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THE DETERMINANTS OF ABSORPTIVE CAPACITY: AN EMPIRICAL INVESTIGATION FOR INNOVATIVE SMEs IN ITALY

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Abstract

Absorptive capacity (ACAP) is one of the fundamental driver that can explain why firms have different performances. Although ACAP has been studied with respect to big corporations, it is also a key variable for innovative small and medium-sized enterprises (SMEs) in Italy.

In order to examine the selected variable, this paper offers a reconceptualization of the ACAP, taking into account the new dimension of the construct, and then it develops an empirical framework, individuating hypothesis and data. We construct a unique data set, combining qualitative and quantitative data, extracted from BvD AIDA.

Results from this study could offer SMEs several information to develop their ACAP. In particular, the partial micro-foundation of our analysis helps innovative SMEs to individuate factors that could be modified and/or improved to raise their absorptive capacity and to increase their competitive advantage.

Keywords: Absorptive Capacity, ACAP, SMEs, Innovation, R&D.

Introduction

Innovation is the primary source of competitive advantage and among all the inputs related to it, absorptive capacity is the most important. Cohen and Levinthal [1] defined the absorptive capacity as "*the ability of a firm to recognise new external knowledge, assimilate it, and apply to commercial ends*". The definition offered by Cohen and Levinthal focuses on three dimensions:

1. Recognising the new external knowledge;
2. Absorbing and incorporating it;
3. Applying to commercial ends.

which are assumed to be the principal components of absorptive capacity (ACAP). Zahra and George [2] stated that ACAP refers to a dynamic capability "*pertaining to knowledge creation and utilization that enhance a firm's ability to gain and sustain a competitive advantage*". These authors also introduced two different dimensions of the ACAP:

1. **Potential absorptive capacity** (PACAP), which makes the firm receptive in acquiring and assimilating the knowledge;
2. **Realized absorptive capacity** (RACAP), which refers to the transformation and the exploitation of the new knowledge.

Since Cohen and Levinthal, and Zahra and George works about the absorptive capacity, a lot of studies analysed the absorptive capacity of firms, but the econometric analysis is a little exploited, due to ambiguity of its definitions and difficulties in funding proxies for it. The aim of this paper is to offer an extension of existent literature, trying to link the theoretical framework to the econometric analysis, and to individuate the key determinants of absorptive capacity of small and medium sized firms (SMEs) of Italy. As remarked by the Report of 2016 by Cerved, in terms of economic relevance, the majority of enterprises active in Italy are SMEs, which account for approximately 73% of GDP, and they operate in technological industries. Innovative SMEs face problems concerning their survival and absorptive capacity has become a critical concept [3] in order to use external knowledge to promote and maintain continuous innovation.

Theoretical framework and hypothesis

ACAP, Patents and Goodwill

Given the classical definition of absorptive capacity due to Cohen and Levinthal, a firm's ability to acquire and exploit external knowledge is often generated as by a product of R&D, so that R&D is the second face of ACAP. If this is true, there should be other drivers of absorptive capacity, like the number of patents and the value of goodwill. While the number of patents is a proxy for R&D activities of a firm, the goodwill represents the effort of a firm to maintain a sustainable competitive advantage, also in term of economic reputation.

ACAP and Organizational Structure

In order to have a panoramic of microeconomic aspects that enhance the level of absorptive capacity, it's important to look at the organizational design characteristics of innovative SMEs.

Let's start from the profitability of the firm and its link with the level of ACAP [4]. At the micro-level theory suggests that the level of absorptive capacity, as a driver of R&D, contribute to the productivity and the profitability of the firms, by improving their efficiency and their *technological capability*. In particular, the latter is the ability of the firm to satisfy the needs of the markets, by introducing new products or technological improvement. So that we expect that firms that are more profitable tends to invest more in developing their technological capacity, and consequently, enhancing the level of ACAP. Another important aspect of organizational structure is the risk structure. Nowadays every firm is embedded in global competition system, so that the risk management has become an indispensable function. Given the dynamic environment in which firm operate, as suggested by the theory [5], a different degree of external turbulence have three different effects:

- Competition increases;
- The ability to imitate a firm's capabilities decrease;
- The speed of imitation reduces.

This can help innovative SMEs to improve their absorptive capabilities. In particular, it's reasonable to expect a positive influence of risks on the level of absorptive capacity of SMEs. Since these firms operate in high risky sectors, it's possible to imagine a high degree of risk in order to take new opportunity windows. In order to have an exhaustive representation of the organizational structure it's important to analyze the adequacy of resources available within the firm, respect to its investments and the risk associated with them. An appropriate level of capital adequacy means that the SMEs are able to support their investments without becoming insolvent, although the technological specialization of those companies requires an intensive use of intangible assets (like human capital and intellectual properties) which are too much expensive. This scenario underlines the importance of organizational structure [6] of the firms, and the hypothesis seems to be adapt to verify if it contributes to improve the sharing of the new knowledge among departments and individuals.

ACAP and Organizational Ownership

Managerial theories suggest that the structure of ownership affects the level of absorptive capacity of the firms [7,8]. French and Smith [9] argued that the ownership concentration of the firm affects the process of innovation. Other researchers, such as Gedajlovic, Cao and Zhang [10] stated that the government ownership affects the firm decisions regarding exploitive and explorative innovation. Cross country evidence is mixed: the most of studies regarding the United States show that agency problems arise from a widely-held ownership structure and this can limit the incentive to innovate and the ability to assimilate and exploit new knowledge, but also ownership concentration may have a negative effect on R&D investments and in ACAP. If we consider the Italian economic system, the majority of the innovative SMEs present a very singular ownership structure. These kinds of firms often present a coexistence between different types of shareholders:

1. Venture capital;
2. Industrial firm;
3. Individuals or families.

Considering the extraction from Aida BvD of innovative SMEs born in 2011, the majority of the firms are individual or family-controlled, so that we expect that agency costs arise with increasing team dimension [11] and with a greater property concentration.

ACAP and Environment

The key determinant of the development of ACAP for the firm is its ability to capture and to introduce the new external knowledge inside the organization and to combine it with the internal knowledge [1]. Anatoliivna [12] stated that *beyond the*

concept of absorptive capacity there is the ability of the firms to exploit the knowledge available outside its borders. The growing need for enhancing innovation capability leads the firms to expand technology interactions with different and geographically dispersed actors [13,14]. Thus, it's important to examine the geographical dimension of SMEs. Given the geography of the Italian districts (IDs) [15] of "Made in Italy" the innovative small and medium sized companies are not located in any of them, since they operate in technological industries and not in traditional ones. This means that those companies don't benefit from adaptability and flexible specialization of IDs, but the concentration of industry matters. In particular, if we look at the following pie chart, it's possible to note that the 82% of the cohort of innovative SMEs of Italy born in 2011 are located in the Centre-North (Fig. 1). Instead of verifying if there's a relationship

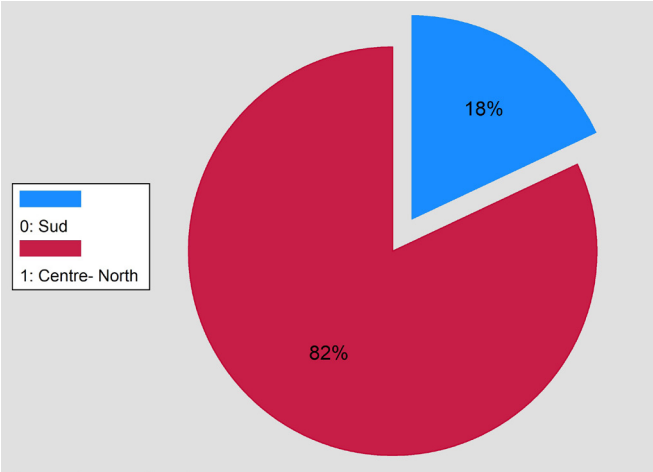

Figure 1. Geographical distribution of innovative SMEs of Italy, born in 2011. Pie chart shows the percentage of innovative SMEs located in northern and in southern regions. In particular, the 82% of firms are located in the Centre-North of Italy, respect to the 18% of SMEs of the South. This seems to confirm that the economic and industrial disparity North-South persists, also for innovative firms.

between ACAP and the localization of the firms in a IDs, we will test a more generalized hypothesis, verifying if the geographical localization matters. Since the disparity between the North and the South persists, it's reasonable to expect some differences between companies that are localized in northern regions respect to the others of the South. For a more precise reconceptualization of the concept of ACAP in the context of innovative SMEs, it's necessary to consider the strategic alliances with foreign firms [16]. Clearly, when a firm engages in a strategic alliance with a foreign firm, the idea is to gain the access to specific and unique resources, that are not available inside the national borders, but that are complementary to the local knowledge. Through the construction of a global R&D network of alliances, the SMEs try to get a sustainable competitive advantage, using a strategy similar to the portfolio diversification. The ACAP is path and history-dependent, so that the firm that establishes international and strategical alliances can obtain knowledge useful for implementing strategies and techniques that are less dependent on the innovation system of home-countries. For our sample of analysis, we don't include any variables reflecting the strategy of acquisition and accumulation of the new knowledge through strategic alliances or mergers and acquisitions (M&A), since no microeconomic variables are available.

Data, method and implementation

To test the hypothesis mentioned in the previous section, this study uses an integrated approach, combining qualitative and quantitative data. In order to evaluate the various aspects of absorptive capacity, we use an econometric model that relates the ACAP to a set of explanatory variables, that describe the organizational structure, the ownership configuration and the external environment. Respect to the previous studies, this paper tries to link the re-contextualized concept of ACAP with the econometric analysis, using more recent data, from 2011 to 2015, a different sample and different measures of variables. The greater number of papers regarding ACAP, focus their attention on the American context and the big corporation, while this project will use data on innovative SMEs in Italy, reported in the Official Chambers of Commerce website. We use panel data, composed of all innovative SMEs born in 2011, and we confirm the robustness of our results, by excluding from the sample of analysis the enterprises which are not "autonomous". This means that only those companies that don't belong to a private or a public group are included in the sample, to consider the own absorptive capacity. The dataset is constructed using microeconomic data, collected from BvD AIDA (Analisi Informatizzata delle Aziende Italiane) and the analysis is realized through the statistical software Stata. To evaluate the various aspects that affect the level of absorptive capacity of innovative small and medium sized enterprises (SMEs) of Italy, we specify a panel estimation. According to the features analyzed, the following multiple linear regression model is employed to investigate the determinants of absorptive capacity.

The empirical model is:

$$Int\_assets_{i,t}=\beta_0+\beta_1 Patents_{i,t}+\beta_2 Goodwill_{i,t}+\beta_3 Patents_{i,t}*Goodwill_{i,t}+\beta_4 Prof_{i,t}+\beta_5 Dummy_{area_{i,t}}+\beta_6 Prof_{i,t}*Dummy_{area_{i,t}}+\beta_7 Leverage_{i,t}+\beta_8 Risk_{i,t}+\beta_9 Prmargin_{i,t}+\beta_{10} Lntotass_{i,t}+\beta_{11} Team_{i,t}+u_{i,t}$$

The explanatory variable *Int_assets* is a proxy for ACAP. Standard R&D proxies, such as R&D intensity or the number of patents' application, are not suitable for our study. As we underlined in the theoretical framework, the ACAP is a multidimensional construct, that it's not perfectly identifiable with the investment in R&D. A more appropriate measure is represented by the *logarithmic variation of intangible assets* [17]. The majority of researches have worked with variables directly related to the firm's activities and investments in R&D to capture ACAP. But R&D is only a component of absorptive capacity, so that in our analysis we use two different variables as drivers of ACAP. The first is *Patents*, which reflects the number of registered patents of each firm; the second is *Goodwill*, that represents reputational component of absorptive capacity, which contributes to the ability of the firm of extracting the new information available inside the firm and outside it. Finally, an interaction variable, given by the product between the number of patents and the value of goodwill, is added to our analysis, in order to test the hypothesis that the effect of one predictor variable on the absorptive capacity is different at different values of the other explanatory variable. *Prof* is given by the EBITDA to sales ratio. As suggested by the theory, this ratio is usually used to capture the sales' profitability of a company, but at the same time it's a liquidity measurement, since it compare the total revenue earned to the residual net income after certain expenses. This variable is obtained directly from AIDA. In order to capture the features of organizational structure of the firms the analysis will concentrate on three aspects:

1. The profitability and the liquidity of the firm.
2. The risk structure;
3. The capital adequacy.

Regardless to the risk structure of the firms, the analysis includes two variables:

- *Leverage*, obtained by the ratio between financial debts and total equity.
- *Risk*, that represents standard deviation over-time of Return On Equity (ROE).

In order to take into account the capital adequacy of the innovative firms, the analysis includes *Prmargin*, that's the primary margin, given by the difference between share funds and fixed assets. Normally, a negative primary margin is considered to be normal, especially for firms that operate in capital intensive industries. The ownership structure is analyzed with microeconomics data, that are extracted from AIDA. We decide to use the variable Shareholder Type, which describe the different categories of shareholders inside the firm, that allow us to construct two variables:

1. *Team*, that capture the team's dimension;
2. *Family_concentration*, given by the number of individuals or families in the board respect to the number of shareholders involved in the management of the firm.

In this paper, given the particular economic Italian system, the importance of geographic position is quantified passing through the variable *Dummy_area*, a dummy variable that represents the localization of each firm in northern or southern regions. This variable seems to be accurate to capture the acquisition of new knowledge from external environment, while other variables are not included, because there are not SMEs located in IDs or with strategic alliances with foreign firms. We include, as control variable *Lntotass*, the log of total assets, which is a proxy for the size of each firm. Finally, the equation includes the constant term β_0 and the error term $u_{i,t}$. Notations, definitions and summary statistics of variable explained before are detailed in Table 1.

In the empirical analysis, we proceed step by step. Firstly, we estimate our empirical model using a traditional econometric approach, the Ordinary Least Square (OLS), in order to test its classical assumptions. Secondly, using the Hausman test, we verify if random or fixed effects are required for the panel estimation. The result suggests to adopt random effects, so that the panel estimations are run. Given our empirical models, by running an OLS estimation, it's possible to test the CLRM assumptions. The results of the different tests are shown in Table 2. OLS requires homoscedasticity in the error distribution, so that, in order to verify the validity of this assumption, we run the post estimation Breush-Pagan (BP) test [18], that shows a p-value of 0.425, that allow us to confirm the absence of heteroskedasticity, as vva linear function of all the explanatory variables in our model. Also the White test, which models the

heteroscedasticity allowing the independent variable to have a nonlinear effect on the error term, suggests that the variance is constant (p-value of 0.4167). Regardless to the multicollinearity problems, we use the variance inflation factor test: the VIF coefficients don't exceed the widely accepted thresholds of 5, confirming the absence of multicollinearity problem in our study. For the assumption of normally-distributed residuals, the graphical analysis shows that data are normally distributed and it's also confirmed by the Shapiro-Wilk W test. The latter shows a very large p-value (.758), indicating that it's not possible to reject the null hypothesis of normality (Fig. 2). The

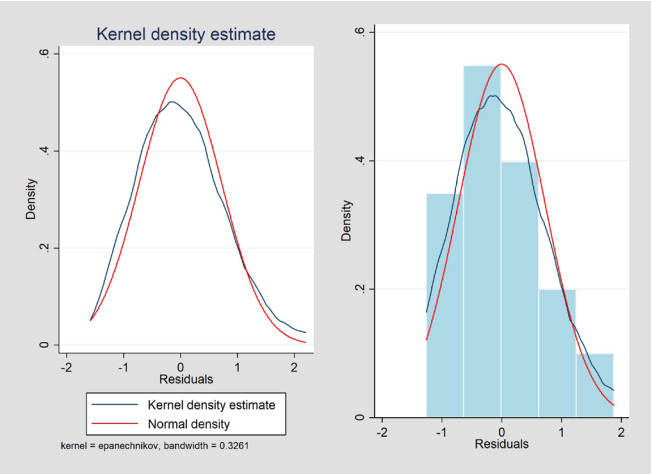

Figure 2. Normality of residuals. Figure 2 graphically check the assumption of normality of the residuals, through a kernel density plot with bandwidth set and a histogram, where a fitted normal density us overlaid. As we can see the residuals of our model are approximately normally distributed with a bandwidth equals to 0.3201.

hypothesis of correct specification of the model is tested through the linktest command in Stata; as shown in Table 3, the non-significant value of _hatsq confirm that our model doesn't suffer from a misspecification problem and it has been correctly specified (there are no irrelevant or omitted variables). The Ramsey's test also confirms the appropriateness of algebraic form of the relationship between the explanatory variable and the predictors, with a p-value of .3953. Finally, the last assumption regards the presence of residuals. The presence of influential values is verified through the computation of Dfbeta measure and the Cook's distance. As we can see from the Dfbeta plot, the observation corresponding to the id code MI1957944 (ESOURCE S.R.L.) could have too much influence on the Leverage's coefficient (Fig. 3). The same information is provided by the Cook's distance, so that ESOURCE S.R.L. is excluded from our sample data. Given the correctness

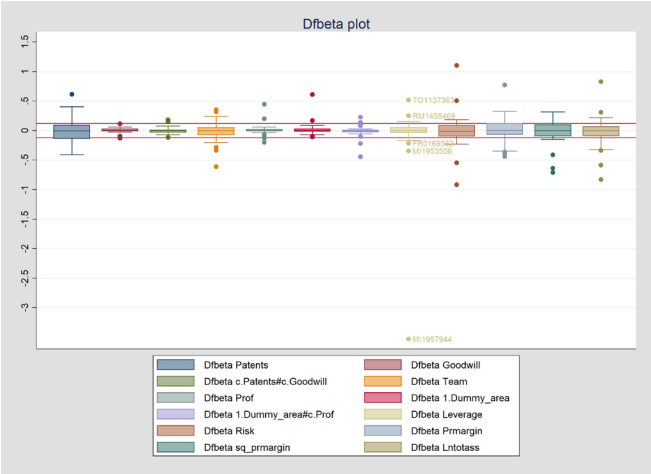

Figure 3. Influential Values. Figure 3 shows the presence of influential values. In particular, the Dfbeta plot individuates a potential outlier that can have a relevant effect on the coefficient of *Leverage*. The observations associated to the id code MI1957944 (ESOUCE S.R.L.) are then excluded from the sample of analysis.

of CLRM assumptions, the panel estimation is run. The Hausman test confirms that random effects are more appropriate (Chi2=3.69 and Prob>-Chi2=0.8148). Two different panel estimations are run: the first model includes the variable *Team* as a proxy for the ownership structure, while the second involves the variable *Family_concentration*. The results of our estimations are reported in Table 4, that show that the goodness of the fit is confirmed by the R squared, which ranges from 0.5312 to 0.7460. Turning to our explanatory variables, as we expected, even if the two main drivers of ACAP, the number of patents and the value of goodwill, are not individually significant, their interaction is highly significant (p-value<0.001), in both estimations. This means that companies that are willing to protect their innovations and to improve their reputation, are more able to increase their level of absorptive capacity. As shown by the following graph, goodwill has the strongest and positive effect on the variation of intangible assets for those firms that tend to protect their intellectual property with patents. Patents give to innovative SMEs of Italy a temporary monopoly, even if they operate in technological industries where the production of innovation is globalized (Fig. 4). The profitability proxy *Prof* is statistically significant and the coefficient is negative. This implies that more profitable companies are less willing to invest in intangible assets. Even though this could be a paradox, this means that innovative SMEs prefer to have more liquidity to face the unexpected events and to take the new external opportunities. Looking at the interaction term between the continuous proxy for profit-

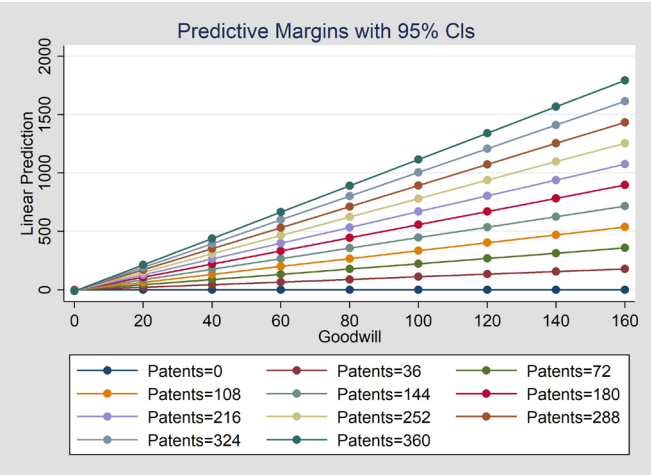

Figure 4. Interaction between Patents and Goodwill. Figure 4 shows the interaction between the continuous variable *Patents* and the continuous moderator *Goodwill*. It shows that the influence of the goodwill on the accumulation process of intangible capital is stronger when SMEs have a higher number of registered patents. Innovation is patent-driven.

ability and the dummy variable reflecting the localization in northern or southern regions of Italy, it's possible to conclude that for increasing level of profitability, the variation of intangible assets is negative, but this effect is stronger for those firms that are located in the South (Fig. 5). If we

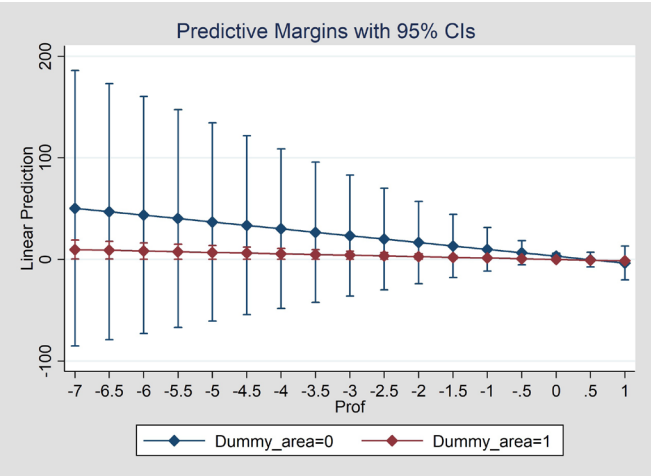

Figure 5. Interaction between Dummy_area and Prof. This figure shows the interaction between the continuous predictor *Prof*, as a proxy for profitability, and the dummy moderator *Dummy_area*. Even if there is a negative effect of the profitability on the logarithmic variation of intangible assets, this effect is stronger for those innovative SMEs that are located in the southern regions.

look at the risk structure of innovative SMEs, the coefficient corresponding to the *Risk* variable is positive and statistically significant. An increase of 1% of standard deviation of ROE overtime determines an increase of the variation of intangible assets, at mean, of 5.93. In line with previous studies [19] this suggest to SMEs that operate in technological and turbulent environment to take risky investments in order to survive and to achieve a competitive and sustainable advantage. The coefficient of *Leverage* is non-significant in both panel estimations, but the effect is positive when we include, as ownership proxy, the variable *Team*, that captures the team dimension. The sign of the coefficient changes when we include as a proxy of the ownership structure Family_concentration. This could be explained by the corporate structure of these firms, that's skewed toward financial debt, when firms are family-controlled, because of their limited financial resources. A further increase in the leverage ratio produces an increase in agency costs, and firms decide to slow down the speed of intangible capital's accumulation. In line with previous theory, the effect of *Prmargin* is negative in both cases but it's statistically significant only in the second estimation. Finally, all the estimations confirm the significance of the control variable *Lntotass*, while irrelevant is the influence of the ownership structure, represented through *Team* and *Family_concentration*, on the variation of intangible assets. In line with previous studies [20], the coefficients associated to the ownership structure are negative, because the benefits of R&D investments are uncertain and shareholders may be reluctant to invest in innovative activities, and in ACAP, that can lead to the creative destruction of current capital.

Conclusions

This paper investigates the key determinants of absorptive capacity (ACAP) of small and medium sized enterprises (SMEs)of Italy. The logarithmic variation of intangible assets is used as a proxy for the level of ACAP, that is analyzed at the micro- level, using data directly extracted by AIDA BvD. Our analysis confirms that innovative SMEs could improve their absorptive capacity and their level of innovation by increasing their level of risk (captured by the standard deviation of ROE overtime) and through a further expansion of their primary margin, even if it is, at mean, negative. Moreover, our results confirm that the innovation is patents-based, but also the firm's reputation matters. In particular, the positive effect of goodwill is stronger for those companies that tend to protect their intellectual property. In conclusion, our analysis focuses on micro determinants of absorptive capacity of SMEs of Italy; an extension of this model could include macroeconomic data.

Table 1. Definitions, Notations and Summary Statistics of variables

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
Int_assets	Logarithmic variation of Intangible Assets	162	0,4467102	1,048945	-3,102603	3,769919
Patents	Number of Patents	59	16,3869300	56,495410	0	361,409000
Goodwill	Value of Goodwill	59	5,4237290	29,203330	0	160,000000
c.Patents#c.Goodwill	Interaction between number of patents and value of goodwill	59	2,747119	15,126160	0	98,080000
Prof	EBITDA to sales ratio	209	-0,1718732	1,067466	-7,262600	0,907500
1.Dummy_area	Dummy for the localization of the firm: 0 for South; 1 for Centre-North	245	0,8163265	0,388010	0	1
Dummy_area#c.Prof	Interaction between Dummy_area and the profitability of the firm					
1		209	-0,1295837	0,9379979	-7	0,9075
Leverage	Financial Debt to Total Equity	225	5,50306100	12,94651	-18,291990	123
Risk	Standard Deviation of ROE overtime	215	0,26542300	0,15165	0,021610	0,6307392
Prmargin	Share Funds- Fixed Assets	221	-0,76525730	4,78026	-37,283060	5,1366900
Lntotass	logarithm of Total Assets	225	5,40194200	1,46220	1,349890	8,6586750
Team	Team dimension	245	1,12244900	0,77440	0	3
Family_concentration	Number of individuals and/or families to Team dimension	195	3,52991500	4,03696	1	23
Source: Elaboration on data provided by AIDA, Bureau Van Dijk						

Table 1. Definitions, Notations and Summary Statistics of variables. This table contains the definitions and the notations of each variable included in the empirical model. In particular, it shows how each variable is computed and reports the associated summary statistics (mean, standard deviation, min and max values). From the latter it's possible to note that Patents and Goodwill are the most volatile variables, while if we look at the min and max values of Prof, it's possible to state that profitability of innovative SMEs included in the sample ranges from -7.26% to 90.75%, and, the mean value is negative. This could be explained by the vulnerability of external environment in which they operate.

Table 2. CLRM Assumptions

Regression assumptions	Test:	We seek values
1) no heterokedasticity problem	**Breusch-Pagan hettest** Chi2(1):0.636 p-value:0.425	>0.05
2) no multicollinearity problem	**Variance inflation factor** Patents: 1.89 Goodwill:1.21 Prof:1.31 1.Dummy_area:1.17 Leverage:1.87 Risk:1.55 Prmargin:3.04 Lntotass:2.50 Team:1.84	<5.00
3) residuals are normally distributed	**Shapiro-Wilk W normality test** z:-0.699 p-value:0.758	>0.01
4) no specification problem	**Linktest** t:0.314 p-value:0.756	>0.05
5) appropriate functional form	**Test for appropriate functional form** F(3,18):1.45 p-value:0.395	>0.05

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

Table 2. CLRM Assumptions. The table shows the principal assumptions of Ordinary Least Square and the relative tests. In addition to Gauss-Markov assumptions, there are other conditions that should be met in order have correct estimates and to make a correct inference. Five assumptions are tested: Heteroscedasticity, multicollinearity, normality of the residuals, specification problem and appropriateness of the algebraic form. All the assumptions are met, so that our estimates and the relative inference are correct.

Table 3. Linktest for the correct specification of the model

Source	SS	df	MS		
F(2,28)	13,47000			Numb. of obs.	31
Model	14,92402	2	7,462011	Prob>F	0,0001
Residual	15,50733	28	0,5538331	R-squared	0,4904
Adj R-squared	0,4540				
Total	30,43135	30	1,014378	Root MSE	0,7442

Int_assets	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
_hat	.9450682	.2157916	4.38	0.000	.5030392	1.387.097
_hatsq	.1128232	.1947136	0.58	0.567	-.2860295	.5116758
_cons	-.0481847	.1712623	-0.28	0.781	-.3989997	.3026303

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

Table 3. Linktest for the correct specification of the model. This table reports the result of the command linktest in Stata used to test the assumption of correct specification of the model. The coefficient associated to _hatsq is statistically non-significant, meaning that the model doesn't suffer from misspecification problems.

Table 4. OLS and Random Effects for the variable Int_assets

	OLS and Random effects for Int_assets with Team variable		OLS and Random effects for Int_assets with the Family_concentration variable	
	POOLED_OLS	**PANEL_RE**	**FamPool_OLS**	**FamPANEL_RE**
Patents	0.01	0.01	-0.03	-0.03
	(0.03)	(0.02)	(0.10)	(0.07)
Goodwill	-0.00	-0.00	-0.00	-0.00
	(0.02)	(0.00)	(0.03)	(0.01)
c.Patents#c.Goodwill	0.02	0.02**	0.03	0.03***
	(0.04)	(0.01)	(0.04)	(0.01)
Prof	-11.33	-11.33****	-6.74	-6.74***
	(8.17)	(2.34)	(8.40)	(2.59)
0.Dummy_area	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
1.Dummy_area	-3.09**	-3.09****	-3.17**	-3.17****
	(1.28)	(0.17)	(1.29)	(0.30)
0.Dummy_area#c.Prof	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)
1.Dummy_area#c.Prof	10.83	10.83****	5.35	5.35*
	(8.21)	(2.73)	(8.48)	(2.81)
Leverage	0.06	0.06	-0.02	-0.02
	(0.08)	(0.07)	(0.10)	(0.04)
Risk	4.34***	4.34***	7.53***	7.53****
	(1.39)	(1.50)	(2.30)	(1.19)
Prmargin	-0.25	-0.25	-0.86**	-0.86****
	(0.17)	(0.19)	(0.34)	(0.12)
Lntotass	0.53**	0.53*	1.24***	1.24****
	(0.23)	(0.30)	(0.37)	(0.28)
Team	-0.15	-0.15		
	(0.35)	(0.26)		
Family_concentration			-0.05	-0.05
			(0.15)	(0.09)
_cons	-0.84	-0.84	-5.23*	-5.23***
	(1.90)	(1.79)	(2.61)	(1.79)
No. of Obs.	31.00	31.00	21.00	21.00
Model Significance	0.10	.	0.10	.
R-Squared	0.5312	0.5312	0.7460	0.7460

* p<0.05 , ** p<0.10, *** p<0.001

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

Table 4. OLS and Random Effects for the variable Int_assets. Table 4 reports the results of the estimation of our empirical model. The first two columns show the coefficients of the pooled regression and the panel estimation, when we use the variable Team as a proxy of ownership structure, while the last two columns reports the estimated coefficients (pooled and panel estimations) when Family_concentration is included. With panel, random effects are used.

Bibliography

1. Cohen and Levinthal (1990), "A new perspective on learning and innovation" on Administrative Science Quaterly, vol. 35, No. 1, Special Issue: Technology", pag. 128
2. Zahra and George (2002), "Absorptive Capacity: A Review, Reconceptualization and Extension" published in Academy of Management Review, vol. 27, No. 2, 185-203
3. Chinho Lin; Bertram Tan; Shofang Chang (2002), "The critical factors for technology absorptive capacity Industrial Management"
4. Anker Lund Vinding. "HUMAN RESOURCES; ABSORPTIVE CAPACITY AND INNOVATIVE PERFORMANCE" In Product Innovation, Interactive Learning and Economic Performance. Published online: 08 Mar 2015; 155-178
5. Ulrich Lichtenthaler (2009), "Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes"- *The Academy of Management Journal* Vol. 52, No. 4 (Aug., 2009), pp. 822-846
6. Khoja, Faiza, and Steven Maranville. "How Do Firms Nurture Absorptive Capacity?" *Journal of Managerial Issues* 22, no. 2 (2010): 262-78. http://www.jstor.org/stable/20798908.
7. Sandra Martins Lohn Vargas, Cláudio Reis Gonçalo, Fábio Ribeirete, Yeda Swirski de Souza, "Organizational practices required for innovation: a study in an information technology company" - *Gestão & Produção*, Epub February 23,2017 https://dx.doi.org/10.1590/0104-530x2161-16
8. Chung-Jen Chen, Bou-Wen Lin, Ya-Hui Lin, Yung-Chang Hsiao, Ownership structure, independent board members and innovation performance: A contingency perspective, In Journal of Business Research, Volume 69, Issue 9, 2016, Pages 3371-3379, ISSN 0148-2963, https://doi.org/10.1016/j.jbusres.2016.02.007.
9. Francis, Jennifer & Smith, Abbie. (1995). Agency costs and innovation some empirical evidence. Journal of Accounting and Economics. 19. 383-409. 10.1016/0165-4101(94)00389-M.
10. Eric Gedajlovic, Qing Cao, Hongping Zhang, Corporate shareholdings and organizational ambidexterity in high-tech SMEs: Evidence from a transitional economy, In Journal of Business Venturing, Volume 27, Issue 6, 2012, Pages 652-665, ISSN 0883-9026, https://doi.org/10.1016/j.jbusvent.2011.06.001.
11. Ang, Cole and Wuh Lin (2000), "Agency Costs and Ownership Structure" in The Journal of Finance, Vol. 55, No. 1, pp. 81-106
12. Anatoliivna (2013), "Absorptive capacity in organizational theories: learning, innovation, managerial cognition".
13. Badillo, E. R., & Moreno, R. (2014). *Does absorptive capacity determine collaborative research returns to innovation? A geographical dimension* (No. 201428). University of Barcelona, Research Institute of Applied Economics.
14. Muscio, A. (2007). The impact of absorptive capacity on SMEs' collaboration. *Economics of Innovation and New Technology*, 16(8), 653-668.
15. Frank Pyke, Giacomo Becattini, Werner Sengenberger – International Institute for Labour Studies (1990), "Industrial districts and inter-firm co-operation in Italy"
16. Deng, P. (2010), "Absorptive capacity and a failed cross-border M&A" in *Management Research Review*, 33(7), 673-682.
17. Landini, F., Arrighetti, A., & Lasagni, A. (2015), "Economic crisis and firm exit: do intangibles matter?"
18. S. Breusch, Trevor & Pagan, Adrian. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. Econometrica
19. Delios, A., & Beamish, P. (2001), "Survival and Profitability: The Roles of Experience and Intangible Assets in Foreign Subsidiary Performance" in *The Academy of Management Journal*, 44(5), 1028-1038. Retrieved from http://www.jstor.org/stable/3069446
20. Di Vito, Jackie; Laurin Claude (2010), "Corporate Ownership, R&D Investment and Performance of Canadian Firms" in Journal of Global Business Management, vol. 6, Iss. 1.