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# The influence of geographical concentration and structural characteristics on the survival chance of the firms

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## Summary

The objective of this work is to evaluate the risk of business mortality. Considering a sample of over 11,741 firms in the textile-clothing sector, the influence that factors such as age, geographic density (district effect) and the principal productive activity (subsector effect) have on Spanish textile firms survival were studied using the postulates of the theory of *Population Ecology of Organizations* (Hannan and Freeman, 1977).

From a theoretical-practical point of view this industry has been found to be especially relevant for this type of study for at least three reasons: 1) its importance in terms of employment and occupation in the EU, 2) as the increase in globalization has resulted in extraordinary failure rates of its firms and 3) because the firms tend to concentrate geographically around cluster type populations or industrial districts.

The results obtained from the analysis suggest that the risk of business mortality is increased by some risk factors relative to the structural characteristics of the firms (younger firms and specialization in low-tech activities), and under determined locational circumstances.

**Key words:** failure, survival, manufacturers, SMEs, industrial district.

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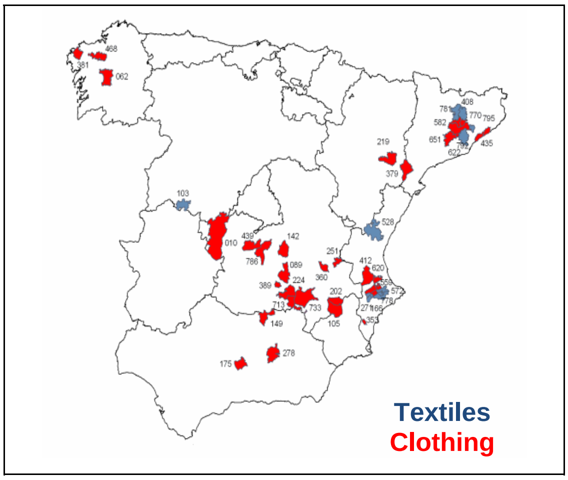
## 1. INTRODUCTION[1]

One of the principal features that define traditional manufacturing sectors (TMS) in some peripheral countries in the EU is the high number of geographic concentrations of firms in the same sector that are distributed throughout the country. In the case of Portuguese textile-clothing the area around Porto stands out, in Italy the Prato region, and in Spain the Valencian region and the industrial district of Alcoi-Ontinyent, among others (authors). In the same way that there is an asymmetrical spatial distribution of these manufacturers; the distribution according to branches and subsectors also shows important biases. Specifically, in the northeast and centre of Spain (Galicia and Castilla La Mancha) there is a productive specialization in clothing (apparel), while the Mediterranean Arc (Catalonia and the Valencian region) specializes in activities more related to textiles and their subsectors (yarns, threads, knitwear, and household and technical textile manufacturers) (figure 1).

**Figure 1: Regional distribution of Spanish textile-clothing.**




*Source: Based on Boix (2009).*

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Due to different aspects that have been framed under the denomination of globalization, the TMSs are having serious survival problems (Buckley and Ghauri 2004; Jones and Hayes, 2004). This fact is reflected in the significant increase in the number of redundancy plans, dismissals, bankruptcy or insolvency proceedings and closings that have occurred in recent years. We believe that the consequences of this negative evolution is very worrying for two reasons: a) industries such as textile-clothing still employ a large number of people in the EU[2] and b) the pattern of location in geographic concentrations mean that an unfavourable evolution has even more painful effects; due to the loss of jobs and the difficulties that this entails for the future regeneration of these zones.

In an attempt to change the declining situation and return to a state of stability and growth the firms must face up to a situation of pessimism, labour unrest and distrust that significantly reduce the possibilities of survival. This unfavourable scenario has its basis in the fact confirmed by the literature that when firms encounter serious problems their suppliers reconsider the relational framework in place up to that moment. This usually results in a reduction in orders and credit. Clients also redefine their relationship as doubts about the possibilities of the firms being able to face up to commitments and agreed shipments grow (Chowhdury and Lang, 1996; Smith and Grave, 2005).

Faced by this uncertain panorama the firms' responses have varied enormously from simple measures to improve efficiency ratios to delocalization to other countries with lower costs. As a result of these responses, the registered results have been very varied: some firms have managed to face the situation and others have failed. There is such an unequal record that while some geographic areas have maintained their level of activity in these industries other regions are about to see these sectors disappear completely.

[2] In the annex (table A-1) the importance in terms of jobs that this industry has among the UE's principal producers is shown. It can be seen that according to Eurostat (2009), in 2006, Italy, a leader at the sector, had 472,000 employees (21.5 %), Portugal 186,000 and Spain 175,000. In total, this industry employed 2,190,000 people at that time.

Hence, in this complex situation, the aspects related to the knowledge and understanding of the risk factors associated with business failure take on an especial importance for businessmen and politicians. Different studies have centred their attention on aspects relative to the management team (Lohrke et al. 2004). However, said focuses have serious application limitations to the most widely held assumption in the TMS formed by SMEs with a family character located in geographic concentrations. We thought, in line with the postulates of the *Population Ecology of Organizations* (Hannan and Freeman, 1977) that this unequal result in the mortality of TMS firms is also very contingent upon other "risk factors" associated with geographic location, age, and activity subsector.

For these reasons, the objective of this work is to evaluate the risk of business mortality starting from the analysis of the localization and structural characteristics of the firms. The results throw light upon the question of why the mortality rates of the TMS firms is heterogeneous, as well as anticipating where most failures will take place and, finally, permitting actions and more efficacious responses. As different authors argue, independently of the causes of decline of the industry its firms' survival will depend on an adequate reaction to the decline situation (Robbins and Pearce, 1992).

In short, to answer the questions relative to where and why a firm has more risk of failure, this work has been structured in five parts. Part 2 establishes the theoretical and conceptual framework from which different hypotheses emanate. Part 3 describes the design of the study, and part 4 contrasts the theoretical hypotheses and discusses the empirical results. Part 5, summarizes our principal conclusions and recommendations.

## 2. THEORETICAL FRAMEWORK AND HYPOTHESIS

Although there is no consensus in the literature about what business failure is, in this work we take it to mean a "situation associated with the mortality or disappearance of a firm (Mellani and Wilkinson, 2004).

Studies dedicated to the analysis of the causes of business failure group them in terms of source: interior or exterior (Boyle and Desai, 1991). As principal *external causes* the increase of competition seems the more influential; the decrease in demand originating from the decline of the sector as the second cause that best explains failure (Céspedes and Carmona, 1998). The increase in costs of the raw materials is another factor that has also traditionally stood out. In relation to the *internal causes*, there is an ample census in naming the management team as the most important factor. Other aspects where there is a great deal of agreement are those related with inadequate policies and financial control or a high cost structure linked to the organizational structure, operating inefficiency or idle resources (Rasheed, 2005).

In relation to the relative importance of each of these factors in the explanation of the adaptation-survival-mortality of the firms there is a debate that is still not yet resolved pivoting on two opposing views: voluntarism and determinism (Céspedes and Carmona, 1998; Mellani and Wilkinson, 2004). The *voluntarist vision* argues that it is the executives with their perceptions and actions who lead the firms down the success-failure path, while the determinist establishes that business failure is principally linked to factors external to the firm.

Voluntarism argues that changes in the environment force the firms and their executives to react; it is therefore more important who makes the response that the context in which it is adopted (Hambrick and Schecter, 1983; Boyle and Desai, 1991). Some of the principal focuses are the *Upper Echelons* of Hambrick and Mason (1984) and the *Threat-Rigidity* of Staw et al. (1981). In general, it can be affirmed that in this research line the works that have focused on the study of aspects related to the management team's characteristics stand out: demographic (Musteen et al., 2005), perceptions (Nadkarni and Barr, 2008) or mental scheme (Chen et al., 2007). All of these characteristics have been analysed in relation to their influence on the container, content and results of the strategic actions implemented.

On the *determinist side* different focuses and theories have stood out such as the *Evolutionist* (Nelson and Winter, 1982), the *Institutionalist* (DiMaggio and Powell, 1983) and the *Ecology of Populations* (Hannan and Freeman, 1977). For the *evolutionists* the firms differ in survival rates because these depend on different routines and competences which are specific and difficult to transfer, efficacious dynamics of these activities (the transformation of routines into competences) being the factor that best explain their success-failure. The *institutionalists* explain the different failure rates in terms of the similar structures that the firms embrace in relation to their institutional environment, the social and cultural factors in use in that environment being the ones that determine their survival. Both perspectives have been criticized as being simplistic and excessively generalist.

The "*ecologists*" argue that business failure should be studied and understood from the populations that form the said firms. The populations are groups of mutually interrelated firms, with similar mechanisms and procedures that condition their growth and decline (Hannan and Freeman, 1977). Therefore, the causes of success-failure of these firms should not be sought so much in evolutionary dynamics or in the firms' institutional context, but in the setting or coherence of populations with the conditions of the environment. In such a way that the ones that survive are those that better fit or adapt to the environmental conditions.

From this proposal the differences in the unequal rates of mortality that the firms register are due to three principal risk factors (Mellahi and Wilkinson, 2004): 1) the population density (location), 2) the size and the age of the organization (age) and 3) the life cycle of the industry (subsector). The first one is more linked to the territory and the other two to the firm's structural characteristics.

*Location*

According to Hannan and Freeman (1977) organizational density can be understood to be the number of firms in the same sector or industry in a given geographic space and time.

For these authors the study of the influence of this aspect can be useful to understand where more failures will take place. The initial supposition is that in a crisis situation, the greater the density, the greater the scarcity of resources, provoking an increase in rivalry that results in cannibalization between the members of the organization.

Facing this fact, the location tendency that has been registered by TMSs in the last 30 years has been geographic concentrations. The reasons that explain why there are regions in which an activity has a high population density are varied. According to Marshall (1890) an industry organized on the basis of a geographic concentration can provide certain advantages for the firms in the zone of influence, which are difficult to attain for firms that are isolated. These advantages are due to three principal factors: the existence of specialized manpower, connecting and interrelated elements, and business factors in the geographical area. According to this author, these advantages in practice mean better innovation rates, greater levels of commercial development or better productivity.

However, business reality is continuously changing. Thus, improvements in information and communication technologies, reduction of transportation costs and the deregulation of markets; aspects that are generically grouped under the concept of globalization, have lead to what some authors have called "the mortality of distance" (Cairncros, 1997; De Martino et al., 2006; De Propis and Lazzeretti, 2009). From this more recent approach comes a warning that external economies associated with this density could become external diseconomies. Some works, such as that of Pla-Barber and Puig (2009) show, in a longitudinal study of the textile-clothing industry, that the positive effect associated with territory in the internationalization of firms is becoming eroded due to globalization.

Other studies more centred in business survival such as that of Staber (2001), show that in the knitwear subsector the location of firms in clusters of the same industry increases the possibilities of failure, while location in regions formed by complementary industries reduces these rates. More recently, works such as that of Neffke et al. (2011) seem to be in the same line, demonstrating that the sign of externalities of manufacturing industries is contingent upon their life cycle. That is, in the initial stages, said effects are growth and positive while in mature stages these effects enter decline and may even be negative. In short, according to the *ecologists'* assumption and the life cycle that relates population density and the maturity of the industry with TMSs failure rates the following hypothesis is suggested:

**Hypothesis 1:** *"The risk of business mortality is greater, when the population density of the firms is greater"*.

*Age*

While the influences of geographic factors in organizational survival have been little explored in the economic-business literature, there is a large amount of research that has demonstrated why mortality rates are heterogeneous (Manjón-Antolín and Arauzo-Carod, 2008). Consequently, there is a certain consensus in that the larger and older the firm the lower the failure rate (Mellahi and Wilkinson, 2004). In spite of there being numerous studies that have validated this inverse relationship there is also a certain controversy in the theoretical argument.

On the one hand, the authors such as Jovanovic (1982) point out that this inverse relationship between size and failure should be characterized with greater precision, as the real inverse relationship is between the firm's age and its failure. The basis of this argument is close to evolutionist principals, suggesting that only those firms that are more efficient (the ones that better adapt to competitive requirements) survive and grow, the older ones therefore being the ones that have a greater probability of continuing. From this perspective size would be a consequence of age.

On the other hand, the *ecologist* postulates argue that the inverse relationship is really between size and failure rates. The basis of this reasoning is that smaller size is associated with greater financial difficulties or a smaller market, especially in the early stages of a firm's life (Hannan and Freeman, 1977). In the case of Spain, some works point out this line; for example, Iturrioz et al. (2009) and Segarra and Callejón (2002).

Nevertheless, given the characteristics of the firms in our sample (SMEs in the great majority) and the data base that we use (it provides information about the age at death but not about the size of the firm when it died) it seems more reasonable that in our analysis we use the variable age. A failure spiral is suggested: 1st) in decline situations pessimism reigns and the firm's survival possibilities are questioned, 2nd) this provokes distrust in the clients, and relative to the factors, an increase in prices, 3rd) only the older firms, which count on a more consolidated market, better reputation and more solidity are capable of facing this situation. Besides, in line with the logical dependence that the *ecologists* suggest, this unfavourable spiral will be still more evident in those territories with TMS firms characterized by a strong concentration of firms, since the available resources will be even scarcer and more difficult to obtain (Staber, 2001). This idea is summarized in the following hypothesis:

**Hypothesis 2:** "*The risk of business mortality is greater, when the firm is younger*".

*Subsector*

As in any other industry, the TMSs are composed of distinct sectors and subsectors that have important common differences in the characteristics of their products and situation in their markets. Thus, in any of these industries it is possible to see subsectors more intensive in manpower - *low-tech* -, to those more intensive in capital - *high-tech* - (Scott, 2006).

Such is the importance of the differences in these sectors that some works suggest that in industries such as textile-clothing in EU countries, only the innovative activities, those that incorporate a greater value added, will have possibilities of survival (Jones and Hayes, 2004). The basis of this argument rests on the concept that to face the intense competition from emergent countries, the firms in these sectors must redirect their productive and commercial strategies. On the one hand, toward options based on productive specialization and subcontracting of those phases that do not suppose a competitive advantage. On the other, choosing diversification toward new products and markets more resistant to competition based on price (Buxey, 2005).

Empirical studies do not agree on this point. For example, while Velucchi and Viviani (2007) do not find enough empiric proof that relates the survival of Italian manufacturing firms with technological intensity, Puig et al., (2009) show a positive effect between productive specialization in textile subsectors that can be considered *high-tech* (home-technical) and growth of firms. Perhaps part of this disagreement is due to the evolutionary dynamics that the clusters experience and the technological heterogeneity of the firms that make them up (Menzel and Fornahl, 2010). To this, it would be pertinent to add the difficulty of defining the levels of technological intensity of their subsectors (Kirner et al., 2009). Independent of the theoretical reasons or methodologies that limit the establishment and contrast of more solid propositions, we point out, in the same line as Jones and Hayes (2004), Buxey (2005) and Scott (2006) that they positively relate survival with the firms' innovative and technological intensity. This allows us to include a third risk factor for TMS firms that we define as subsectors and, starting from which we establish the following hypothesis:

**Hypothesis 3:** *"The risk of business mortality is lower in high-tech subsectors as compared with the rest".*

## 3. DESIGN OF THE STUDY

The source of statistical information used in the study was the SABI[3] data base. The population under analysis is Spanish firms that belong to the textile-clothing sector: codes 17 and 18 of the CNAE 93 and NACE Rev. 1. The selection criteria of the sample was based on the declaration of principal activity by the firms; so only those firms whose

[3] The *Sistema de Análisis de Balances Ibérico* (SABI) is feed with data gathered in the *Registro Mercantil de España*. Its use provides important advantages, most of all in relation to its individualized breakdown at a regional and sectorial level. Another very interesting aspect is that it indicates the date of creation and, and if relevant, the company's change of status. This data base has been used extensively in other similar investigations, e.g. Puig, et al. (2009).

primary code pertains to the textile line (epigraphs 17.1 to 17.7) and clothing line (epigraphs 18.2) were considered. Therefore, other firms that carry out activities in this sector, but have declared a different principal activity were not considered, for example those dedicated to commercialization or other related sectors such as machinery, chemicals or tanning.

The last period for which we have SABI data is 2008. According to the extraction made at the end of April 2009, were 11,741 textile-clothing firms that made up the population, which from a point of legal-commercial point of view (Jiménez, 2008), can be classified in 9 different states. The first, and most numerous, is named "active" and includes 9,308 firms the remaining 8 states (Formal closing, Provisional Formal closing, Tender, Dissolved, Extinguished, Inactive, Bankruptcy, Suspension of Payments) make up the remaining 2,433 firms.

Given that our objective is to evaluate how determined variables, locations and structures influenced the risk of business failure, 2 groups of variables were defined: a) *dependent* (state), b) *independent* (location, age and sector, and legal status as control).

In order to facilitate statistical treatment the dependent variable **State** was operationalized into three homogeneous values (Jiménez, 2008): 1=Active, 2=Irregular and 3=Dead. The state **Active** makes up 75% of the sample, **Irregular** includes the firms that are Inactive, in Tender, Bankruptcy, and Suspension of Payments, making up 7% of the sample. The state **Dead** includes those firms that are Formally closed, Dissolved and Extinguished making up 18%.

**Location** was operationalized defining three models of density or geographic concentration (Staber, 2001). This permitted us to differentiate three different models of level of population density. Specifically:

- Model no.1, distinguishes 3 types according to the coefficient of provincial[4] specialization[5] ( low = $[0<CS<1]$, medium =$[1<CS<2]$, high = $[CS>2]$);
- Model no.2, takes into account the coefficient of provincial specialization in a continuous form (CS= 0.02,…, 3.44) and establishes the level of population density.
- Model no.3, differentiates the firms according to whether they are located outside an industrial district - EFD - or within an industrial district -EDD- (0=EFD, 1=EDD) (district effect). This model is intended to contrast the more extreme case of geographic concentration and density: an industrial district. The details about the geographic delimitation of the industrial district which is located in Alcoi-Ontinyent[6] can be found in the work of Puig and Marques (2010), for those related to the district effect, Signorini (1994) and Soler (2000) may be consulted.

In line with the majority of works centred on business survival-failure the variable **Age** was measured by the firm's number of years (Manjón-Antolín and Arauzo-Carod, 2008). This piece of information was obtained as the difference between the year 2009 and that of initiation. As expected said information has a strong correlation with size.

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[4] The coefficients of specialization (CS) of the Spanish textile industry at a provincial level are shown in the annex (table A-2).

[5] The coefficient of specialization is a statistic which evaluates the presence of an activity (in our case the textile-clothing sector) in a region (province) in relation to the presence of this sector in the referential group (nation). The greater this datum the more significant the presence of the activity in the region considered.
Its mathematical expression is the following:
Where:
*Eij* refers to the volume of employment in the line in the regional entity j,
*Ej* indicates the total employment in the regional entity j,
*Ei* is the variable that shows the total employment in the line i,
*En* considers the total volume of employment in the nation.

A practical application of the calculation and acquisition of the coefficient of specialization in the Spanish textile industry can be found in Puig and Marques (2010).

[6] This district is located west of the Alicante and Valencia provinces and employs over 15,000 people (around 9 per cent of total employment in the Spanish textile-apparel sector.

In the definition of **Subsector** of activity, previous empirical evidence related to the subsector effect in the textile industry was taken into account (Puig et al., 2009). A variable which has two values was established:

- 0 = subsectors more intensive in manpower, (*low- tech*) including: Yarn (epigraphs 17.1 and 17.2), Finished articles (17.3), Knitted textiles (17.6 and 17.7) and Clothing (18.2).
- 1 = more capital-intensive subsectors, (*high-tech*) including Home-technical (17.4 and 17.5)

We have established **legal status** or proprietary structure as a control variable, which has two values: 1= Plc. and 2= Ltd. (Esteve et al., 2004). We should note that the absence in this study of other legal statuses is due to the fact that their weight in the total sample was marginal (2.1 %) and hence were not included for analysis.

The analysis techniques that were used are in terms of the research objectives and the nature of the data (Hair, et al. 2000). Given that the purpose of the present work is based on an analysis of failure and changes of state, the Markov process model technique was used. This econometric model is appropriate when aspects relative to time are analysed and risk factors have to be evaluated (Ericson and Pakes, 1995; Santamaría et al., 2009).

## 4. RESULTS AND DISCUSSION

Markov processes are multi-state models which are very useful for the description of longitudinal survival data. They are stochastic processes in which at a given time the process occupies a determined state from between a whole group of discreet states. In biomedical applications the states can represent different situations that an individual experiences in the course of an illness during a period of time, for example: healthy state, onset of illness, sickness, recurrence, progression and death (Santamaría et al., 2009). In our case, this group of states refer to the distinct phases that the firm can experience with time: active, presence of irregularities (the firm becomes sick/ill or becomes inactive for a period of time) and death. In this study a homogeneous Markov process with continuous time is considered, with which the evolution of the group of 11,742 firms is modelled for the period 2000-08 (Ericson and Pakes, 1995; Meyn and Tweedie, 2009).

These models give us information about the effect of risk factors defined in each of the transitions considered between the states in our study (active, irregularity, death). That is, to identify which specific factors can influence an active firm to presenting irregularities, or which factors can influence a firm to die from an active state, or become ill or become inactive given that it was active initially. Besides with multi-state models it is also possible to calculate the probabilities and prediction the transitional between the different states, as well as the number of firms that will become ill or die in the near future (three years).

The Markov process $\{X(t), t \geq 0\}$ applied to our case has the state space $S = \{1, 2, \ldots, 3\}$ where the state *1* is transient and the states *2* and *3* are absorbent. The stat of the process at an instant $t$ is given by $X(t)$. The initial process state is *1* (active firm), so that $X(0) = 1$. The transitional probabilities are defined by $\{p_{ij}(t) = P\{X(t) = j \mid X(0) = i\}$ within the *matrix of transitional probabilities* $P(t) = (p_{ij}(t))$. The infinitesimal generator associated to this Markov process $\{X(t), t \geq 0\}$ is given by the *matrix of transitional intensity* $Q = (q_{ij})$, $i = 1,\ j = 2, 3$ where $q_{ij}$ is the derivative, with respect to *t*, of the function of transitional probability $p_{ij}(t)$ in $t = 0$. The Kolmogorov relation that relates the matrixes is well-known $P(t)$ and $Q$ so that $P'(t) = P(t)Q$, whose solution is $P(t) = \exp(Qt)$.

As transitional intensities depend on the vector of the variable *z* resulting in $q_{ij}(z) = q_{ij} \exp(z' \beta_{ij})$ where $\beta'_{ij} = (\beta_{ij}^1, \beta_{ij}^2, \ldots, \beta_{ij}^k)$ is the vector of regression coefficients associated with the vector *z* for the transition $i \rightarrow j$ and $q_{ij}$ is the transitional basal intensity between the states *i* and *j*. The effect out of each variable $z_h, h = 1, \ldots k$ in the transition $i \to j$ is measured by the coefficient $\beta_{ij}^{h}$ with $h = 1, 2, \ldots, k$. The intensities of risk are interpreted as the functions of risk of Cox's model, which have been utilized widely in studies of business survival-failure (Manjón-Antolín and Arauzo-Carod, 2008). As in our analysis the variables age, activity subsector, location and the firm's legal status are considered, the vector of coefficients associated with the vector the z is, $\beta'_{ij} = (\beta_{ij}^{1}, \beta_{ij}^{2}, \beta_{ij}^{3}, \beta_{ij}^{4})$.

In table (1) the significance of each variable in the transitions under study (Active->Irregular, Active->Dead) is shown in summarized form: a) the coefficients associated with each of the variables considered (β) aid us in predicting whether the influence of these is statistically significant or not and its sign; b) the estimation of risk associated with each of these variables (Exp(β)); c) the measurement of the level of influence or association between the variables and the transitions considered is summarized and illustrated with asterisks. So that, for any of the four risk factors analysed its statistical significance should be seen, the sign (positive or negative) which indicates whether this intensifies or decreases the risk of change in the two established transitions (act>ill or act> death) and the transitional rates or risk associated.

Specifically, in table (1) and according to the model of location no.1, the significance and sign of the variable *Location* permits us to affirm that as the CS increases the risk of going from active firm to irregular firm (β= 0.248) and active firm to dead firm (β= 0.081) increases significantly. This result is in accordance with H1. Besides, as in this case CS refers to a provincial level, starting from the other two columns according to each individual value of the coefficient (Exp(β) = 1.281 y Exp(β) = 1.085) it could be affirmed that a firm located in a province such as Alicante, which has a level of CS= 2.14 (high density, level 3) has 28.1 % more risk of presenting irregularities and 8.5% more risk of dying with respect to other provinces such as Bilbao (CS= 0.02) which is classified in level 1 (table A.1).

**Table 1: The geographic concentration takes 3 values: 0=low CE, 1=medium CE, and 2=high CE.**

| | **β** | **β** | **Exp(β)** | **Exp(β)** |
|---|---|---|---|---|
| | act>ill | act>death | act>ill | act>death |
| Location (mod. 1) | **0.248***** | **0.081***** | *1.281* | *1.085* |
| Age | **-0.014***** | **-0.035***** | *0.985* | *0.965* |
| Subsector | -0.139 | **-0.360***** | *0.869* | *0.697* |
| Legal status | 0.108 | **0.184***** | *1.114* | *1.202* |
| *-2* log-likelihood* ***47658.57.*** *p<0,1**p<0,05; ***p<0,01*** | | | | |

In line with H2, for the variable *Age* it is verified that this decreases the intensity of going from active firm to irregular firm and to dead firm. Thus, it is confirmed that the older a firm the lower the risk of changing of state (becoming ill or dying) (β= -0.014 y β= -0.035). Starting from the other two columns according to each individual value of the coefficient (Exp(β) = 0.985 and Exp(β) = 0.965) it can be estimated that the risk of becoming ill diminishes by 1.45% while that of dying diminishes by 3.35%.

In relation to the *Subsector*, the betas indicate that this is only significant (- 0,360) to predict active firms becoming dead firms. Given that this has been encoded as 0 if a subsector is *low-tech* and 1 if it is *high-tech* the influence of activity in business failure is partially confirmed (H3). Nevertheless, the estimation of Exp(β) permits us to deduce that being in a *high-tech* subsector decreases the risk of death by 30.3%.

The coefficients of the variable Legal Status (Plc.=1, Ltd.=2) of a firm suggest that the fact that the firm is an Limited Company increases the intensity of going from active firm to dead firm. The risk of death increases for those firms whose legal status is Limited Company. Thus, it is confirmed that those firms that have this legal status (less resources) present a higher risk of change of state from active to dead, while the legal status does not have an influence on presenting irregularities. Starting from the column Exp(β) it can be deduced that the risk of death increases by 20.2 % for those firms whose legal status is Limited Company.

Table (2) shows the results obtained from the analysis of the models of location 2 and 3 in a summarized form. Model 2 contrasts the effect of location considering CS as a continuous variable, while the third analyses the influence of location on the basis of belonging to a defined industrial district or not. In general, it can be affirmed in both models that the same happens as in 1 (table 1): *Age* is negatively related to change of state (to become sick or die); while *Subsector* influences death. It can also be observed that the variable legal status is almost irrelevant for the interpretation of change of state from active to sick. On the whole these results verify H2 and partially H3.

**Table 2: Geographic concentration takes continuous values of CE or location according to the Industrial District.**

| | **2a) CE is continuous** | | **2b) EFD =0 and EDD =1** | |
|---|---|---|---|---|
| | **β** | **β** | **β** | **β** |
| | act>ill | act>death | act>ill | act>death |
| Location (mod. 2 y mod. 3) | **0.124***** | **0.105***** | 0.078 | **0.131*** |
| Age | **-0.017***** | **-0.036***** | **-0.018***** | **-0.034***** |
| Subsector | -0.105 | **-0.198***** | **-0.181*** | **-0.232***** |
| Location (mod. 2 y mod. 3) | **0.124***** | **0.105***** | 0.078 | **0.131*** |
| Legal status | -0.0313 | 0.058 | -0.042 | 0.089 |
| *p<0,1**p<0,05; ***p<0,01*** | *-2* log-likelihood* | ***47649.08*** | *-2* log-likelihood* | ***47681.86*** |

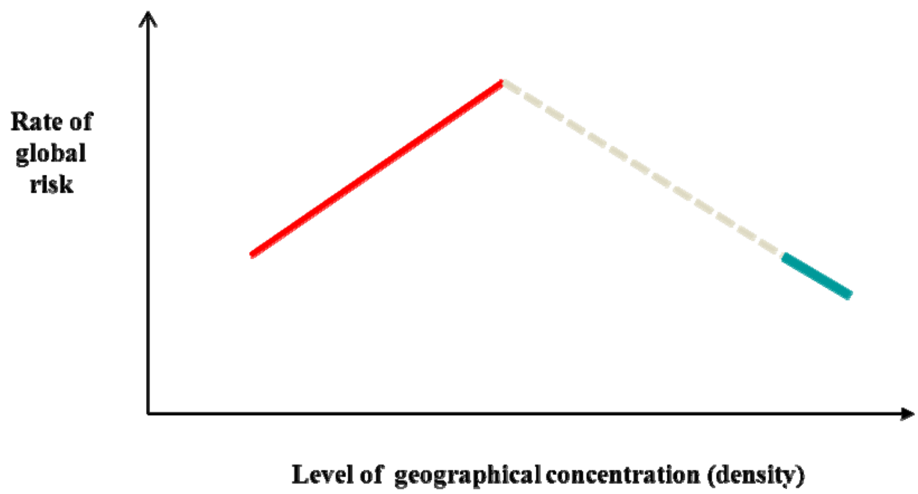
In relation to *Location* the results suggest that its influence on business failure is in terms of the level of geographic concentration (density): the greater the level of difference of agglomeration of firms, the lower the significance of this factor and, therefore, the lower its explicative capability for risk of mortality (β= 0.105 significant at 95% in the model (2a table) and β= 0.131 significant at 90% (table 2b). This aspect leads us to partially accept H1: The risk of mortality increases as the population density of its firms increases, to a point at which this seems to have little influence.

## 5. CONCLUSIONS

The objective of this work was to evaluate the risk of business mortality from an integrated perspective, analysing the influence of determined risk factors such as location, age and the subsector of activity as causes of a firm presenting irregularities (becoming ill) or disappearing (not surviving).

From the evidence obtained from the longitudinal analysis (2000-08) it can be affirmed that in business failure there are states and different behaviours that are influenced by risk factors related with location, the firm's experience and its principal activity. More specifically three principal conclusions could be suggested. Firstly, it is shown that business survival is more threatening for younger firms. Secondly, the Spanish textile firms that are more at risk are those whose principal activity is more intensive in manpower. Finally, it can be stated that there are "losing" geographic regions related with medium levels of geographic concentration. In fact it could be argued that the risk of business mortality and the proximity effect have a concave or inverse-U form (figure 2).

**Figure 2: Relationship between the rate of global risk and geographic density.**




These results are in line with the more established *determinism vision*. On the one hand, with the focus of the *Ecology Populations* (Hannan and Freeman, 1977; Freeman and Boeker, 1984), which suggests that the environment selects the organizational forms, so that only those which are more competitive can survive. On the other, with works such as that of Jovanovic (1980) which point out an inverse relationship between age and business failure. Besides, the conclusions derived coincide to a certain extent with those originating from other more specific studies that alert the executives of the TMS firms to the need of embracing a proactive attitude (Smith et al., 2005; Zourek, 2007), though it may be necessary to adopt readjustments in some aspects of their activity (specialization) and/or to redefine it toward segments more resistant to globalization (Jones and Hayes, 2004; Buxey, 2005).

In short, these ideas help us to understand that the different rates of failure of the TMS firms are a function of their characteristics: location and structure. This permits us to anticipate that at a territorial level globalization will continue to have an unequal impact, threatening more those formed by a geographic concentration of medium density and low-tech subsectors.

Finally, we want to emphasize that the results of this work are subject to a series of limitations relative to the sample and the definition of states. Firstly, our conclusions have been obtained starting from a sample of manufacturing firms in the Spanish textile sector. It is not clear whether these results can be generalised to other countries and other TMSs, although some evidence points in that direction. An extension of this work would be to test its robustness for industries such as footwear or furniture and in other countries (for example, Italy or Portugal). Secondly, the data analysed here do not offer information about other critical organizational factors in the survival of TMSs, neither at an executive level (demographic and cognitive) nor of strategy (internationalization, innovation, cooperation, etc.). Thirdly, the relations considered have always been linear and never quadratic or multiplicative. Finally, it should be emphasized that the delimitation of the “winning” subsector has in certain form been arbitrary.

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## ANNEX

**Table A-1: Textile-clothing employement in the EU (2006) (Million).**

| | Textiles (NACE 17) | | Clothing (NACE 18) | | Total Employements | |
|---|---|---|---|---|---|---|
| | | (%) | | (%) | | (%) |
| **Italia** | 234 | 23.56 | 238 | 19.88 | 472 | 21.51 |
| **Rumania** | 71 | 7.15 | 257 | 21.47 | 328 | 14.95 |
| **Polonia** | 81 | 8.16 | 152 | 12.70 | 233 | 10.66 |
| **Portugal** | 76 | 7.65 | 110 | 9.19 | 186 | 8.51 |
| **España** | 82 | 8.26 | 93 | 7.77 | 175 | 8.02 |
| **Francia** | 79 | 7.96 | 58 | 4.85 | 137 | 6.26 |
| **Alemania** | 83 | 8.36 | 41 | 3.43 | 124 | 5.65 |
| **Reino Unido** | 76 | 7.65 | 34 | 2.84 | 110 | 4.98 |
| **República Checa** | 46 | 4.63 | 33 | 2.76 | 79 | 3.64 |
| **EU-27** | **993** | **100** | **1197** | **100** | **2190** | **100** |

*Source: constructed using data from Eurostat (2009).*

**Table A-2: Textile-clothing specialization coefficients of Spanish provinces.**

| Province | SC | Province | SC | Province | SC | Province | SC |
|---|---|---|---|---|---|---|---|
| Toledo | 3.44 | Burgos | 1.16 | **Ávila** | **0.56** | Huelva | 0.18 |
| Barcelona | 2.59 | Pontevedra | 1.10 | León | 0.55 | Segovia | 0.18 |
| Ciudad Real | 2.55 | Zaragoza | 0.99 | Sevilla | 0.55 | Las Palmas G. C. | 0.17 |
| A Coruña | 2.53 | Málaga | 0.98 | Zamora | 0.50 | La Rioja | 0.16 |
| **Albacete** | **2.41** | Córdoba | 0.89 | Valladolid | 0.48 | Cádiz | 0.15 |
| **Alicante** | **2.14** | Palencia | 0.83 | Cantabria | 0.41 | Ceuta-Melilla | 0.11 |
| Girona | 2.07 | Tarragona | 0.81 | **Badajoz** | **0.40** | Navarra | 0.08 |
| Valencia | 1.64 | Cuenca | 0.80 | Guadalajara | 0.37 | Guipúzcoa | 0.04 |
| Orense | 1.58 | Soria | 0.80 | Lugo | 0.37 | Madrid | 0.04 |
| Teruel | 1.39 | Cáceres | 0.76 | **Asturias** | **0.31** | Vizcaya | 0.03 |
| Jaén | 1.27 | Granada | 0.71 | Murcia | 0.29 | **Álava** | **0.02** |
| Lérida | 1.27 | Huesca | 0.69 | Baleares | 0.26 | | |
| Castellón | 1.23 | Salamanca | 0.67 | **Almería** | **0.19** | | |

*Source: constructed using data from INE (2004).*