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ENTREPRENEURIAL QUALITY AND REGIONAL DEVELOPMENT: CHARACTERISING SME SECTORS IN LOW-INCOME AREAS*

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Abstract. This paper analyzes the characteristics of SMEs in less-developed areas in comparison with more advanced economies. The conceptual framework includes different factors making up the so-called 'entrepreneurial quality' of the SME sector: the personal characteristics of the entrepreneurs (motivations and previous experience), different dimensions of the SMEs' entrepreneurial orientation, and the patterns of the SMEs' insertion in national and global value chains. The empirical analysis uses data of SMEs in four different Spanish provinces representing examples of low-income economies and comparatively high-income ones, respectively. Results show the SMEs in the low-income economies to be characterized by a lower entrepreneurial quality.

JEL Classification: L25; L26; R11.

Keywords: SME, entrepreneur, innovation, linkage, development.

1. Introduction

In recent decades, entrepreneurship and SMEs have received increasing attention by academics and policymakers (Acs and Audretsch 1990; Audretsch and

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Keilbach 2007). This interest has been stimulated by different studies showing the important contribution of SMEs to economic growth, job creation and innovation (Storey 1994; Carree et al. 2007). However, there does not seem to be a straightforward relationship between the per capita income and the size of the SME sector –this being made up of all the SMEs within an economy. Thus, in the European Union, the countries with the largest SME sectors (considering their contribution to total employment) are the Mediterranean economies and the Baltic States, which are not among those with the highest per capita incomes (Schmiemann 2008). Furthermore, Cravo (2011) has shown that the size of the SME sector has a negative or insignificant effect on economic growth in the case of Brazilian micro-regions. Moreover, the highest rates of entrepreneurial activity are generally found in developing economies and the relationship between total entrepreneurial activity and per capita income seems to be curve shaped (Reynolds et al. 2002; Bosma and Harding 2007). Thus, as an economy develops, nascent entrepreneurship declines with per capita income because returns to wage work increase relative to entrepreneurial returns and marginal managers find they can earn more money working as employees. However, in later phases of the development process, entrepreneurial activity will rise again due to, among other factors the increasing importance of services and the information technologies developments that create new business opportunities (Acs et al. 2008).

Besides, Stam et al. (2007) suggest that entrepreneurs with "high expectations for growth" contribute more to national economic growth than entrepreneurs in

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general. This macroeconomic positive impact of growth-oriented entrepreneurship can be observed in both low- and high-income countries (Stam et al. 2010). Moreover, SMEs in highly-developed areas tend to be more innovative, more internationalized and more efficient that those in low-income areas (see European Commission 2010). All these facts suggest that, when considering the role of SMEs in regional development, not only is the number of entrepreneurs and SMEs in an economy the relevant factor, but also their 'quality'.

From this perspective, this paper aims at identifying the particular characteristics of the SME sectors in less-developed areas in comparison to the SME sectors in more advanced economies. In order to do so, a set of characteristics of the entrepreneurs and SMEs -making up their 'entrepreneurial quality' (EQ)- will be considered. Specifically, the entrepreneurs' motivation and previous experience, different dimensions of the SMEs' entrepreneurial orientation, and the patterns of SME insertion in national and global production chains will be included in the analysis. Based on these dimensions, it might be possible to differentiate between 'high-quality' SME sectors, characteristic of highly-developed regions, and 'low-quality' SME sectors, usually found in less-developed areas. The hypotheses proposed in this paper will be tested using data from a survey among 663 SME managers/business owners in four provincial economies in Spain: two low-income ones –Badajoz and Cádiz- and two comparatively high-income provinces –Álava and Valencia. In this way, some particular weaknesses of the entrepreneurs and SMEs in the low-income economies included in the analysis will

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be identified using the logistic regression model. The paper is organized as follows. The second section reviews the literature and proposes a theoretical framework to delimitate the notion of EQ. The third section is devoted to the empirical analysis. Next, some conclusions and policy implications are presented to end the paper.

2. Analytical framework

First of all, following Cravo (2011), a conceptual clarification is pertinent regarding the relationship between entrepreneurship and SMEs which can be viewed as two different dimensions –dynamic and static- of the same phenomenon. On the one hand, measures such as the start-up rates or the Total Entrepreneurial Activity (TEA) index are flow variables referring to the dynamic dimension of entrepreneurship. On the other hand, the stock of SMEs in an economy -measured by their contribution for the total value added or employment- would represent the static dimension of entrepreneurship. Since the great majority of start-ups are SMEs, these two dimensions are directly linked: an increase in start-up rates will naturally lead to a higher share of SMEs in an economy. Of course, in this respect, a second flow has to be accounted for: the rate of mortality among the SMEs. From this perspective, the size of the SME sector also adjusts through failures in the entrepreneurial activity.

In this paper, as was said before, the so-called EQ of the SMEs in low-income areas will be analyzed in comparison with other more advanced economies.

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According to the analytical framework proposed here, this EQ would be shaped by certain characteristics of the individual entrepreneurs and SMEs which might influence the economic growth and employment creation in a particular area. In this sense, the entrepreneur's previous work experience and motivations, on the one hand, and different dimensions of the SME's entrepreneurial orientation (EO), on the other hand, will be specifically considered. However, the EQ of the SME sector is not exclusively determined by the mere aggregation of the characteristics of individual agents. External effects also play a significant role, particularly those associated with productive linkages between firms. Therefore, it is necessary to consider the patterns of insertion of the SMEs into national and global value chains and the subsequent situations of dependence that are often generated.

FIGURE 1 ABOUT HERE

2.1. Entrepreneurs' personal characteristics: Motivations and work experience

Motivation can be defined as the set of reasons that prompt individuals to engage in a particular behaviour, for instance, starting up a business (Shane et al. 2003). The type and strength of individual entrepreneurial motivation may determine the goals and aspirations for the firm, leading to different macroeconomic outcomes (Hessels et al. 2008; Fernández et al. 2009). In this

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respect, different taxonomies of motivations have been proposed in the literature. One of the most usual ones differentiates between intrinsic and extrinsic motivations (see, for instance, Guzmán and Santos 2001). An intrinsic entrepreneurial motivation poses that entrepreneurs develop their activity for the mere pleasure of carrying it out, that is, for vocational reasons or for the need of personal development and autonomy. On the contrary, extrinsic entrepreneurial motivation implies the entrepreneurs' activity being driven by the desire of gaining an economic reward or making a material achievement. According to the literature, those entrepreneurs with an intrinsic motivation are more prone to the adoption of energizing business behaviours (Krueger and Casrud 1993). Consequently, higher intrinsic motivation might stimulate innovation, cooperation, ambition and a long-run vision in SMEs (Guzmán and Santos 2001).

Another relevant classification differentiates between 'necessity' and 'opportunity' motivation. Opportunity entrepreneurs are viewed as entrepreneurs who start a business in order to pursue an opportunity in the market, whilst necessity entrepreneurs are pushed by unemployment situations or dissatisfaction with their previous jobs. Block and Wagner (2010) have shown that the opportunities exploited by opportunity entrepreneurs are generally more profitable than those exploited by necessity entrepreneurs. Moreover, countries with a low ratio of opportunity to necessity entrepreneurs also seem to have a low GDP per capita (Acs et al. 2005).

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Nevertheless, in the case of incumbent businesses, entrepreneurs often play their role mainly to keep a family business going. This type of motivation, which will be named 'continuity' motivation throughout this paper, could be more frequent in those economies with a strong entrepreneurial tradition.

Furthermore, sound empirical evidence shows that previous work experience has a positive influence on the entrepreneur's decision to start up and on the subsequent development of the business activity (Lin et al. 2000; Lazear 2004). Working experience makes up a learning process through which entrepreneurial skills can be acquired and social networks that are useful for future business activities can be developed (Cooper 1985). However, self-employment is frequently the only option for people who cannot find a job. These 'necessity entrepreneurs' lack the work experience which could help them to succeed in their business initiatives and expand them.

Thus, the following four hypotheses are proposed in this paper:

H1: Low-income areas are characterized by a lower presence of entrepreneurs with autonomous and opportunity motivations (in comparison to high-income areas).

H2: Low-income areas are characterized by a higher presence of entrepreneurs with a necessity motivation (in comparison to high-income areas).

H3: Low-income areas are characterized by a lower presence of entrepreneurs with a continuity motivation (in comparison to high-income areas).

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H4: Low-income areas are characterized by a lower presence of entrepreneurs with previous work experience as employees (in comparison to high-income areas).

2.2. Entrepreneurial Orientation (EO)

Miller (1983) characterized an entrepreneurial firm as that one which "engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch". Thus, three main dimensions of the EO have been established in the literature: innovation, proactivity and taking risks. However, certain authors have considered other variables within the concept of EO, capturing different characteristics and behaviours that shape entrepreneurial attitude or organizational strategy (Stevenson and Jarillo 1990; Wiklund 1999). For the objectives of this paper, the following three aspects will merit attention: innovation, proactivity and cooperation.

A core dimension of EO is innovation. In this respect, Covin and Miles (1999) identified four types of innovations related to firms' EO, while Lumpkin and Dess (1996) distinguished between innovation 'product market' -which puts the emphasis on product design, market research and advertising and promotion- and innovation 'technology' -characterized by the development of new products and processes. Furthermore, innovation -regarding both firms' products and processes- has also been a topic of great interest in other streams within the SME literature (Acs and Audretsch 1990; Marcati et al. 2008; Forsman 2011).

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Besides, Miller (1983) pointed out proactivity as a dimension of business strategy that allowed entrepreneurs to act in advance by adopting an aggressive behavior compared to their rivals. 'Proactive' entrepreneurs differ from 'reactive' entrepreneurs who only respond to previous changes in the market or their business environment (such as new technologies and innovation or changes in competition or customer tastes). Lumpkin and Dess (1996) considered that proactivity and reactivity are both opposite concepts to 'passiveness'. The latter one poses a behavior of indifference or inability to grab opportunities or take the lead in the markets (McMullen et al. 2007). In contrast, proactivity has been defined as the ability to find and exploit new products and market opportunities before competitors (Miller and Friesen 1978; Stevenson and Jarillo 1990). Among the characteristic activities of proactive entrepreneurs, business planning has been pointed out as a strategic policy facilitating firm growth (Guzmán and Santos 2001, de Justo et al. 2010).

Though cooperation with other firms has not been usually considered as a dimension within the EO concept, it has been pointed out as a relevant factor contributing to EQ (Guzmán and Santos 2001; Santos and Liñán 2007). By means of collaboration with other companies, SMEs can strengthen their competitive position in the market, grow faster and increase profitability (Ginevičius 2010). The importance of cooperation has been particularly revindicated in the light of the phenomenon of flexible specialization in central and northeastern Italy (the 'Third Italy'). In this sense, the spontaneous cooperative networks of small local firms are

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essential for the economic success of SMEs in industrial districts (Guerrieri et al. 2001; Markusen 1996). Cooperative behaviors are especially useful for SMEs, which can benefit, in this way, from some of the advantages of large firms without losing the flexibility characteristic of small companies (Pyke et al. 1991). Cooperation can be carried out through formal agreements with other firms or through informal agreements, based on personal networks of contacts.

In this respect, the following hypothesis can be proposed:

H5: Low-income areas are characterized by a lower proportion of innovative SMEs (in comparison to high-income areas).

H6: Low-income areas are characterized by a lower proportion of proactive SMEs (in comparison to high-income areas).

H7: Low-income areas are characterized by a lower proportion of cooperative SMEs (in comparison to high-income areas).

2.3. Position within value chains

The contribution of SMEs to regional development may differ according to their pattern of integration in value chains. National and global value chains are generally governed by large companies which assume the coordination of the activities within the chain (Gereffi at al. 2005). This leads to asymmetric power relationships between large companies and SMEs within these value chains. Therefore, it is interesting to analyze the position of SMEs in value chains and its

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implications for the firms and the regional economies. With this in mind, the notions of functional dependence and productive dependence proposed in Guzmán-Cuevas et al. (2009) can be a useful tool.

a. Functional Dependence

Nowadays, value chains are generally spread across different regions and countries as a result of the process of productive fragmentation (Romero et al. 2009). From this perspective, the 'functional' dependence concept points out the dependence of the enterprise system in a specific economy with respect to other territories. Thus, following Guzmán-Cuevas et al. (2009), studying functional dependence imply considering the geographical origin of a firm's inputs (purchases) and the geographical destination of its outputs (sales). The maximum degree of functional dependence would be represented by a firm purchasing all its intermediary inputs in the foreign market and selling all its production in the local market. Conversely, the minimum degree of functional dependence (in other words, a maximum degree of functional autonomy) would be represented by a firm acquiring all its inputs in the local market and exporting all its output. A high level of functional dependence, as an overall characteristic of the SME sector, represents a weakness for a regional economy and poses a limitation, from a macroeconomic perspective, to the generation of added value and employment (Guzmán-Cuevas et al. 2009). A great presence of functionally-dependent firms would imply that the economy does not benefit from the multiplying impact derived from possible backward linkages. By contrast, a production system characterized by a large

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presence of functionally-autonomous firms would be associated with a higher growth potential –due to the orientation to export markets- and a greater capacity to generate spillover effects through backward linkages.

These considerations are also related to an extensive literature stressing the importance of production linkages within a specific area. In this respect, the endogenous growth theory has highlighted the role of the technological spillovers as a source of increasing returns (Romer 1990). Knowledge spillovers seem to be more frequent in diversified productive systems due to a cross-fertilization among sectors (Glaeser et al. 1992), productive linkages being a natural route for them. Furthermore, the 'New Economic Geography' pays attention to the backward and forward linkages as relevant factors in the spatial dynamic of the productive activity (Fujita et al. 1999). From this perspective, productive linkages can be seen as externalities leading to agglomeration economies (Parr et al. 2002).

b. Productive dependence

Porter (1985) pointed out the buyer and supplier power, among the forces influencing competition in an industry. More recently, the asymmetric power relationships within the value chains and their implications for upgrading in SMEs have been studied within the Global Value Chain approach (Gereffi at al. 2005; Morrison at al. 2008; OECD 2008). In this respect, the concept of productive dependence refers to the degree of concentration of the firm's purchases and/or sales from/to a small number of suppliers and/or customers. An extreme situation

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of backward productive dependence would be observed in the case of a firm which purchases all its inputs from only one supplier. Analogously, an extreme situation of forward productive dependence would be associated with a firm which concentrates all its sales on only one client, for instance, a firm working exclusively for another company through a subcontract agreement. A high forward or backward productive dependence situates a firm in a vulnerable position, as the majority of its outputs and inputs are subject to decisions and circumstances outside its control that, in extreme cases, might even put the firm's activity at grave risk. Moreover, these situations of dependence imply a limitation for the SME's bargaining power and, in consequence, for the firm performance. From the macroeconomic perspective, an excessive productive dependence represents a weakness for the production systems that might be especially characteristic of low-income economies. This would imply an especially high presence of firms, often of very small size, acting as official dealers, franchises or concessions, subordinated to large corporations (Guzmán-Cuevas et al. 2009).

In this respect, we formulate in this paper the following three hypotheses:

H8: Low-income areas are characterized by a larger presence of functionally-dependent SMEs (in comparison to high-income areas).

H9: Low-income areas are characterized by a larger presence of forward productive dependent SMEs (in comparison to high-income areas).

H10: Low-income areas are characterized by a larger presence of backward productive dependent SMEs (in comparison to high-income areas).

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3. Empirical analysis

In this paper these hypotheses will be tested using data for SMEs in four Spanish provinces: Badajoz, Cádiz, Valencia and Álava. These provincial economies were selected trying to provide a representative picture of the Spanish economy as a whole. Two of them -Cádiz and Badajoz- which are located in the south and west of Spain in the regions of Andalusia and Extremadura respectively, are among the least developed economies in the country. In contrast, Álava, in the north of Spain, and Valencia, on the Mediterranean coast, are comparatively-advanced economies. Table 1 shows data regarding per capita income and provincial unemployment levels. As can be seen, Álava and Valencia have higher income levels: Valencia, which is the third largest provincial economy in Spain in terms of GDP -after Madrid and Barcelona- is around the average national per capita income and Álava is the richest province of Spain. Both have unemployment rates below the national average rate, particularly in the case of Álava. On the contrary, Badajoz and Cádiz present GDP per capita and unemployment rates far higher than the Spanish average. In addition, other differences between the production systems of these economies can be observed in Table 1. Álava has the largest industrial sector, whereas Badajoz shows a comparative specialization in agriculture and Cádiz in services. The low-income economies, Badajoz and Cádiz, are characterized by lower average firm sizes in comparison with the advanced

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ones and lower business densities (establishments per 100 inhabitants). However, there is not a clear relationship between the SME sector size and the per capita income level for the regional economies considered. Thus, the largest SME sector - in terms of its contribution to total employment- is observed in the case of Valencia, whereas the smallest SME sector is Álava's (and these are the two richest economies among those included in this study).

INSERT TABLE 1 ABOUT HERE

The empirical analysis in this section will aim at testing whether the SMEs in the provinces with low per capita income (Badajoz and Cádiz) have different characteristics than those SMEs in the comparatively high-income provinces (Álava and Valencia) and, if so, at observing whether these possible differences might be interpreted as differences in the EQ of their SME sectors.

3.1. Data and methodology

Data used for this analysis have been obtained from a survey carried out among SMEs in the four provinces considered. The person interviewed was the entrepreneur, this being defined as a business owner also assuming managerial functions. According to the European Commission's standards, SMEs were defined

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as businesses with at least one worker and up to 250 employees. Firms surveyed were randomly selected from directories of SMEs located in industrial and business parks. SMEs operating in industry and services were interviewed, whereas the primary sector was excluded. The sample was stratified with quotas for sectors and firm size intervals. The fieldwork was undertaken during the last quarter of 2007 and the first quarter of 2008 and was based on personal interviews with an overall response rate of 21.2%. Some observations had to be removed from the dataset due to mistakes, missing data and inconsistencies. The final sample includes 663 observations: 200 for Cádiz, 153 for Badajoz, 222 for Álava and 88 for Valencia. This final dataset is statistically representative of the two categories of economies – low and high-income ones– with an error of ±6% and a confidence level of 95%. Furthermore, it is also representative of each provincial SME population in the cases of Badajoz, Cádiz and Álava with an error of ±8% and a confidence level of 95%. Since the missing observations corresponded mainly to Valencia, the representativeness of the data for this province cannot be guaranteed. Nevertheless, the composition of the final dataset is reasonably balanced: there are 353 for low-income areas and 310 observations for comparatively high-income provinces. Some firm characteristics for each group are summarized in Table 2.

INSERT TABLE 2 ABOUT HERE

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In this exercise, the *dependent variable* will be the *location of the SMEs (loc)*, differentiating between low-income areas and comparatively high-income ones. This dichotomous variable takes value *1* for those SMEs located in Badajoz and Cádiz and *0* for those located in Álava and Valencia.

The *independent variables* in this analysis can be classified into four types:

a) Control variables:

In order to isolate the influence of the main variables, several control variables were included in the model. These variables allow the controlling of the sectoral specializations of the economies and other general demographic characteristics of their SMEs.

1. *Firm Age (age)*: number of years of activity since the creation of the firm (continuous variable).

2. *Firm Size (size):* firm size measured using the number of employees (continuous variable).

3. *Construction* (*const)*: this variable takes the value *1* for the firms operating in the construction sector and *0* for the rest (dichotomous variable).

4. *High technological industries* (*high_tech)*: this variable takes the value *1* for the firms operating in high and medium-high technological manufacturing and *0* for the rest (dichotomous variable). The specific industries included in this category are listed in the Appendix 1.

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5. *Low technological industries (low_tech)*: this variable takes the value *1* for the firms operating in low and medium-low technological manufacturing and *0* for the rest (dichotomous variable) (Appendix 1 lists the industries included in this category).

6. *Advanced business services* (*adv_serv):* this variable takes the value *1* for the firms operating in advanced service activities and *0* for the rest (dichotomous variable) (see also the Appendix 1).

b) Entrepreneurs' personal characteristics:

Two personal features of the entrepreneurs are considered: the nature and strength of their motivations and their previous work experience.

The entrepreneurs interviewed were asked about their level of agreement with the following seven statements related to their *motivations* for running a business:

- "Because this is the best option for my personal and professional development."
- "Because I want to be my own boss."
- "Because I wanted to take advantage of a good economic opportunity."
- "Because this way I earn more money than working as an employee."
- "Because I did not have another option (I was unemployed)."
- "Because I had to add to the family income."
- "Because I had to continue with a family business."

The answers were coded using a Likert scale with 7 items (from *1* meaning absolute disagreement to *7* meaning full agreement). Since there were certain

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correlations between these variables, a principal components analysis was carried out in order to include a lower number of uncorrelated variables in the regression model. As a result of this, the following three vectors with eigenvalues greater than one were obtained –variables *7* to *9*:[1]

INSERT TABLE 3 ABOUT HERE

7. *Autonomy and opportunity motivations* (*aut_mot)*: This vector is made up of the first four motivations proposed, which are related to the desire of autonomy and the attempt at exploiting attractive business opportunities. It explains 31.6% of the total variance (Table 3 shows the factorial loading of each vector).

8. *Necessity motivation* (*nec_mot):* This vector includes two motivations related with necessity situations, that is, those who run a business to escape from unemployment and those who need to add to the family income. It explains 15.2% of the total variance.

9. *Continuity motivation* (*cont_mot)*: This vector is exclusively made up of the variable identifying the business owners who run a family business. It explains 19.4% of the total variance.

1. The value of the Kaiser-Meyer-Olkin statistic is 0.675 and the Barlett's sphericity test shows a significant value for the Chi-square, confirming that the correlation matrix is non-random. All the communalities have values higher than 0.55. These three vectors correspond to the unrotated solution. The results applying the varimax rotation were observed to be consistent with this analysis.

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10. *Work experience (exper):* This dummy variable takes value *1* for those interviewed who had previously worked as employees before running their current business and value *0* in the negative case.

c) Entrepreneurial Orientation

Three dimensions of EO are considered in this work:

- **Innovation**: three variables for innovation have been considered:

11. *Product innovation* (*prod_inn*): the entrepreneurs interviewed indicated whether their SMEs had introduced product innovations in the previous three years. The answers were coded as Likert variables with five alternatives with an ascendant degree of innovativeness: *0* meant no innovations; *1* meant innovations in goods or services similar to others already in the market; *2* indicated innovations in goods or services with slight modifications with respect to the existing ones; *3* indicated innovations in goods or services with substantial changes with respect to the existing ones, and *4* represented innovations in goods or services that were entirely new in the market.

12. *Process innovation* (*proc_inn*): this variable captures innovation in the firm's internal processes in different areas (production, marketing, logistics, management, etc.) in the previous three years. This variable was coded as follows: *0* indicated no innovations; *1* represented small incremental innovations coming from experience; and *2* meant radical process innovations introduced by the company.

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13. *Technology acquisition* (*tech_acq*): this variable indicates whether the SMEs have purchased new technology in the market. It takes values from *0* to *4*: *0* means no purchase and *1*, *2* and *3* indicates respectively sporadic, moderate and intense acquisition of technology.

- Proactivity: three following variables are considered as indicators of proactivity.

14. *Planning (plan)*: this dichotomous variable takes value *1* if the firm annually carried out formal business planning activities and *0* in the negative case.

15. *Control (cont)*: this dichotomous variable takes value *1* if the firm habitually carried out activities for monitoring and forecasting the firm's performance and *0* in the negative case.

16. *Alertness to business opportunity* (*opor*): this dichotomous variable takes value *1* if the firm habitually searched for new economic opportunities in the market and *0* in the negative case.

- **Cooperation:** Six variables regarding cooperation activities are included in our analysis.

17. *Cooperation* (*coop*): this variable reflects the existence of collaboration agreements between firms. It takes value *0* in the case of absence of any type of cooperation with other firms, *1* if informal cooperation existed, and *2* in the case of the existence of formal cooperation agreements.

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18. *Research and Development cooperation* (*r&d_coo*): This dichotomous variable takes value *1* if the firm carried out any cooperation activity with other firms in the field of research and development and *0* in the negative case.

19. *Production cooperation* (*prod_coo*): This dichotomous variable takes value *1* if the firm carried out any cooperation activity with other firms regarding the organization of production and *0* in the negative case.

20. *Distribution and Sales cooperation* (*sal_coo*): This dichotomous variable takes value 1 if the firm carried out any cooperation activity with other firms regarding the distribution and sale of its products and *0* in the negative case.

21. *Marketing and publicity cooperation* (*mar_coo*): This dichotomous variable takes value 1 if the firm carried out any cooperation activity with other firms regarding marketing or publicity issues and *0* in the negative case.

22. *Purchasing cooperation* (*pur_coo*): This dichotomous variable takes value *1* if the firm carried out any cooperation activity with other firms regarding the purchasing of inputs to be used in its production process and *0* in the negative case.

d. Dependence

23. *Functional dependence (FDI)*: to measure the firms' functional dependence an index is proposed built upon the answers to a set of questions about the approximate percentages of sales and purchases that the companies made in the provincial market, in the rest of the region, in the rest of Spain, and abroad (see Fig. 2). The functional dependence index is constructed from two indexes of

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extraversion -one for the sales and another one for the purchases. These indexes were defined following Romero (2011):

1. The midpoint of each interval indicated in Fig. 2 was established as a class mark (m_i).

2. A weight for each geographic market, w_i, was introduced as follows: *0* for the provincial market, *0.2* for the rest of the regional market, *0.5* for the rest of the national market, and *1* for the rest of the world.

3. The two synthetic indexes were defined to capture the extraversion of the sales (*SE*) and the purchases (*PE*), as follows:

$$SE(PE) = \frac{\sum_i w_i \cdot m_i^{s(p)}}{\sum_i m_i^{s(p)}} \quad (1)$$

INSERT FIGURE 2 ABOUT HERE

The indexes of SE and PE were calculated as weighted averages of each market for each firm. In fact, the numerator in (1) could itself represent an index of extraversion. Nevertheless, the denominator $\sum_i m_i^{s(p)}$ in expression (1) was introduced to make a pertinent correction because of the use of class marks instead of real percentages. If $m_i^{s(p)}$ denoted the exact percentages of the sales and

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purchases in each market, it would hold that $\sum_i m_i^{s(p)} = 1$. However, because $m_i^{s(p)}$ represent class marks that is not necessarily true. That could imply a slight overestimation or underestimation of the extraversion indexes which can be faced by means of introducing the denominator in expression (1).The resulting indexes of SE and PE take values from *0* to *1*, indicating the level of extraversion of the SME regarding its sales or its purchases, respectively (higher values of the indexes reflect higher levels of extraversion).

Finally, the *Functional Dependence* index (FDI) is given by the following expression:

$$FD = PE\text{-}SE \qquad (2)$$

The FDI index takes values between *-1* and *1*. The extreme value of *-1* would be obtained for a firm which purchased all its intermediary inputs from local producers and sold all its output in export markets. On the contrary, value *1* would be obtained for a firm which imported all its inputs and sold its entire production in the local market.

24. Backward and forward productive dependence (BPD and FPD): Productive dependence from the firm's suppliers and clients has also been calculated using two indexes. In the questionnaire used for the survey, there were four questions asking about the approximate percentage of purchases/sales that the firm made

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from/to its main supplier/client, two main suppliers/clients, five main suppliers/clients or ten main suppliers/clients. The entrepreneurs interviewed had to choose between the following six possible answers: less than 10%, between 10% and 25%, between 25% and 50%, between 50% and 75%, between 75% and 99%, and 100%. The midpoint of each interval indicated before was established as a class mark (*p* for the input purchases and *s* for the output sales), except for the category "less than 10%" with *0* as a class mark, and the category "100%" represented by *1*. In this way, the final indexes of productive dependence –taking values between 0 and 1- can be calculated as follows:

$$BPD = \frac{1}{4}\sum_i p_i \quad (3)$$

$$FPD = \frac{1}{4}\sum_i s_i \quad (4)$$

where p_i represents the class mark regarding the input purchases absorbed respectively by its main supplier, its two main suppliers, the five main suppliers and the ten main suppliers ($i = 1,\ldots,4$); and s_i represents the class mark for the previous intervals of percentages regarding sales to, respectively, the main client, the two main clients, the five main clients or ten main clients ($i = 1,\ldots,4$). Higher values indicate a higher concentration of the firm's sales or purchases among a

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small number of clients or suppliers. The backward/forward productive dependence index (BPD/FPD) will take value *0* for those SMEs which concentrate less than 10% of their purchases/sales among their ten main suppliers/clients and *1* for the SMEs which concentrate 100% of their purchases/sales among their ten suppliers/clients.

The matrix with the correlations between all these variables is shown in Appendix 2.

Since the dependent variable is dichotomous, the logistic regression model is applied in this paper. However, the aim of our model is not to explain the firms' location as a conscious decision process. Most SMEs tend to operate where the entrepreneurs are settled, this factor being crucial, even the only relevant consideration, when they start up. On the contrary, the purpose of this analysis is to identify the particular characteristics of the SMEs in the low-income provinces (versus the comparatively high-income ones). The logistic regression models presented next estimate the probability of an individual SME being located in a low-income area based on the observed values for the independent variables. The regressions were estimated using the maximum likelihood method.

3.2. Results

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Four logistic regressions were estimated: Model 1 includes only the control variables. In Model 2 the variables for motivation and work experience are incorporated. Model 3 adds the variables for the three dimensions of EO – innovation, proactivity and cooperation. Finally, Model 4 gathers all the variables including the three dependence indexes. Final results can be seen in Table 4. The omnibus test is always significant ($p<0.05$), denoting the acceptance of the hypothesis that β coefficients are different from zero. The variance inflation factors (VIF) and the condition indexes (CI) indicate that multicollinearity is not a problem in these models. The highest condition index is 11.16 and the highest VIF is 2.29, this being observed for the variable cooperation.

In the baseline Model 1, firm age and size significantly contribute to explain the dependent variable, SMEs in low-income economies being younger and smaller. These results are notably robust, since they are maintained when additional variables are included in Models 2 to 4. The lower firm age in the low-income economies might be explained by a higher entrepreneurial activity along with a reduced rate of business survival which could be related to their lower stock of human capital (Acs et al. 2007). Regarding the sectors, in this Model 1 the only statistically-significant variable is the one for advanced services. In this respect, it is less probable for SMEs operating in advanced services to be located in the comparatively low-income provinces. However, in Models 3 and 4, once the rest of variables are included, there are two significant dummies for the sectors: the low-technology industries and the construction sector. In both cases, the signs are

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positive, which indicated a higher probability of finding SMEs in low-technological industries and construction in the low-income provincial economies. Both facts tell us about an adverse specialization of the comparatively low-income economies.

In Models 2, 3 and 4, the three types of motivations considered have significant coefficients with the signs expected in line with H1, H2 and H3. Entrepreneurs with an autonomy-opportunity and continuity motivation have a lower probability of being found in the low-income economies, whereas this probability increases for those entrepreneurs with a necessity motivation. Our results in this respect are in line with previous research from an international perspective within the GEM project (Reynolds et al. 2002; Hessels et al. 2008). Furthermore, the fact that business owners in low-income economies are less frequently motivated by the continuation of the family business might indicate a lack of entrepreneurial tradition which would have intergenerational consequences. Moreover, the variable 'experience' has a negative and significant coefficient, showing that the inexperienced business owners are more probably located in the low-income provinces, as proposed in H4.

Regarding the EO dimensions, firstly, those SMEs which developed product or process innovations are more likely to be located in the more advanced provinces, as the negative signs of the correspondent β coefficients in the regressions indicate. These results support H5. However, the SMEs which had purchased technology are

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located with a higher probability in the low-income provinces. So, though SMEs in low-income areas frequently do not have enough resources and capacity to generate their own innovations, they make a significant effort in order to catch up and get closer to the technology frontier. Secondly, H6 is not supported by these results since none of the variables for proactivity is significant. This might be due to the proxies for proactivity being to some extent correlated with other variables in the model, such as those for innovation –positively correlated- and necessity motivation –negatively correlated (see Appendix 2). These variables, which do appear as significant ones in the model, could be also capturing the effect of the proactivity dimension. Finally, no difference is detected regarding the intensity of cooperation agreements by SMEs in low- and comparatively high-income economies (H7). Nevertheless, significant differences do exist regarding the type of cooperation relationships. Those SMEs which cooperate with other firms in production activities are more likely to be located in the advanced economies. On the contrary, those SMEs which have carried out cooperation activities in distribution and marketing have a higher probability of being located in low-income areas. In this respect, our analysis suggests that SMEs in the two types of economies might be playing different roles within their value chains: in advanced areas SMEs might be acting as specialized suppliers for other SMEs and large companies. However, in low-income regions SMEs might be simply taking on the distribution and marketing of goods and services produced by large external

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companies. This seems to be confirmed by the results related to functional and productive dependence in Model 4.

INSERT TABLE 4 ABOUT HERE

Thus, the indexes for functional and backward productive dependence are highly statistically-significant, in line with H8 and H10. The two coefficients are positive, showing that those SMEs which are productively dependent on their suppliers and functionally-dependent are more probably located in the low-income provinces. However, forward productive dependence has the expected positive sign (H9), but its effect is not significant. These results might be indicating an unfavorable insertion of the SMEs in low-income areas into the value chains. The SMEs in the low-income areas would import their inputs and sell their output in the internal market, having a negative macroeconomic impact on the regional trade balance. Moreover, as said before, they might be often involved exclusively in the distribution and marketing of products. In this way, they would act as the last tier of value chains controlled by large external companies on which they heavily depend as official dealers, franchises, or concessions. This position might imply that SMEs in low-income economies can only capture a residual component of the

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total added value generated, whereas most of it would go to the large companies governing the value chains. [2]

4. Conclusions

The aim of this paper has been to analyze the particular characteristics of the SME sectors in low-income areas from the perspective of their "entrepreneurial quality". In order to delimitate this idea of entrepreneurial quality, an analytical framework has been proposed considering some crucial factors which might influence the macroeconomic impact of SMEs in regional economies. In this respect, the focus of this paper is not the most habitual one: instead of paying special attention to the 'high-quality' SME sectors in highly-developed areas, the issue has been studied from the perspective of the low-income regions, trying to identify the characteristics of their 'low-quality' SME sectors.

The empirical work has been based on a dataset with SMEs in four Spanish provinces with different levels of economic development. In this respect, entrepreneurs' motivations in low-income areas have been shown to have certain peculiarities with respect to those in comparatively high-income economies. In

[2] As a test for the robustness of the results, the analysis was replicated using only the data for the two extreme cases: Badajoz, as a low-income economy versus Álava, as a high-income economy. The results are still basically the same. This applies particularly to autonomy-opportunity motivation, previous experience, product innovation, process innovation, technology acquisition, production cooperation, functional and productive dependence. The full results for this exercise are available upon request.

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addition, SMEs in low-income areas introduced less product and process innovations, but they are more active regarding the acquisition of external technology. Furthermore, though in general terms SMEs in the low- and comparatively high-income provinces have no statistically-significant differences regarding the intensity of cooperation relationships with other firms, the more frequent types of cooperation in low and comparatively high-income areas seem to differ. Thus, SMEs in low-income economies are less frequently involved in production cooperation, but they cooperate more in marketing, publicity, distribution and sales.

These results for cooperation seem to be related to the existence of different patterns of integration into the value chains for the SMEs in low- and high-income areas. In our opinion, this issue is probably the most important contribution of our paper. Though the insertion of SMEs in national and, mainly, in global value chains has recently been receiving much attention, this line of research is generally based on individual case studies or collections of them. On the contrary, the current paper provides an overall perspective of some key features related to the positioning of SMEs in regional economies within national and global chains. In this respect, we propose to study the dependence relationships associated with the participation of SMEs in value chains using the concepts of functional and productive dependence. Thus, we have found that SMEs in low-income provinces are more functionally-dependent on other areas, since they tend to purchase their inputs from external suppliers and sell them in the internal market. In the same

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way, they are more productively-dependent with regard to specific suppliers from which they purchase a high percentage of all the inputs they require in their production processes. These suppliers might be in many cases large external companies exerting the governance of the national and global value chains.

This comparative analysis has direct implications for the design of entrepreneurship policies aiming at fostering SMEs as an engine of growth. These actions should be conceived as not merely considering entrepreneurship from a quantitative perspective, but also taking into account its qualitative dimension. Consequently, policy makers should try to improve the entrepreneurial quality of the SME sector paying attention to aspects such as the entrepreneurs' motivations, the SMEs' entrepreneurial orientation and the patterns of insertion of SMEs in national and global value chains.

Three main limitations can be pointed out in this work. On the one hand, the analysis carried out allows the indentifying of specific characteristics of SME sectors in areas with different levels of development. However, our empirical framework does not allow us to answer the question about to what extent these relationships have a causal nature and, if so, what is the direction of the causality. That is: Do low-income areas have this particular type of SME sectors due to their low level of development or, conversely, do they remain relatively backward areas because they have this specific type of SME sectors? To address this issue, panel data with representative samples for different regions would be necessary. This

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leads to the second limitation of our paper. Its analysis is based on just four economies and, therefore, could be influenced by the specific characteristics of the areas included in the study. Therefore, datasets gathering information for a larger number of regional economies would be required to confirm the findings presented in this paper. Finally, the third limitation is also related to the characteristic of the dataset. This research has a focus on SMEs located in industrial and business parks and, therefore, it is convenient to be cautious when applying its conclusions to all the population of SMEs. Furthermore, it would be desirable to work with datasets with larger numbers of observations in order to assure higher levels of representativeness for the samples. In this respect, this work proposes a conceptual framework and provides some provisional conclusions representing an early step in a potentially fruitful line of research. Nevertheless, much more research is needed to confirm our hypotheses and get to know in depth the mechanisms through which the contribution of entrepreneurs and SMEs for economic development is materialized.

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Appendix 1. Sector classification

Low and medium-low technological industries
Mining and quarrying (ISIC Rev. 3. C.10-C.14)
Manufacture of food products and beverages (ISIC Rev. 3. D.15)
Manufacture of tobacco products (ISIC Rev. 3. D.16.)
Manufacture of textiles (ISIC Rev. 3. D.17)
Manufacture of wearing apparel; dressing and dyeing of fur (ISIC Rev. 3. D.18)
Tanning and dressing of leather; manufacture of luggage, handbags, etc. (ISIC Rev. 3. D.19)
Manufacture of wood and of prod. of wood and cork (except furniture), etc. (ISIC Rev. 3. D.20)
Manufacture of paper and paper products (ISIC Rev. 3. D.21)
Publishing. printing and reproduction of recorded media (ISIC Rev. 3. D.22)
Manufacture of coke, refined petroleum products and nuclear fuel (ISIC Rev. 3. D.23)
Manufacture of rubber and plastics products (ISIC Rev. 3. D. 25)
Manufacture of basic metals and fabricated metal products (ISIC Rev. 3. D. 27 and D28)
Manufacture of other non-metallic mineral products (ISIC Rev. 3. D. 26)
Manufacture of furniture; manufacturing n.e.c. (ISIC Rev. 3. D.36)
Recycling (ISIC Rev. 3. D.37)
High and medium-high technological
Manufacture of chemicals and chemical products (ISIC Rev. 3. D. 24)
Manufacture of machinery and equipment n.e.c. (ISIC Rev. 3. D. 29)
Manufacture of office, accounting and computing machinery (ISIC Rev. 3. D.30)
Manufacture of electrical machinery and apparatus n.e.c. (ISIC Rev. 3. D. 31)
Manufacture of radio, television and communication equipment and apparatus (ISIC Rev. 3. D.32)
Manufacture of medical, precision and optical instrum., watches and clocks (ISIC. Rev. 3. D33)
Manufacture of motor vehicles, trailers and semi-trailers (ISIC Rev. 3. D. 34)
Manufacture of other transport equipment (ISIC Rev. 3. D. 35)
Advanced Business Services
Computer and related activities (ISIC Rev. 3. K.72)
Research and development (ISIC Rev. 3. K. 73)
Other business activities (ISIC Rev. 3. K.74)

Note: Industry classification follows the OECD's criteria (http://www.oecd.org/dataoecd/43/41/48350231.pdf). The "Advanced Business Services" category includes some specific services among the "High Tech Knowledge Intensive Services" and "Market Knowledge Intensive Services" categories according to Eurostat (http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an2.pdf).

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Appendix 2. Correlation matrix

	Size	Age	High_tech	Low_tech	Constr	Adv_serv	Aut_mot	Nec_mot	Cont_mot	Exper	Prod_inn	Proc_inn
Size	**1**											
Age	**0.109**	**1**										
High_tech	0.030	0.017	**1**									
Low_tech	0.003	0.023	-0.16	**1**								
Constr	0.022	-0.04	**-0.10**	-0.16	**1**							
Adv_serv	0.151	-0.00	**0.097**	-0.15	**-0.10**	**1**						
Aut_mot	0.022	0.018	0.006	-0.03	0.024	0.001	**1**					
Nec_mot	0.002	-0.05	-0.01	-0.00	-0.03	0.035	1.041	**1**				
Cont_mot	0.045	0.201	-0.03	0.057	**-0.06**	-0.00	7.700	-2.37	**1**			
Exper	0.053	**0.107**	-0.00	-0.00	-0.03	-0.05	-0.03	**-0.10**	**0.146**	**1**		
Prod_inn	0.030	0.048	0.041	**0.105**	-0.02	-0.00	**-0.08**	0.022	-0.04	-0.01	**1**	
Proc_inn	0.036	0.061	-0.00	0.060	-0.07	-0.00	-0.06	**0.094**	-0.05	0.012	0.323	**1**
Tech_acq	0.029	0.029	**0.087**	-0.01	-0.01	-0.06	-0.02	0.014	0.009	0.063	0.257	0.204
Plan	0.074	0.051	0.060	-0.02	0.000	-0.05	-0.05	0.007	0.004	0.015	0.177	**0.127**
Cont	0.044	0.047	0.017	0.046	-0.06	-0.02	0.009	0.026	-0.04	-0.03	**0.100**	0.044
Opor	0.033	0.015	0.032	0.050	-0.04	0.013	-0.06	**0.087**	0.006	0.056	0.174	**0.082**
Coop	0.073	-0.04	0.022	-0.04	-0.03	0.053	0.004	0.006	-0.01	-0.00	0.179	**0.122**
R&D_coo	0.019	-0.06	-0.04	0.004	-0.04	0.042	-0.03	0.033	-0.06	-0.02	**0.128**	**0.082**
Prod_coo	0.046	-0.03	0.056	0.051	0.034	0.07	0.008	-0.02	-0.00	0.008	0.003	-0.00
Sal_coo	0.011	-0.01	0.016	**-0.08**	-0.06	0.021	-0.01	0.013	-0.00	0.048	0.055	0.051
Mar_coo	0.066	-0.02	0.004	-0.02	-0.03	0.014	0.015	0.059	0.023	0.008	**0.144**	0.065
Pur_coo	-9.63	0.012	-0.03	0.026	-0.05	0.031	-0.00	-0.01	0.055	0.003	0.017	0.031
FDI	-0.06	-0.05	-0.03	-0.02	-0.04	-0.06	0.038	-0.00	-0.02	0.066	-0.00	-0.04
FPD	**-0.09**	0.030	**0.131**	0.047	-0.04	-0.02	-0.04	-0.04	0.039	0.018	-0.02	-0.01
BPD	**-0.14**	-0.07	-0.00	0.015	-0.00	-0.06	0.071	-0.04	-0.03	0.051	-0.07	-0.05

Note: Significant correlations at the level of 0.05 are shown in bold.

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Continued Appendix 2

	Tech_acq	Plan	Cont	Opor	Coop	R&D_coo	Prod_Coo	Sal_coo	Mar_Coo	Pur_coo	FDI	FPD	BPD
Size													
Age													
High_tech													
Low_tech													
Constr													
Adv_serv													
Aut_mot													
Nec_mot													
Cont_mot													
Exper													
Prod_inn													
Proc_inn													
Tech_acq	**1**												
Plan	0.197	**1**											
Cont	0.164	0.392	**1**										
Opor	**0.114**	0.252	0.234	**1**									
Coop	0.209	**0.124**	**0.078**	**0.139**	**1**								
R&D_coo	**0.135**	0.071	0.019	**0.076**	0.314	**1**							
Prod_coo	**0.082**	0.009	0.048	0.070	0.389	0.026	**1**						
Sal_coo	0.121	0.058	**0.081**	0.072	0.532	0.031	**0.103**	**1**					
Mar_coo	**0.112**	**0.125**	0.033	**0.146**	0.315	**0.093**	0.011	**0.119**	**1**				
Pur_coo	0.057	**0.095**	0.046	**0.126**	0.296	0.065	**0.123**	0.200	0.099	**1**			
FDI	0.032	0.040	0.004	0.028	0.052	0.004	0.019	**0.091**	-0.00	0.046	**1**		
FPD	0.053	0.030	0.049	0.021	-0.00	-0.05	0.020	0.024	-0.02	-0.01	-0.03	**1**	
BPD	**0.107**	**0.065**	0.037	-0.01	0.049	0.003	0.024	**0.079**	0.017	-0.00	0.056	0.341	**1**

Note: Significant correlations at the level of 0.05 are shown in bold.

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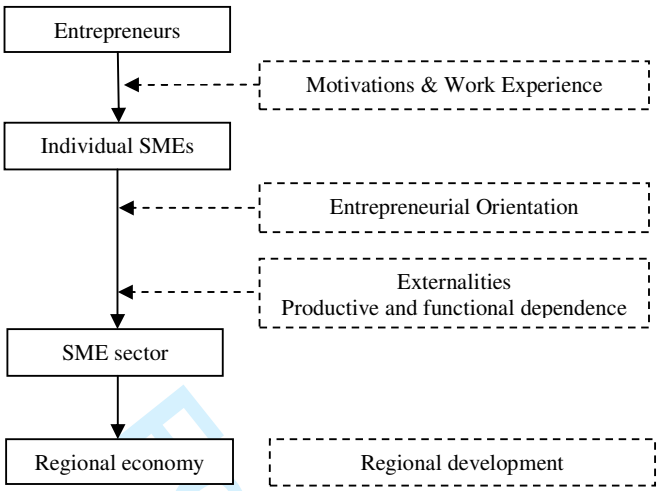

Fig. 1. Analytical framework

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Market weight (w_i)	Spatial markets	None	Up to 10%	10-25%	25-50%	More than 50%	100 %	Interval
		0	0.05	0.175	0.375	0.75	1	Class marks (m_i)
0	Provincial market	□	□	□	□	□	□	
0.2	Rest of the regional market	□	□	□	□	□	□	
0.5	Rest of the national market	□	□	□	□	□	□	
1	Rest of the world	□	□	□	□	□	□	

Question: What approximate percentage of the total sales (purchases) is made in the provincial market, the rest of the regional market, the rest of the national market and the rest of the world?

Fig 2. Construction of the purchase and sales extraversion indexes

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Table 1. Some indicators for the provincial economies. 2007

	Badajoz	Cádiz	Valencia	Álava
Population (nº inhabitants)	678,459	1,207,343	2,486,483	305,459
GDP per capita (euros)	15,991	18,556	21,790	33,998
Unemployment rate (%)[1]	14.12	14.91	8.14	4.96
Business establishments (per 100 inh.)	6.6	6.09	8.29	7.54
Average number of workers per firm	8.93	9.35	9.94	12.58
SMEs (with 1-249 employees) (% of the number of firms)	99.76	99.69	99.70	99.60
Workers in SMEs (with 1-249 employees) (% of the number of workers)	72.19	71.32	73.41	68.38
Agriculture (% of total employment)	9.15	3.52	2.85	1.48
Industry (% of total employment)	11.31	10.61	18.76	32.95
Construction (% of total employment)	13.54	13.54	14.35	8.52
Services (% of total employment)	66.00	71.95	64.03	57.05

Source: Calculated from data of the National Institute of Statistics and the National Institute of Social Security. (1) Annual average.

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Table 2. Some descriptive indicators

	No.	%	Firm Age (average)	Firm Size (average)	High-tech. industries	Low-tech. industries	Construct.	Advanced Services
Low-income economies	353	53.2	14	10	48.4%	58.8%	60.0%	33.9%
High-income economies	310	46.8	19	20	51.6%	41.2%	40.0%	66.1%

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Table 3. Entrepreneurial motivations. Main components analysis

	Components		
	1	2	3
This is the best option for my personal and professional development	**.611**	-.371	-.048
I want to be my own boss	**.732**	-.062	.039
I wanted to take advantage of a good economic opportunity	**.763**	.136	.033
This way I earn more money than working as an employee	**.820**	.119	.081
I did not have another option (I was unemployed)	-.056	**.744**	-.379
I had to complement the family income.	.164	**.790**	.188
I have to continue with a family business	-.153	.111	**.927**
Cronbach's alpha	.723	.746	**----**

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Table 4. Logistic regressions

Dependent variable: SME location (loc) (1 for low income areas; *0* for comparatively high income areas)																
	MODEL 1				**MODEL 2**				**MODEL 3**				**MODEL 4**			
	β	S.E.	Sig	Exp(β)	β	S.E.	Sig	Exp(β)	β	S.E.	Sig	Exp(β)	β	S.E.	Sig	Exp(β)
Control variables																
Size	-.017	.004	***	.983	-.016	.004	***	.984	-.018	.005	***	.982	-.014	.005	***	.986
Age	-.023	.006	***	.978	-.025	.007	***	.975	-.027	.007	***	.974	-.027	.008	***	.974
High_tech	-.093	.286		.911	-.127	.295		.880	-.181	.317		.834	-111	.324		.895
Low_tech	.300	.212		1.350	.362	.218	*	1.436	.615	.235	**	1.849	.596	.253	**	1.816
Constr	.321	.285		1.379	.312	.290		1.283	.459	.307		1.582	.548	.324	*	1.730
Adv_serv	-.643	.316	*	.526	-.594	.326	*	.552	-.510	.342		.600	-.356	.367		.700
Entrepreneurs' personal charact.																
Aut_mot					-.163	.084	*	.849	-.184	.090	**	.832	-.200	.097	**	.819
Cont_mot					-.155	.087	*	.856	-.230	.094	**	.792	-.229	.100	**	.795
Nec_mot					.234	.085	***	1.264	.235	.090	***	1.264	.187	.097	**	1.206
Exper					-.888	.197	***	.412	-.896	.209	***	.408	-.875	.222	***	.417
Ent. orientation																
Prod_inn									-.563	.200	***	.569	-.460	.213	**	.631
Proc_inn									-.552	.166	***	.576	-.533	.179	***	.587
Tech_acq									.333	.095	***	1.396	.263	.101	**	1.300

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Continued Table 4

Plan									.084	.197		1.088	-.039	.215		.962
Cont									.207	.245		1.230	.289	.268		1.335
Opor									-.311	.202		.733	-.303	.219		1.354
Coop									.042	.157		1.043	-.002	.165		.996
R&D_coo									-.574	.347		.563	-.566	.367		.572
Prod_coo									-.431	.274		.650	-.498	.291	*	.608
Sal_coo									.689	.268	**	1.992	.600	.283	***	1.762
Mar_coo									.976	.391	**	2.653	1.172	.411	***	3.336
Pur_coo									.367	.327		1.443	.451	.344		1.570
Firm depend.																
FDI													1.537	.338	***	4.651
FPD													.167	.469		1.182
BPD													2.658	.429	***	14.265
Constant	1.346	.220	.000	3.842	1.370	.223	.000	3.936	1.062	.379	.005	2.892	.342	.415	.410	1.407
Goodness-of-fit																
Chi-squared (sig.)	51.097***				85.706 ***				149.095***				225.915***			
-2 log-likelihood	862.444				827.835				764.446				687.626			
Nagelkerke R-squared	.099				.162				.270				.387			
Percentage correct (1)	59.9				64.8				71.1				75.3			

*, **, *** Differences statistically significant at the 0.10, 0.05, 0.10 levels, respectively. S.E = Standard Error. (1) A cut-off value of 0.532 is used.

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