Sowing the seeds: The impact of initial ties on growth and innovation among micro and small firms

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Abstract

We investigate the influence of networking on micro and small enterprises (MSEs) innovation and growth. We claim that people whom the entrepreneur approaches for advice as well as the companies with which initial relationships are forged leave an imprint that is reflected in MSEs tendency to upgrade—that is, innovate and grow. Our analysis of a sample of forty-six thousand French MSEs shows that the likelihood that MSEs upgrade within the first five years of existence is affected by their initial partners. Specifically, we find that companies seeking professional advice early on have a higher likelihood to achieve growth through innovation than others whilst companies relying primarily on advice provided by family members and/or organizations specializing in entrepreneurship have a lower likelihood. Moreover, we find that initial cooperation with other companies as well as cooperation with suppliers and customers leave a positive imprint on the MSEs' propensity to innovate and grow. Thus, the paper provides unique insights on the importance of fostering opportunities for networking in the earliest stages of MSEs development.

1. Introduction

Economic growth is increasingly attributed to innovation and consequently the promotion of innovation has become a widely shared policy goal. Indeed, innovation drives productivity growth and the launch of new industries (Baumol, 2004; Helpman, 2009). Given that over ninety percent of firms in Europe are classified as micro and small enterprises (MSEs) (Stawińska, 2011), promoting conditions enabling at least some of these firms to innovate and grow into medium-sized companies would therefore be a good and useful policy. Yet, very little is known about growth in MSEs (Nichter and Goldmark, 2009) and few studies have examined the factors that would explain MSEs upgrade—that is, innovate and grow (Hampel-Milagrosa et al., 2015).

The focus of this article is on the impact of networks on MSE upgrading. Ties between the firm and the outside world constitute networks. These ties can be with individuals, organizations and institutions; they can concern different types of interactions, and may serve a variety of purposes (Todeva, 2011). In general networks make it easier for firms to access resources. This is true for social (or interpersonal) networks based on professional or family and friendship ties (Arregle et al., 2015), and for business (or inter-firm) networks based on vertical and horizontal linkages between firms (Street and Cameron, 2007). With respect to upgrading, James et al. (2014) survey different kinds of links established between small and large firms and point out that the degree of independence a small firm is afforded by a large firm will impact whether and how it can upgrade.[1] Apart from large firms, MSEs also engage with customers, potential competitors, consultants, and institutions. While contact with customers is generally thought to enhance innovation (Brunswicker and Vanhaverbeke, 2011), such a positive effect was not found in a recent study of MSEs (Tu et al. 2014). Similarly, for small and medium sized companies (SMEs) it appears to be the case that innovation is made easier through ties with suppliers (Nieto and Santamaria, 2010; Tomlinson, 2010), through ties with competitors (Tomlinson and Fai, 2013), and through ties with consultants or support from institutions (Back et al. 2014). Innovation does not always result in firm performance however (Rosenbusch et al., 2011) and again it is not clear that what is good for SMEs is good for MSEs as well.

With this article, we contribute to the literature by exploring different types of networks that might affect MSE upgrading. Indeed, the research to date on MSE growth and

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[1] Differences in the relationships between small and large firms may explain why a study of small firms in the Great Brittan found that partnering with members of the supply-chain is associated significantly higher growth rates (Wynarczyk and Watson, 2005), while a study of South Korea found no such effect (Park et al. 2010).

innovation does not provide much evidence on the relative importance of these factors (Hampel-Milagrosa et al., 2015). This lack is partly due to the preponderance of qualitative case studies in the literature, yielding results that are not generalizable unless they are based on at least medium-sized samples and rigorous techniques of data generation and interpretation. Thus, on the basis of t-tests and regression analysis on a sample of over 46 thousand MSEs established in France in 2002, we find that the potential for MSE upgrading indeed depends on the nature of network deployed. Specifically, establishing business networks enhances the likelihood of upgrading, as do relationships with customers and suppliers. On the other hand, we find that advice provided by family members and/or organizations specializing in entrepreneurship decrease MSEs' likelihood of upgrading. Thus, entrepreneurs should carefully consider the nature of networks they prompt if they want to ensure their MSEs' upgrading.

The remainder of the paper contains three sections: Section 2 explains our methodological design to ensure a cohesive empirical study. Section 3 presents our findings with regard to the networks key factors of MSEs upgrading. The final section discusses the results and concludes the paper.

2. Data and methods

For our analysis, we rely on data from a survey carried out by the French national bureau for statistics, INSEE, among firms that were established in the first half of 2002. Specifically, firm data was taken from the official French register of newly created firms (SINE), which is under the authority of the INSEE. The SINE data covers firms in the manufacturing, construction, trade and repair, and other services sectors. In 2002 these firms were asked to indicate the main source of advice upon which they had relied in order to set up the firm as well as the main intra-firm linkages that had facilitated creation. Five years later, in 2007, the same firms were asked to indicate how many people they employed. In addition, the firms were asked whether they had carried out innovations. The final sample comprised from 46,412 registered firms from all sectors of activity.

Our research design includes several statistical techniques to test the impact of networks on MSE upgrading. We collected information on the initial ties established by upgraders and non-upgraders in order to identify significant differences between the two groups that might explain why they upgraded differently. We performed *t*-tests to compare upgrader and non-upgrader sub-samples. We deemed a two-tailed *t*-test to be most appropriate inasmuch as we wanted to determine whether there were significant

differences in the mean scores of the upgrading and non-upgrading MSEs (the null hypothesis being that the means are equal); also, it is more conservative than the one-tailed test. Furthermore, we used the fully representative panel data from the three rounds of the INSEE survey for linear probability and logit regression analyses to understand how the initial ties impacted MSE upgrading.

2.1 Dependent variable

The number of employees was the main indicator for MSE size and firm growth. The MSE size thresholds were based on the European Commission Recommendations (2003/361/EC). Thus three broad parameters defined MSEs: micro enterprises have up to 10 employees, small enterprises have up to 50 employees, and medium-sized enterprises have up to 250 employees. To classify enterprises as upgraders, we drew on the recent works of Hampel-Milagrosa et al., (2015) and Laguir and Den Besten (2016) who define upgrading as "growth through innovation", which they expand into "innovation that induces an increase in any target variable of entrepreneurs, such as the company's returns, sales, assets, or number of employees."[2] Specifically upgraders: (i) had to have started from below the specific threshold in terms of the number of regular employees (they must have been a micro or small enterprise at that time) and grown beyond that same threshold by the time they were questioned in 2007; and (ii) had to have documented evidence of any kind of innovation. Thus, our independent variable is denoted by the dummy variable MSE upgrading (Upgrading), which takes a value of 1 if the MSE respects the two previous conditions ((i) and (ii)) and 0 otherwise.

2.2 Explanatory variables

Social (or interpersonal) networks were measured using three dummies. "Family" takes a value of 1 if the most useful business advice for firm creation was provided by the entrepreneur's family and 0 otherwise; "Professional" takes a value of 1 if the most useful business advice was provided by consultants and 0 otherwise; and "Institutional" takes a value of 1 if the most useful business advice was provided by organizations specializing in entrepreneurship and 0 otherwise. In addition, business (or inter-firm) networks were measured using four dummies. "Cooperative" takes a value of 1 if the firm was involved in regular cooperative ties with other businesses and 0 otherwise; "Supplier" takes a value of 1 if the type of relationship that facilitated the firm's creation was related to suppliers and 0 otherwise; "Customer" takes a value of 1 if the type of relationship that facilitated the firm's creation was related to customers and 0

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[2] cf. Gereffi (2002) and Thanos et al. (2016) for other definitions of upgrading.

otherwise; and "Company" takes a value of 1 if the type of relationship that facilitated the firm's creation was related to the company where the entrepreneur was employed beforehand and 0 otherwise. We take these dummies as proxy for the type of network that is developed by the firm. Following Simsek et al. (2015), we consider that initial network ties leave an imprint, which is reflected in performance several years later. That is, the types of links that are activated at startup represent early strategic decisions with potentially a long-term growth impact (Siepel et al., 2015).

2.3 Regression models

To examine how network type affects an MSE's likelihood to upgrade and to obtain the best predictive model of adoption, we conducted multiple regression analyses. The specification of the regression model is as follows:

$$Zi = \alpha_1 + \beta_1 Vi + \varepsilon i \qquad (1)$$

where the dependent variable, Zi, is a binary choice variable of 1 or 0 for a respondent i: the value of 1 for upgraders and the value of 0 for non-upgraders. The Zi dummy variable was constructed from the difference between the data for 2002 and 2007. Vector Vi consists of the set of explanatory variables related to social business networks, which includes proxies for sources of advice and business ties. The disturbance term in the regressions is εi.

To find the probability that an MSE would upgrade, we estimated the linear probability (OLS) model and the logit model[3]. The logit model, which is estimated by using the maximum likelihood estimation method, measures the probability Pi that an MSE will upgrade:

$$Prob\ Pi\ (Zi = 1) = \frac{\exp(\alpha_1 + \beta_1 Vi)}{1 + \exp(\alpha_1 + \beta_1 Vi)} \qquad (2)$$

where Zi and Vi are defined as above. This logit model remedies the limitation of the linear probability model whose predictions may lie outside of the [0, 1] interval for

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[3] We also estimated the probit model, which showed similar (unreported) results to the logit model reported here. The only difference between the two is that the probit model is associated with the cumulative normal probability function in transformation in order for the estimation of the dependent variable to get predictions inside the (0, 1) interval, while the logit model is based on the cumulative logistic probability function. The logit and probit formulations are quite similar; the only difference is that the logit has slightly fatter tails (Pindyck and Rubinfeld, 1998).

some sets of explanatory variables (Pindyck and Rubinfeld, 1998). For the independent variables, we used only data from 2002 in order to control for possible reverse causality.

3. Results

3.1 Descriptive statistics

The descriptive statistics are reported in Table 1. For the dependent variable, we find that the sample firms have a mean upgrading (Upgrading) level of approximately 1.4%. With regard to the independent variables, we observe that, on average, 31.2% of entrepreneurs state that the most useful business advice is provided by family members, 12.2% are involved in regular cooperative ties with other businesses, and 27.4% (21.7%) report that the relationship that facilitated the firm's creation was with customers (suppliers).

Table 1. Descriptive statistics

	mean	*Sd*	*min*	*Median*	*max*
Upgrading:					
Upgrading	0.013	0.117	0	0	1
Advice:					
Family	0.312	0.463	0	0	1
Professional	0.206	0.404	0	0	1
Institutional	0.162	0.368	0	0	1
Useful Ties:					
Competitor	0.122	0.327	0	0	1
Supplier	0.217	0.412	0	0	1
Customer	0.274	0.446	0	0	1
Company	0.116	0.321	0	0	1

3.2 t-test statistics

Table 2 provides the significant t-test statistics for the upgraders and non-upgraders across the range of key upgrading factors.

Table 2. Significant t-test statistics for MSE upgraders and non-upgraders

	Upgraders	*Non- Upgraders*	*t-score*	
Advice:				
Family	0.259	0.313	-3.13	**
Professional	0.302	0.205	5.32	***
Institutional	0.101	0.163	-5.24	***
Useful Ties:				
Competitor	0.205	0.121	4.86	***
Supplier	0.269	0.216	3.01	**
Customer	0.427	0.272	7.90	***
Company	0.331	0.505	-9.29	***

* Significance at the .10 level; ** Significance at the .05 level; *** Significance at the .01 level.

The upgraders receive more pertinent advice from their professional networks, have closer and more regular cooperative ties with other businesses, and have stronger ties with suppliers and customers.

3.3 Correlation results

Table 3 provides the Pearson pairwise correlation. The results reveal significant correlations between upgrading and several of the explanatory variables ($p < .05$ or better). Moreover, the results show only moderate levels of collinearity between our explanatory variables. Last, we computed variance inflation factors (VIFs) when estimating our regression models to test for signs of multi-collinearity between the explanatory variables and found that no VIFs exceeded 5, so multi-collinearity is not problematic in our study (Hair et al., 2006).

Table 3. Pearson's correlation matrix and variance inflation factors (VIFs).

	Upgrading	*Family*	*Professional*	*Institutional*	*Cooperative*	*Supplier*	*Customer*	*Company*
Upgrading:								
Upgrading	1.000							
Advice:								
Family	-0.013*	1.000						
Professional	0.028*	-0.162*	1.000					
Institutional	-0.019*	-0.135*	-0.133*	1.000				
Useful Ties:								
Cooperative	0.028*	-0.022*	0.082*	0.006	1.000			
Supplier	0.015*	0.051*	0.034*	0.053*	0.059*	1.000		
Customer	0.040*	0.009*	0.068*	0.074*	0.081*	0.117*	1.000	
Company	0.006	0.001	0.143*	-0.016*	0.053*	-0.049*	-0.064*	1.000
VIFs		**1.06**	**1.09**	**1.06**	**1.02**	**1.03**	**1.04**	**1.03**

* Significance at the .05 level; ** Significance at the .01 level.

3.4 Regression results

Given that our dependent variable (upgrading) is a dummy variable, we employ logit regression analysis (e.g., Hair et al., 2006) as a complement to ordinary least squares to test our research question.

Table 4. The impact of social and business networks on MSE upgrading: estimation results of the linear probability (OLS) model and the logit model

Variable\Method	*OLS Model*	*Logit Model*
Advice:		
Family	-0.004 (1e-03) **	-0.3 (0.10) **
Professional	0.005 (2e-03) **	0.3 (0.10) **
Institutional	-0.007 (1e-03) ***	-0.6 (0.13) ***
Useful Ties:		
Cooperative	0.007 (2e-03) **	0.4 (0.11) ***
Supplier	0.003 (1e-03) *	0.2 (0.09) *
Customer	0.010 (1e-03) ***	0.7 (0.08) ***
Company	0.002 (2e-03)	0.1 (0.12)

(Intercept)	0.011 (9e-04) ***	-4.5 (0.07) ***
Adjusted R²	0.003	
Pseudo R²		0.023
F-statistic	22.4 ***	
Wald Chi²		146.08 ***
N	46412	46412

The "upgrading" dummy variable was constructed from the difference between the data for 2002 and 2007: it was set as "1" for companies that had: (i) started from below the specific threshold in terms of the number of regular employees (they must have been a micro or small enterprise at that time) and grown beyond that same threshold by the time they were questioned in 2007, and (ii) they must have documented efforts in any kind of innovation. Numbers in parentheses are robust standard errors.
* Significance at the .10 level; ** Significance at the .05 level; *** Significance at the .01 level.

Table 4 presents the regression results for the impact of social and business networks on MSE upgrading. We observe that the regression coefficients for family and institutional networks are significantly and negatively associated with upgrading. In contrast, the regression coefficient for professional networks is significantly positive. Thus, upgrading is lower for MSEs receiving advice from organizations (mainly public) specializing in entrepreneurship, or from the entrepreneur's family members, whereas it is higher for MSEs receiving advice from the entrepreneur's professional network. Furthermore, the regression coefficients are significantly positive for suppliers, customers, and cooperative ties with other businesses.

Interpretation and conclusion

The aim of this study was to analyse the networks key factors explaining why MSEs upgrade—that is, innovate and grow. Though many works have addressed the effect of network on innovation and growth separately, very little is known about network factors of MSE upgrades and their relative importance.

The paper presents several original findings. Indeed, the paper reveals that strong ties with suppliers, customers, and cooperative collaboration improve MSE upgrading, which agrees with the literature suggesting that vertical and horizontal linkages facilitate innovation or growth (e.g., Tu et al. 2014; Nieto and Santamaria, 2010; Wynarzyk and Watson, 2005). Furthermore, the study complements prior research (e.g., Hampel-Milagrosa et al., 2015) and shows that, at least in the French context, upgrading

is lower for MSEs receiving advice from organizations (mainly public) specializing in entrepreneurship as well as from entrepreneurs' family members.

This study has several relevant implications for both policymakers and entrepreneurs. Indeed, to ensure their MSEs upgrading, entrepreneurs need to foster the development of professional networks as well as business ties. Indeed, professional networks help entrepreneurs to access information (e.g., leads about profitable business opportunities) and resources (e.g., credit) and can be crucial in dealing with obstacles related to transaction costs, contract enforcement, and regulation. Business networks, on the other hand, can help MSEs overcome many of the drawbacks of being small, providing a way to access market information or services, consolidate production, improve the negotiating position with buyers or suppliers, and lobby for political or regulatory changes. They also can facilitate MSE upgrading by expanding a firm's set of viable business opportunities and by improving firm capabilities through new opportunities for learning and innovation. Moreover, an important distinction for policymakers is between firms that are upgraders or non-upgraders, as upgraders are likely to require types of specialized development assistance that are substantially different from what non-upgraders need. In addition, when specific policies for upgrading are introduced, the focus should be on those entrepreneurs with strong professional networks and with well-established ties with suppliers, customers, and cooperative collaboration.

This study has some limitations that provide future research opportunities. Indeed, the possibility of generalizing the present findings to countries beyond France is limited by the fact that data were collected exclusively there. The relationships explored may change across countries because the upgrading management process may be bound by cultural contingencies. Furthermore, a longitudinal research design that controls for the stability of the independent variables over the crisis period that started in 2008 might provide further evidence on the causal relationships among the variables we included. Last, following Stam et al. (2014), it might be interesting to investigate the moderating effects of firm age, and sector on the impact of network type on MSE upgrading.

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