it with official register data. We thereby utilize a unique data set that combines survey data with trade register microdata at the firm level. The remainder of the paper consists of three sections. The following discusses the concept of enterprise-related social capital and the specificities in the case of firms in the periphery in terms of the importance of geographical proximity and distance of network ties. Section 3 presents details on the case study regions, the survey and sample, as well as the employed methods. The results of our quantitative analysis are shown in section 4, and concluding remarks are discussed in section 5.

2. Theoretical framework: enterprise-related social capital in peripheral regions

Social capital can be defined as consisting of 'networks of actors and the norms and values being distributed in these networks' (Westlund and Adam, 2010, 897). There is a large amount of studies investigating the influence of social capital of the civil society, i.e. society-related social capital which has mainly non-economic purposes on regional development (Sabatini, 2008; Knack, 2003; Callois and Aubert, 2007; Neira et al., 2009). The principal argument is that people who collaborate in non-economic contexts are also ready to work together in economic settings (Westlund and Adam, 2010). On the other hand, some studies focus on social capital at the firm level more specifically, i.e. so-called enterprise-related social capital and its influence on firm performance (Westlund and Nilsson, 2005; Cooke and Clifton, 2004; Cooke et al., 2005). Enterprise-related social capital gives a firm access to different sources of knowledge and relevant information. As firms in developed knowledge economies increasingly rely on external sources of knowledge to stay competitive, enterprise-related social capital has the potential to increase firm competitiveness, and thus firm growth positively. Cook found that "social capital is indeed a key ingredient of successful SME performance (2007, 100).

Westlund distinguishes between different forms of enterprise-related social capital, namely enterprise-internal social capital on the one hand, and external production-related, environment-related and market-related social capital on the other hand (Westlund, 2006). We focus on external production-related and environment-related social capital, which seem to be especially important to firms in peripheral regions. Peripheral regions show various characteristics that make these two types of social capital crucial to firms located there. More specifically, peripheral firms utilize production-related and environment-related social capital to overcome periphery-specific challenges, such as limited local knowledge spillovers (Grillitsch and Nilsson, 2015), weakly developed organizations (e.g. innovation facilities or legal and financial consulting companies) and institutions (e.g. innovation culture, policies), as well as limited political power due to a lack of a critical mass of firms (Trippl et al., 2016; Tödtling and Trippl, 2005). Moreover, social capital contributes to trust building and consequently the willingness of firms and other actors to collaborate, which might positively influence firm performance. This is particularly important in peripheral regions where strong in-group ties and fragmented social capital might prevail (Jack, 2005).

So far, however, the literature on the relationship between enterprise-related social capital and firm performance in the periphery has predominantly focused on production-related social capital in the form of innovation linkages or connections with customers and suppliers and the spatial extent of those linkages. For example, Grillitsch and Nilsson (2015) found evidence for firms in peripheral regions in Sweden that compensate for a lack of local knowledge spillovers by collaborating more at all spatial scales. Rodríguez-Pose and Fitjar (2013) underline the importance of extra-regional networks to access new knowledge that is relevant for innovation for firms outside metropolitan regions in Norway, although such networks need more planning and are relatively costly. Tödtling et al. (2012) found evidence that international knowledge sources including customers and suppliers enhance the innovativeness of information and communication technology (ICT) firms in 'thin' regional innovation systems. Flåten et al. (2015) emphasise that national and global knowledge sources are critical for innovation and therefore global competitiveness of two successful firms in an organisationally thin region in Norway.

This preoccupation with production-related social capital, which includes networks to suppliers, customers and R&D partners (Keeble and Wilkinson, 1999; Westlund and Nilsson, 2005), however, does not take into account that firms in peripheral regions also engage in networks that produce environment-related social capital.

Environment-related social capital encompass networks that go beyond technical/financial-related concerns (Westlund, 2006). Environment-related social capital not only includes relations among firms, but also between firms and other actors such as policy makers, business associations, industry groups, etc. These broader, more diverse networks, going beyond production-related social capital, can have positive effects on firm competitiveness. For example, national policy makers might prioritize the needs of firms in agglomerations due to several reasons. First, firms in agglomerations generally outnumber those in the periphery and thus would have a stronger weight when it comes to decision-making. Second, firms in agglomerations are often (geographically) closer to political decision-makers than their counterparts in peripheral regions and have therefore more and better opportunities to lobby personally and even informally for their interests. Consequently, laws and regulations that take into consideration the particularities in peripheral regions are rather thin, which impacts on economic development (Trippl et al., 2016). By influencing the legal framework, the conditions for doing business in the periphery can be improved. This in turn, could influence firm performance.

Firms can reach those public decision-makers via business associations, informal networks or the attendance of fairs and events that assemble representatives of the economic and political world (Westlund, 2006). Moreover, when several firms collaborate in informal networks or business associations, reciprocal trust can be increased, opportunistic behaviour decreased and operational advantages of networking can be facilitated (Cisi et al., 2016). Through business associations, member firms can access "a set of collective services including public R&D facilities, legal and financial advice, marketing, and all typically at a lower cost due to staff expertise, economies of scale and lower transaction costs" (Tomlinson and Branston, 2017, 3). This could positively influence firm growth. Moreover, memberships in extra-regional informal networks, and business associations in particular, open up contacts to influential political decision-makers. There is empirical evidence that political networks of firms can have positive effects on firm profitability by influencing the regulatory environment, facilitating the access to bank financing or by giving access to profitable contracts in public procurement e.g. (for a list, see Sokolov and Solanko, 2016). Hence, access to different types of social capital seems to be especially important (Lechner et al., 2006) for doing business in peripheral regions.

In order to find empirical evidence on our two forms of social capital, we focus on three manifestations of enterprise-related social capital, namely relations to important innovation partners, participation in informal networks, and memberships in business associations (BA).

Relations to important innovation partners such as suppliers, clients, and supporting industries represent traditional production-related social capital. Environment-related social capital is operationalized by informal networks, which consist of relations that include other actors than firms who are relevant regarding the specific interests of firms in peripheral regions. Examples are for instance political decision-makers. These networks are informal insofar as they are not part of an official organisation and gatherings take place relatively irregularly. Informal networks seem to be especially important for firms sharing the same interests in gathering with different types of actors in an uncomplicated way, to exchange knowledge and to lobby for their political interests (Tomlinson and Branston, 2017). Another form of environment-related social capital is built through membership in business associations and can be oriented towards the region, extra-regional or even national level. In some cases, memberships in BAs can have public good properties as firms may seek influence to improve framework conditions for all firms in the region. However, firms that engage in these networks may have an advantage over those that do not because they may be able to also use the established contacts to advocate for specific interests that all firms of a region share, or to access specific knowledge that non-members cannot acquire.

To sum up, the three network types include knowledge sources that are relevant for production and innovation (relations to innovation partners), and networks that go beyond the immediate needs of production (informal networks, BA memberships). The latter enable firms to access important political information and to influence political decisions at best, but also give access to important legal, financial or innovation services that help firms save transaction costs (Tomlinson and Branston, 2017). Generally speaking, good relations to innovation partners, engagement in informal networks as well as memberships in BA supposedly have positive effects on knowledge exchange and facilitate access to political decision-makers, which can in turn have a positive influence on the competitiveness of the firms (Giuliani, 2007). When investigating social capital and its influence on firm growth not only the type, but also the number of networks seems to be crucial (Lechner et al., 2006). We thus formulate as first hypothesis:

Hypothesis 1. *The higher the amount of important innovation partners, participation in informal networks, and BA memberships, the higher the firm growth.*

However, not only the raw amount of social capital has an influence on firm success, but also the geographical distribution of networks is important. The spatial dimension of production-related and environment-related social capital is a long-debated discussion in economic geography. Literature on clusters (Porter 1998, 2000; Giuliani, 2007), industrial districts (Asheim 1996, 2000; Amin, 2003), creative milieus (Crevoisier, 2001; Maillat et al., 1995; Camagni, 1991) or regional innovation systems (Doloreux and Parto, 2005; Tödtling and Trippl, 2005) has emphasized the importance of the immediate environment for knowledge exchange. Their main argument is that face-to-face contact and spatial proximity are indispensable for the exchange of uncodified, tacit knowledge (Giuliani, 2007). The importance of spatial proximity is also inherent in the concept of environment-related social capital.[1] In general, social relations to the local community engender trust and collaboration which can also affect the quality of inter-firm networks (Keeble and Wilkinson, 1999).

Nevertheless, those networks can reach further than the immediate environment and can include national and transnational scales (Westlund and Nilsson, 2005). Bathelt et al. (2004) examined in depth the advantages of both 'local buzz and global pipelines' and argued for a more nuanced understanding. Local networks for example, often have similar characteristics as Granovetter's (1973) strong ties, that are characterized by high levels of trust. Too many strong ties, however, can often act as a barrier to the acquisition of information (Malecki and Poehling, 1999) and lead to functional, cognitive and political lock-ins as shown for the case of old industrial areas (Hassink, 2005). This can also negatively influence innovation (Uzzi, 1997). In contrast, weak ties, which often correspond to extra-regional networks (Atterton, 2007), entail new information, as they 'can reach outside one's own immediate network or social circle and into new areas of information and opportunity' (Cooke et al., 2005, 1067). Moreover, they can create access to important policy-makers at the extra-regional level. Membership in extra-regional BA gives firms of the periphery access to a critical mass to benefit from different services (Tomlinson and Branston, 2017). However, extra-regional networks have some disadvantages, too. For example, it can be very costly to establish extra-local relations as they need a lot of planning and it takes time to create trust over distance, which is however a prerequisite for successful relations. In general, there is a large uncertainty with regard to communication processes in extra-regional networks (Bathelt et al., 2004; Dubois, 2016).

As noted earlier, previous literature on production-related social capital has shown the importance of extra-regional knowledge networks for firms in the periphery (Isaksen and Trippl, 2014; Lagendijk and Lorentzen, 2007; Grillitsch and Nilsson, 2015; Rodríguez-Pose and Fitjar, 2013; Tödtling et al., 2012). Hence, it is crucial to take into consideration the spatial extent of those networks. Too many local networks could lead to a lock-in with regard to knowledge and information exchange because important knowledge sources and key actors are predominantly located in metropolitan regions (Grillitsch and Nilsson, 2015; Rodríguez-Pose and Fitjar, 2013). Moreover, too many regional environment-related networks gathering always the same people and (political) decision-makers could lead to a cognitive lock-in. Therefore, by enlarging and renewing their interest networks and by being members in extra-regional BAs, firms from peripheral regions can state their interest in associations and informal networks that dispose of a higher number of members/participants and therefore more political weight (Tomlinson and Branston 2014, 2017). By participating in extra-regional BAs or in informal networks, they are closer to decision-makers who have a certain competence to influence the economic framework conditions for doing business in the periphery. There is however, a lack of empirical evidence on the influence of membership in regional and extra-regional BAs and informal networks on firm growth. Nevertheless, we argue that for production-related and environment-related networks, it is important to have extra-regional networks, as this avoids lock-in of any kind, particularly for firms in the periphery. Thus, we hypothesize that:

Hypothesis 2. *Having innovation partners, informal networks, or BA memberships outside of the home region increases firm growth.*

3. Case study regions and methods

We investigate six case study regions in Switzerland (see Fig. 1) that are located outside the Swiss metropolitan areas.[2] This corresponds to Lagendijk and Lorentzen's (2007) definition of periphery. The decision to take six case study regions should be understood as a compromise: On the one hand, we increase the quality and robustness of our results by using more than just one case study region, on the other hand, we

[1] For example, environment-related social capital also includes networks of firms to the local civil society and their organizations, and concern therefore their socio-spatial embeddedness (see Korsgaard et al., 2015; McKeever et al., 2015). Those networks help to increase the acceptance of the firm in the local community. This can be especially important for small enterprises that serve their local market.

[2] Five metropolitan regions have been defined for Switzerland, namely Geneva-Lausanne, Bern, Basel, Zurich, and southern Ticino (Schuler et al., 2005).

Fig. 1. The six case study regions and the metropolitan areas in Switzerland. Source: Map base layer by the Swiss Federal Office of Topography, www.geo.admin.ch.

limit the time effort and costs associated with surveys by limiting the number of regions covered. With our case study regions, we cover roughly ten percent of the population, manufacturing firms, and manufacturing employees in peripheral regions of Switzerland.[3] We define periphery rather broad in this paper, as the usual characteristics of periphery including low population density and spatial distances (Pato and Teixeira, 2014) are less important in Switzerland. Yet, our case study regions are peripheral in several other respects (see Table 1). First, settlement sizes are quite small, with the largest city having slightly more than 11,000 inhabitants. Thus, urbanization effects will be relatively low. We also consider spillover effects from metropolitan regions to be limited due to two aspects. First, the definition of metropolitan regions in Switzerland is based on commuting patterns (Dessemontet et al., 2010). Thus, areas outside of metropolitan regions show a low degree of interaction regarding commuters. Second, our case study regions generally show a different economic structure (a dominant manufacturing sector, relatively low educational levels, and relatively low average wages) and lower growth rates in comparison to core regions (Dessemontet et al., 2010), which further supports the assumption that they are not part of the wider metropolitan area, but constitute a distinct type of regional economies that is only to a limited extent influenced by metropolitan regions. Finally, political and economic actors from the case study regions have the possibility to apply for supporting measures within the framework of the 'New Regional Policy', a policy specifically designed to support firm competitiveness and renewal of rural and mountainous regions (Organisation for Economic Co-Operation and Development, 2011).

The employed dataset is derived from a survey conducted among manufacturing firms in the six peripheral regions in Switzerland. Questionnaires were sent to the complete base population of 978 firms, from which 441 responded. This corresponds to a relative sample size of 45%, which is rather high and seems to be related to the application of Dillman et al.'s (2014) tailored design method. We compared the frequency distributions of our sample and the base population regarding location (with regard to the case study regions), industry sectors, age, and size of firms. A comparison between the survey sample and the base population can be found in appendix A.

The survey data was then matched with register data from the STATENT database of the Swiss Federal Statistical Office to gain a more robust dependent variable (firm growth in terms of employment between 2012 and 2016). The matching was performed using the company name (as specified in the Swiss Trade Register) as matching variable. As both datasets rely on information from the Swiss Trade Register,[4] data matching proved effective. A manual consistency check was performed by comparing firm age and firm size variables from both datasets. Eventually, 388 matched observations could be used for the statistical analysis.

The data was treated as survey data and stratified by regions for the subsequent analyses. As for most surveys, questionnaires were partly incomplete. In order to minimize possible biases resulting from incomplete cases (Little and Rubin, 2002), a multiple imputation method was used instead of simply dropping incomplete cases. Missing values were sequentially imputed using chained equations (White et al., 2011) comprising all variables that will later be used in the final regression models. Roughly, one out of four cases have missing values and 5% of all values are missing. 30 imputed datasets are created.[5]

As outlined in the previous section, we are interested in the influence of enterprise-related social capital on the creation of new jobs in the periphery. Our inferential models use as dependent variable the yearly average percentage change of employees of a firm. More specifically, we calculate the relative change of employees in 2016 based on

[3] These figures are based on the statistical sources used in Table 1.

[4] The sample for the survey was deduced from a list of company names and their location based on Swiss Trade Register information.

[5] In order to assess whether the imputed values lie in an acceptable range, Monte Carlo error estimates are calculated. For all relevant variables, the ratio between MCE estimates of coefficients and standard error of the coefficients, MCE estimates of test statistics, as well as MCE estimates of p-values meet the conditions defined by White et al. (2011) so that we can reasonably assume that our results are statistically reproducible.

Table 1
Descriptive statistics on case study regions.
Sources: Swiss Statistics: STATENT and STATPOP datasets; Swiss Federal Tax Administration: Tax Statistics dataset; figures for 2014 if not stated otherwise

	Total Population	Largest Town	Share of workers in 2. Sector	Average Income per capita (2013)	Share of population over age of 25 with university degree
Case study regions	189,172	11,168	37.5%	28,971	22.5%
City of Zurich	384,786	384,786	6.6%	41,963	47.3%
Metropolitan region of Zurich	1,919,214	384,786	17.3%	43,374	n. a.
Switzerland	8,139,631	384,786	21.8%	36,286	31.0%

the number of employees in 2012. Thus, a value larger than 100 signifies an increase in employment, a value smaller than 100 a reduction in employment. The data for the dependent variable was not retrieved from the survey, but from register data from the STATENT database of the Swiss Federal Statistical Office. This data was matched to the survey data as outlined earlier. This gives us further information on the firms of the survey and guarantees that our dependent variable is more robust.

Our main explanatory variables can be subdivided into three types of network relations: First, we assess the number of important innovation partners (variable: *innovation partners*) as an indicator for production-related social capital. We define partners as important if respondents stated that the respective innovation partner was "rather important" or "very important". If one accepts that firms have regular and intensive interaction with important business partners, it is reasonable to assume that having more important business partners also means having more social capital. Respondents were asked to specify the importance (on a Likert scale) of different types of partners regarding innovation. In our analysis, this comprises clients, suppliers, and supporting industries (such as IT companies or design agencies).[6] The variable *innovation partners* depicts how many of those three possible innovation partners a firm regards as important.

Second, we count the number of informal network types firms are active in, as an indicator for environment-related social capital. Here again, more networks mean more social capital in the form of more important acquaintances. In this respect, respondents were asked to state whether they are active in (1) informal networks with other entrepreneurs or company executives, (2) informal networks with a variety of actors (not only entrepreneurs or company executives), or (3) sporadic networking events comprising both economic and political actors. The variable *informal networks* counts the number of network types the company is active in, and can take values between zero and three.

Third, the variable *BA memberships* depicts the number different types of business associations a company states it is a member of, as a further indicator for environment-related social capital. Business associations can either represent only locally active specialized industry associations *(regional BA memberships)*, region-overarching specialized industry associations *(extra-regional BA memberships)* or nationally organized general employer's associations *(National BA memberships)*. This way firms can try to influence politics at different scales.

Further, we specify the geographical extent of innovation partners, informal networks and BA memberships. We create binary variables for the geographical location of every type of innovation partner, that is, clients, suppliers, and supporting industries (*regional clients, regional suppliers, and regional supporting industries*). The geography of innovation partners and informal networks can be analysed by differentiating them into regional and extra-regional ones. Binary variables are constructed in order to depict whether a firm's innovation partners are located in the same region or not. For informal networks, we differentiate whether a firm is active in at least one regional or extra-regional network. Concerning the geography of BA memberships, three different variables are constructed, depicting whether a firm is a member in at least one regional, extra-regional, or national business association.

Three firm-level control variables are added to the models, namely the size of the firm (*Firm size*, measured as the natural logarithm of the number of employees in 2012, the innovativeness of the firm (*innovative*, measured as bivariate variable whether or not the firm brought an innovation to the market during the last five years), and the age of the firm (*firm age,* measured as the natural logarithm of the number of years of existence). Further, we control for the overall economic dynamics in manufacturing industries within a municipality by measuring the average percentage change of employment of manufacturing firms between 2012 and 2016. Finally, we include fixed effects dummy variables for industry[7] and region. Table 2 shows the descriptive statistics for the employed variables; appendix B gives a summary of variable descriptions and appendix C the correlation table. We use linear OLS models for our analysis. The results from the linear models are reported in Table 3.

4. Results

We first investigate whether the control variables show the expected tendency. Model 1 depicts the influence on yearly average employment change of firm size, innovativeness, firm age, and the general local development dynamic. All control variables are significant and show that smaller, younger, and more innovative firms create more jobs. Further, firms located in municipalities with a generally favourable employment dynamic will show higher job growth rates themselves.

In model 2, we add the number of important innovation partners, the number of informal networks and the number of business associations firms are active in. Only the coefficient for memberships in BA is significant and shows that a higher number of membership has a positive effect on firm growth. We can thus confirm Hypothesis 1 only with respect to memberships in BA, where we see a positive effect on firm growth.

In Model 3, we analyse if different types of innovation partners have different effects on firm growth. We thus split the *innovation partners* variable into our three different innovation partner types. The insignificant results hint at the fact, that the location of those might be important. This is what we investigate in the next model.

In model 4, we take a closer look at the geographical patterns of our social capital indicators. More specifically, we analyse which effect on job creation regional or extra-regional informal networks, BA memberships, and innovation partners have (for a detailed variable description, see appendix B). The results for extra-regional informal

[6] The questionnaire asked about 7 types of innovation partners in total. These comprise both economic and non-economic actors. For our analysis of production-related social capital, only innovation partners related to production are taken into account. Further, some innovation partners are excluded from the analysis because of high missingness. Thus, in the final analysis, we only take into account three innovation partners representing production-related social capital.

[7] Two-digit NOGA-codes are used to differentiate industries. The Swiss NOGA codes are based on the European NACE code rev.2. Since we only took manufacturing firms (excl. manufacturing of food and beverages) into account, 21 different industry classes are present in the dataset.

Table 2
Descriptive statistics on variables.

Variable name (n = 388)	Mean	Std. Dev	Min	Max
Firm growth (dependent variable)	108.5	22.70	74.3	256.1
Firm size (ln)	1.981	1.475	0	7.04
Innovative	0.393	0.488	0	1
Firm age (ln)	3.245	0.943	0	5.352
Local growth	104.5	7.055	93.1	139.1
Informal networks	1.306	1.096	0	3
BA memberships	1.322	1.009	0	3
Innovation partners	1.222	0.864	0	3
Regional informal networks	0.553	0.497	0	1
Extra-regional informal networks	0.566	0.496	0	1
Regional BA memberships	0.619	0.486	0	1
Extra-regional BA memberships	0.348	0.476	0	1
National BA memberships	0.356	0.479	0	1
Regional clients	0.187	0.390	1	1
Regional suppliers	0.084	0.278	1	1
Regional supporting industries	0.158	0.365	1	1

Note: descriptive statistics are based on the imputed data sample.

Table 3
OLS regression with firm growth as dependent variable.

	Model 1	Model 2	Model 3	Model 4	Model 4
Firm size	−4.159*** (0.716)	−5.192*** (0.828)	−5.183*** (0.832)	−5.452*** (.0889)	−5.376*** (0.880)
Innovative	6.939*** (1.832)	7.026*** (1.971)	7.147*** (1.877)	6.935*** (1.817)	6.777*** (1.815)
Firm age	−2.564** (1.146)	−3.229*** (1.064)	−3.210** (1.073)	−2.960*** (1.101)	−2.955*** (1.102)
local growth	0.708*** (0.152)	0.698*** (0.158)	0.702*** (0.157)	0.711*** (0.155)	0.708*** (0.154)
Networks		1.015 (0.683)	1.049 (0.677)		
Memberships		2.848*** (1.066)	2.731*** (1.056)		
Innovation partners		−0.928 (0.894)			
Clients			−2.354 (1.812)		
Suppliers			−1.997 (1.506)		
Supporting industries			2.059 (1.632)		
regional informal networks				−3.454 (2.107)	−3.645* (2.131)
Extra-regional informal networks				6.597*** (1.975)	4.829*** (2.148)
Regional BA memberships				1.432 (1.523)	1.528 (1.524)
Extra-regional BA memberships				5.851*** (2.094)	5.579*** (2.038)
National BA memberships				1.791 (1.332)	−1.483 (2.148)
National BA memberships * Extra-regional informal networks					5.362* (2.834)
Regional clients				3.679 (2.237)	3.821* (2.255)
Regional suppliers				5.063* (2.851)	4.892* (2.857)
Regional supporting industries				−3.541 (2.373)	−3.392 (2.361)
Constant	52.63*** (17.50)	44.10*** (17.68)	56.22.15*** (17.46)	52.72*** (18.19)	53.50*** (18.00)
Industry FE	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
R^2	0.238	0.272	0.297	0.297	0.304
N	388	388	388	388	388

Standard errors in parentheses; *p < 0.1, **p < 0.05, ***p < 0.01.

networks show a positive effect on firm growth. With regard to BA memberships, only extra-regional BA memberships are significantly associated with higher growth rates. The positive effects of non-local informal networks and memberships in BA thus confirm Hypothesis 2.

With respect to the geography of innovation partners, the results hint towards an advantage of having them at proximity. Firms having important suppliers in their region show significantly higher growth rates. This is a surprising result, as the literature on organizational thinness would argue that peripheral regions are characterized by a lack of innovation networks. One would thus expect that firms in the periphery profit from extra-regional ties to important innovation partners. This assumption, however, does not seem to hold for our case study regions.

In a final step, we want to have a closer look at interaction effects between extra-regional informal networks and BA memberships. We tested several interaction effects between informal networks and BA memberships, but only found one significant coefficient, that is, between extra-regional informal networks and national BA memberships. Interestingly, the results of model 4 show that the interaction term's coefficient is positive, which suggests that extra-regional informal networks and national BA memberships affect each other, with the effect that firms holding both characteristics grow faster than firms holding just either one of them. Further, regional informal networks now show a significant negative effect on firm growth, and having regional clients as innovation partners is now positively attributed to firm growth.

5. Discussion and conclusion

This article sought to specify the effects of different forms and spatial levels of enterprise-related social capital on employment growth of firms in the periphery. In general, we state that the conventional wisdom of 'the more social capital the better' is indeed too simplistic as Eliasson et al. (2013, 114) underline. In that sense, this study contributes to research on enterprise-related social capital and its influence on firm growth in peripheral regions by drawing a more nuanced picture. It challenges conventional assumptions regarding social capital by illustrating that more social capital does not always mean better and by shedding light on different types of social capital.

More specifically, the results show that it is important for firms in peripheral regions to have regional clients and suppliers as innovation partners. This speaks for the assumption in the literature that closely located clients and suppliers might be relevant in order to get access to important knowledge (North and Smallbone, 2000). This is quite surprising as several empirical studies showed that extra-regional innovation partners seem to be especially important for firms in peripheral regions (Fitjar and Huber, 2015). Hence, the proximity of firms to their clients and suppliers seems to be valid also for the peripheral regions under scrutiny and probably has a similar positive effects as in a cluster (access to tacit knowledge, quick testing of prototypes, reduction of transaction costs etc. (Porter, 1998)).

For informal networks, there is no specific tendency that more involvement is generally better for firm growth. In this case, the geography of informal networks seems to be more important than the mere

amount. The significantly negative effects of regional informal networks supports the claim that regional networks in peripheral regions might come with a risk of over-embeddedness (Uzzi, 1997) or lock-in (Atterton, 2007), which can occur when regional informal networks are dominated by only a few decision-makers from the economic or political sphere. These may probably not be open for new ideas or try to ensure their own interests (Bürcher 2017). It thus seems to be important for firms in the periphery not to focus only on regional informal networks, which speaks for the assumption that organizational and institutional arrangements in the periphery are thin. On the other hand, involvement in extra-regional informal networks has a positive effect on firm growth, which speaks for the assumption that these can be important knowledge sources. More specifically, informal networks that connect peripheral firms with policymakers and interest groups that go beyond their own region, may help them access important information about laws, regulations, standards and have more weight to influence them and lobby for their specific interests (see Westlund, 2006).

In line with our assumption, a higher number of memberships in BAs has positive effects on firm growth, especially for extra-regional and national BAs memberships. This confirms on the one hand the assumption that BAs rather positively influence the success of a firm, which is widespread, especially in the cluster literature and the literature on industrial districts (Giuliani, 2007; Tomlinson and Branston, 2014). The positive influence of extra-regional and national BAs on firm growth seems to underline the importance especially for firms in peripheral regions to enlarge their sphere of influence by being closer to national decision-makers. Due to the access to more heterogeneous networks and therefore more potentially valuable information, firms from peripheral regions can overcome the typical strong ties existing in those regions with limited new information sources (see Jack, 2005).

Further, our results suggest a positive effect of extra-regional network engagement in informal networks for firms with memberships in national BAs. A possible explanation could be that firms that are members of national BAs get in contact with important political decision-makers. Then, they might go on to network with them via informal networks to lobby for their specific interests. This result suggests that firms can invest in both types of networks without having to expect that they negatively influence each other.

We thus conclude that environment related social-capital seems to play an important role for firm growth in the periphery. Especially extra-regional links to strengthen environment-related social capital seem to be beneficial. Future research is needed to better understand those enterprise-related networks in peripheral regions and especially to find out more about the concrete role of regional suppliers and extra-regional BAs and informal networks. More generally speaking, our study shows diverging results regarding regional and extra-regional forms of social capital. We can thus not confirm that extra-regional ties are always advantageous for firms in the periphery, nor are regional ties always disadvantageous. More research is needed to better understand under which conditions regional and extra-regional social capital can be positively used by firms in the periphery.

The study does not come without limitations. First, this is a study of firms in peripheral regions in Switzerland. With its specificities regarding the natural preconditions, the relatively small size of the country, and its unique political-institutional framework, the transferability of our results to other countries is certainly limited to a certain degree. Further, we do not consider non-economic social capital. This might however be especially important for peripheral regions, where the degree of voluntary engagement is higher than in metropolitan regions, at least in Switzerland (BFS, 2015). In addition, our relatively small sample size does not allow to look more specifically into single industries. It is however likely that social capital phenomena differ between industries. Case studies on individual industries could yield interesting results in that respect. Finally, our quantitative study cannot give insights into the motivations of firms to engage in networking activities, and on the specific type of knowledge that is exchanged. Qualitative studies investigating in further detail, why firms engage with innovation partners, in networks and business associations, which type of knowledge they exchange and how they make use of their social capital might yield intriguing results on the advantages and disadvantages of social capital for firms in the periphery.

Acknowledgements

The authors would like to acknowledge financial support from the Swiss National Science Foundation (grant number 146436). We also thank the Swiss Federal Statistical Office for the opportunity to work with their register data.

Appendix A. Frequency tables for some key characteristics of sample and base population

	Base population (N = 978)		Survey Sample (N = 441)	
	Number of Firms	Percent	Number of Firms	Percent
Regional distribution				
Rheintal	474	48.47	198	44.90
Toggenburg	179	18.30	102	23.13
Obwalden	170	17.38	71	16.10
Entlebuch	44	4.50	26	5.90
Klettgau	60	6.13	28	6.35
Diessenhofen	51	5.21	16	3.63
Firm size distribution (No. Of employees)				
Microfirms (< 10)*	679	69.43	292	66.21
Small firms (10–49)	216	22.09	105	23.81
Medium Sized firms (50–249)	68	6.95	36	8.16
Large firms (> 250)	15	1.53	8	1.81
Industry distribution (based on Swiss NOGA 2-digit Industry classification)				
Textiles, Clothing, Leather, Shoes (13,14,15)	51	5.21	23	5.22
Wood processing, Furniture, Paper, Printing (16,17,18,31)	271	27.71	141	31.97
Chemicals, Pharmaceuticals (20,21)	36	3.68	14	3.17
Rubber, plastics, glass, ceramics, stone processing (22,23)	88	9.00	31	7.03
Metal products, metal casting (24,25)	249	25.46	109	24.72
Electrical and optical instruments (26,27)	92	9.41	43	9.75
Mechanical engineering, cars, other vehicles (28,29,30)	122	12.47	49	11.11
Other Products (32)	69	7.06	31	7.03
Age distribution				
0–9 years	267	27.30	109	24.72
10–19 years	275	28.12	124	28.12

20–49 years	348	35.58	165	37.41
> 50 years	88	9.00	43	9.75

* Among these microfirms, 27% are single employee firms.

Appendix B. Description of employed variables

Variable	Variable type	Description
Firm growth	binary	Yearly average percentage change of employees of a firm within in the timespan 2012–2016
Firm size	Metric	Natural logarithm of number of employees of the firm
Innovative	binary	Variable = 1 if respondent states that the firm introduced an innovation to the market during the last five years
Firm age	Metric	Natural logarithm of number of years a firm is in existence
Local growth	Metric	Average percentage change of employment of manufacturing firms of firms between 2012 and 2016
Networks	Metric	Number of informal network types the firm is active in
BA memberships	Metric	Number of industry association types the firm is a member of
Innovation partners	Metric	Number of innovation partner types the firm considers as important or very important
Clients	Binary	Variable = 1 if the firm states that clients are important innovation partners, 0 if otherwise.
Suppliers	Binary	Variable = 1 if the firm states that suppliers are important innovation partners, 0 if otherwise.
Supporting Industries	Binary	Variable = 1 if the firm states that supporting industries are important innovation partners, 0 if otherwise.
Regional networks	Binary	Variable = 1 if the firm is active in at least one regional network
Extra-regional networks	Binary	Variable = 1 if the firm is active in at least one extra-regional network
Regional BA memberships	Binary	Variable = 1 if the firm is a member in at least one industry associations where members only come from the region
Extra-regional BA memberships	Binary	Variable = 1 if the firm is a member in at least one business associations where association members come from different regions, but the association is not organized nation-wide.
National BA memberships	Metric	Variable = 1 if the firm is a member in at least one industry associations where members come from all over Switzerland
Regional clients	Binary	Variable = 1 if clients are located only at the regional level, 0 if they are not located at the regional level.
Regional suppliers	Binary	Variable = 1 if suppliers are located only at the regional level, 0 if they are not located at the regional level.
Regional supporting industries	Binary	Variable = 1 if supporting industries are located only at the regional level, 0 if they are not located at the regional level.

Appendix C. Correlation table

	n = 388	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Firm size	1														
2	Innovative	.31	1													
3	Firm age	.51	.07	1												
4	Local growth	-.08	.00	-.05	1											
5	Networks	.26	.15	.16	.06	1										
6	BA memberships	.53	.16	.48	-.02	.29	1									
7	Innovation partners	.14	.19	-.01	.06	.18	.06	1								
8	Regional networks	.23	.12	.19	.03	.70	.27	.19	1							
9	Extra-regional networks	.22	.14	.08	-.01	.74	.22	.15	.46	1						
10	Regional memberships	.35	.06	.38	-.05	.27	.77	.07	.25	.19	1					
11	Extra-regional memberships	.53	.20	.33	.04	.21	.67	.00	.16	.18	.31	1				
12	National memberships	.24	.07	.30	-.03	.12	.66	.05	.14	.10	.30	.10	1			
13	Location of clients	-.18	-.19	.02	-.08	-.05	-.03	-.01	.07	-.11	-.01	-.16	.11	1		
14	Location of suppliers	-.07	-.08	.03	.09	.01	-.02	.06	.04	-.10	-.00	-.03	-.01	.18	1	
15	Location of supporting industries	-.08	-.09	-.03	-.01	.03	-.03	.10	.04	-.06	.04	-.07	-.04	.24	.20	1

Note: Correlation matrix is based on the imputed dataset.

References

Amin, A., 2003. Industrial districts. In: Sheppard, E., Barnes, T.J. (Eds.), A Companion to Economic Geography. Blackwell Publishing, Oxford, pp. 149–167.

Asheim, Bjørn, 1996. Industrial districts as 'learning regions': a condition for prosperity. Eur. Plann. Stud. 4, 379–400.

Asheim, Bjørn, 2000. Industrial districts: the contribution of Marshall and beyond. In: Clark, G.L., Feldman, M.P., Gertler, M. (Eds.), The Oxford Handbook of Economic Geography. Oxford University Press, Oxford, pp. 413–431.

Atterton, Jane, 2007. The 'strength of weak ties': social networking by business owners in the highlands and islands of Scotland. Sociol. Rural. 47 (3), 228–245.

Bathelt, Harald, Anders, Malmberg, Maskell, Peter, 2004. Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. Prog. Hum. Geogr. 28 (1), 31–56. https://doi.org/10.1191/0309132504ph469oa.

BFS, 2015. Freiwilliges engagement in der schweiz. Neuchâtel.

Bürcher, Sandra, 2017. Regional engagement of locally anchored firms and its influence on socio-economic development in two peripheral regions over time. Enterpren. Reg. Dev. 29 (7–8), 692–714. https://doi.org/10.1080/08985626.2017.1330903.

Callois, J.M., Aubert, F., 2007. Towards indicators of social capital for regional development issues: the case of French rural areas. Reg. Stud. 41 (October), 809–821. https://doi.org/10.1080/00343400601142720.

Camagni, Roberto, 1991. Introduction: from the local 'milieu' to innovation through cooperation networks. In: Camagni, Roberto (Ed.), Innovation Networks. Spatial Perspectives. Belhaven Press, London, pp. 1–9.

Cisi, M., Devicienti, F., Manello, A., Vannoni, D., 2016. The Impact of Formal Networking on the Performance of SMEs, vol. 39 Torino.

Cooke, Philip, 2007. Social capital, embeddedness, and market interactions: an analysis of firm performance in UK regions. Rev. Soc. Econ. 65 (1), 79–106.

Cooke, Philip, Clifton, N., 2004. Spatial variation in social capital among UK small and medium-sized enterprises. In: de Groot, H.L.F., Nijkamp, P., Stough, R. (Eds.), Entrepreneurship and Regional Economic Development. A Spatial Perspective. Edward Elgar, Cheltenham 107–37.

Cooke, Philip, Clifton, N., Oleaga, M., 2005. Social capital, firm embeddedness and regional development. Reg. Stud. 39 (8), 1065–1077. https://doi.org/10.1080/00343400500328065.

Crevoisier, O., 2001. Der ansatz des kreativen milieus: bestandesaufnahme und forschungsperspektiven Am beispiel urbaner milieus. Z. für Wirtschaftsgeogr. 45 (3–4),

246–256.
Dessemontet, Pierre, Kaufmann, Vincent, Jemelin, Christophe, 2010. Switzerland as a single metropolitan area? A study of its commuting network. Urban Stud. 47 (13), 2785–2802. https://doi.org/10.1177/0042098010377371.
Dillman, D.A., Smyth, J.D., Christian, L.M., 2014. Internet, Phone, Mail and Mixed-mode Surveys: the Tailored Design Method. Wiley, Hoboken, New Jersey. https://doi.org/10.1017/CBO9781107415324.004.
Doloreux, D., Parto, S., 2005. Regional innovation systems: current discourse and unresolved issues. Technol. Soc. 27 (2), 133–153. https://doi.org/10.1016/j.techsoc.2005.01.002.
Dubois, Alexandre, 2016. Transnationalising entrepreneurship in a peripheral region – the translocal embeddedness paradigm. J. Rural Stud. 46, 1–11. https://doi.org/10.1016/j.jrurstud.2016.05.003. Elsevier Ltd.
Eliasson, K., Westlund, H., Fölster, S., 2013. Does social capital contribute to regional economic growth? Swedish experiences. In: Westlund, H., Kobayashi, K. (Eds.), Social Capital and Rural Development in the Knowledge Society. Edward Elgar, Cheltenham, pp. 113–126.
Fitjar, Rune Dahl, Huber, Franz, 2015. Global pipelines for innovation: insights from the case of Norway. J. Econ. Geogr. 15 (3), 561–583. https://doi.org/10.1093/jeg/lbu017.
Flåten, Bjørn-Tore, Isaksen, Arne, Karlsen, James, 2015. Competitive firms in thin regions in Norway: the importance of workplace learning. Nor. J. Geogr. 69 (2), 102. https://doi.org/10.1080/00291951.2015.1016875.
Giuliani, Elisa, 2007. The selective nature of knowledge networks in clusters: evidence from the wine industry. J. Econ. Geogr. 7 (2), 139–168. https://doi.org/10.1093/jeg/lbl014.
Granovetter, Mark, 1973. The strength of weak ties. Am. J. Sociol. 78 (6), 1360–1380.
Grillitsch, Markus, Nilsson, Magnus, 2015. Innovation in peripheral regions: do collaborations compensate for a lack of local knowledge spillovers? Ann. Reg. Sci. 54 (1), 299–321. https://doi.org/10.1007/s00168-014-0655-8.
Hassink, Robert, 2005. How to unlock regional economies from path dependency? From learning region to learning cluster. Eur. Plann. Stud. 13 (4), 521–535. https://doi.org/10.1080/09654310500107134.
Isaksen, Arne, Trippl, Michaela, 2014. Regional Industrial Path Development in Different Regional Innovation Systems: a Conceptual Analysis. 2014/17. Papers in Innovation Studies. Lund.
Jack, Sarah, 2005. The role, use and activation of strong and weak network ties: a qualitative analysis. J. Manag. Stud. 42 (6), 1233–1259.
Keeble, David, Wilkinson, Frank, 1999. Collective learning and knowledge development in the evolution of regional clusters of high technology SMEs in Europe. Reg. Stud. 33 (4), 295–303. https://doi.org/10.1080/00343409950081167.
Knack, Stephen, 2003. Groups, growth and trust: cross-country evidence on the olson and putnam hypotheses. Publ. Choice 117 (3), 341–355. https://doi.org/10.1023/B:PUCH.0000003736.82456.04.
Korsgaard, S., Ferguson, R., Gaddefors, J., 2015. The best of both worlds: how rural entrepreneurs use placial embeddedness and strategic networks to create opportunities. Enterpren. Reg. Dev. 5626 (October), 1–25. https://doi.org/10.1080/08985626.2015.1085100.
Lagendijk, Arnoud, Lorentzen, Anne, 2007. Proximity, knowledge and innovation in peripheral regions. On the intersection between geographical and organizational proximity. Eur. Plann. Stud. 15 (4), 457–466.
Lechner, Christian, Dowling, Michael, Welpe, Isabell, 2006. Firm networks and firm development: the role of the relational mix. J. Bus. Ventur. 21 (4), 514–540. https://doi.org/10.1016/j.jbusvent.2005.02.004.
Little, Roderik, Rubin, Donald, 2002. Statistical Analysis with Missing Data, 2nded. Wiley Interscience, Hoboken.
Luo, X.M., Griffith, D a, Liu, S.S., Shi, Y.Z., 2004. The effects of customer relationships and social capital on firm performance: a Chinese business illustration. J. Int. Market. 12 (4), 25–45. https://doi.org/10.1509/jimk.12.4.25.53216.
Maillat, D., Lecoq, B., Nemeti, F., Pfister, M., 1995. Technology district and innovation: the case of the Swiss Jura arc. Reg. Stud. 29 (3), 251–263.
Malecki, Edward, 2012. Regional social capital: why it matters. Reg. Stud. 46 (8), 1023–1039. https://doi.org/10.1080/00343404.2011.607806.
Malecki, Edward, Poehling, R., 1999. Extroverts and introverts: small manufacturers and their information sources. Enterpren. Reg. Dev. 11 (3), 247–268. https://doi.org/10.1080/089856299283191.
McKeever, E., Jack, S., Anderson, Alistair R., 2015. Embedded entrepreneurship in the creative Re-construction of place. J. Bus. Ventur. 30 (1), 50–65. https://doi.org/10.1016/j.jbusvent.2014.07.002. Elsevier Inc.
Neira, Isabel, Vázquez, Emilia, Portela, Marta, 2009. An empirical analysis of social capital and economic growth in Europe (1980-2000). Soc. Indicat. Res. 92 (1), 111–129. https://doi.org/10.1007/s11205-008-9292-x.
North, David, Smallbone, David, 2000. Innovative activity in SMEs and rural economic development: some evidence from England. Eur. Plann. Stud. 8 (1), 87–106.
Organisation for Economic Co-Operation and Development, 2011. OECD territorial reviews: Switzerland 2011. Territorial Reviews. https://doi.org/10.1787/9789264092723-en.
Pato, Maria Lucia, Teixeira, Aurora, 2014. Twenty years of rural entrepreneurship: a bibliometric survey. Sociol. Rural. 1–26.
Porter, Michael E., 1998. Clusters and the new economics of competition. Harv. Bus. Rev. 76 (November-December), 77–90.
Porter, Michael E., 2000. Location, competition, and economic Development : local clusters in a global economy. Econ. Dev. Q. 14 (1), 15–34.
Rodríguez-Pose, Andrés, Fitjar, Rune Dahl, 2013. Buzz, archipelago economies and the future of intermediate and peripheral areas in a spiky world. Eur. Plann. Stud. 21 (3), 355–372.
Sabatini, F., 2008. Social capital and the quality of economic development. Kylos 61 (3), 466–499.
Schuler, M., Dessemontet, P., Joye, D., 2005. In: Eidgenössische Volkszählung 2000. Die Raumgliederungen Der Schweiz [Federal Population Census 2000. The Spatial Division of Switzerland]. Swiss Federal Statistical Office, Neuchâtel.
Sokolov, Vladimir, Solanko, Laura, 2016. Political influence , firm performance and survival. BOFIT Discussion Papers 20, 1–37.
Tödtling, Franz, Grillitsch, Markus, Höglinger, Christoph, 2012. Knowledge sourcing and innovation in austrian ICT companies—how does geography matter? Ind. Innovat. 19 (4), 327–348. https://doi.org/10.1080/13662716.2012.694678.
Tödtling, Franz, Trippl, Michaela, 2005. One size fits all? Towards a differentiated regional innovation policy approach. Res. Pol. 34 (8), 1203–1219. https://doi.org/10.1016/j.respol.2005.01.018.
Tomlinson, Philip R., Branston, J Robert, 2014. Turning the tide: prospects for an industrial renaissance in the north staffordshire ceramics industrial district. Camb. J. Reg. Econ. Soc. 7 (3), 489–507. https://doi.org/10.1093/cjres/rsu016.
Tomlinson, Philip R., Branston, J Robert, 2017. Firms, governance and development in industrial districts. Reg. Stud. 0 (0), 1–13. https://doi.org/10.1080/00343404.2017.1324199. Taylor & Francis.
Tregear, Angela, Cooper, Sarah, 2016. Embeddedness, social capital and learning in rural areas: the case of producer cooperatives. J. Rural Stud. 44https://doi.org/10.1016/j.jrurstud.2016.01.011. Elsevier Ltd: 101–10.
Trippl, M., Asheim, Bjørn, Miörner, J., 2016. Identification of regions with less developed research and innovation systems. In: Parrilli, M.D., Fitjar, R.D., Rodriguez-Pose, A. (Eds.), Innovation Drivers and Regional Innovation Strategies. Routledge, New York, pp. 23–44.
Uzzi, Brian, 1997. Social structure and competition in interfirm Networks : the paradox of embeddedness. Adm. Sci. Q. 42 (1), 35–67.
Westlund, H., 2006. Social Capital in the Knowledge Economy. Springer, Berlin.
Westlund, H., Adam, F., 2010. Social capital and economic performance: a meta-analysis of 65 studies. Eur. Plann. Stud. 18 (6), 893–919. https://doi.org/10.1080/09654311003701431.
Westlund, H., Nilsson, E., 2005. Measuring enterprises' investments in social capital: a pilot study. Reg. Stud. 39 (8), 1079–1094. https://doi.org/10.1080/00343400500328164.
White, Ian R., Royston, Patrick, Wood, Angela M., 2011. Multiple imputation using chained equations: issues and guidance for practice. Stat. Med. 30 (4), 377–399. https://doi.org/10.1002/sim.4067.