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Entrepreneurial profile and market competitive intensity as predictors of survival in Mexican microenterprises

Entrepreneurial profile and market competitive intensity as predictors of survival in Mexican microenterprises

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Abstract

This paper shows the results of an investigation carried out in 93 micro companies of the conurbation of San Luis Potosí-Soledad de Graciano Sanchez, Mexico, with the objective of finding factors that influence their chances of long-term survival. A logit logistic regression model was used to estimate the way in which the competitive intensity of a sector, the geographical location, the profile of the entrepreneur, the performance of market studies and the geographical concentration of competitors influence the probabilities of business survival. Among the relevant findings, a greater relative importance of the variables profile of the entrepreneur and market study stand out.

JEL Code: C35, L26, M13
Keywords: micro companies survival; entrepreneurial profile; competitive intensity

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Resumen

En este trabajo se muestran los resultados de una investigación realizada en 93 microempresas de la zona conurbada de San Luis Potosí-Soledad de Graciano Sánchez, México, con el objetivo de encontrar factores que influyen sobre sus posibilidades de supervivencia a largo plazo. Se utilizó un modelo de regresión logística logit para estimar la forma en que la intensidad competitiva de un sector, la localización geográfica, el perfil del emprendedor, la realización de estudios de mercado y la concentración geográfica de competidores influyen sobre las probabilidades de sobrevivencia o cierre de un negocio. Entre los hallazgos relevantes destacan una mayor importancia relativa de las variables perfil del emprendedor y estudio de mercado.

Código JEL: C35, L26, M13
Palabras clave: supervivencia de microempresas; perfil emprendedor; intensidad competitiva

Introduction

Knowing the factors that influence the survival of a business is essential for the proper management of entrepreneurship projects and programs to promote business creation. The first five years of a business are usually the most challenging since it is during this period that the highest proportion of business closures occur. In Mexico, for example, 33% of businesses disappear during the first year of life, and only 35% survive after five years from their creation (INEGI, 2018).

Table 1
Survivors per 100 businesses entering economic activity, by economic sector, by age

Age of the business	Manufacturing	Trade	Private non-financial services	Total
0	100	100	100	100
1	70	66	68	67
5	40	33	36	35
10	30	23	26	25
15	24	16	20	19
20	20	12	15	15
25	17	9	12	11

Source: INEGI (2018); life expectancy of businesses, with data from the Economic Censuses 1989, 1994, 1999, 2004, 2009, and 2014

Globally, low profitability is most often cited as the main cause of business closure (Global Entrepreneurship Monitor, 2014), followed by personal reasons and problems obtaining financing (Table 2).

Table 2
Main reasons for closing a business

Cause	%
Opportunity to sell the business	3.9%
The business was not profitable	30.7%
Problems obtaining financing	13.2%
Other job or business opportunity	9.6%
Planned exit	3.4%
Retirement	4.4%
Personal reasons	17.9%
An incident	3.1%
Government, taxes, bureaucracy	4.3%
Other	9.6%

Source: created by the author with Global Entrepreneurship Monitor (2015) APS Global Individual-Level Data information.

However, it is possible that underneath the problems of profitability and financing, there are factors such as decision-making processes, the perception of the market, and the management style assumed by the entrepreneur or business manager.

The research question that led to this work is: Is there any statistical relationship between the probability of survival of an entrepreneurial project and the value of some determinants of its performance, such as the profile of the entrepreneur, the competitive intensity of the sector in which he ventures, the characteristics of the location of the company, the number of competitors in the place where it is established, and the implementation of market research?

Literature review

In Mexico, a microenterprise is defined as a business unit with a maximum of ten workers whose sales do not exceed four million pesos (Diario Oficial de la Federación, 2011). There are 5.3 million microenterprises in Mexico, of which 11% correspond to the industrial sector, 50% to the commercial sector, 37% to the services sector, and 2% to other economic activities (INEGI, 2015).

The strong concentration of microenterprises in the commercial and service sectors results in highly fragmented and competitive markets, which seems to influence their low profitability, rapid exit from the market, marginal growth, and difficulties in developing sustainable competitive advantages.

From the perspective of the structure-behavior-outcome paradigm (Zou & Cavusgil, 2002; Ruppenthal & Bausch, 2009), it is possible to deduce that the survival of a business unit is a function of the degree of concentration of supply and demand, product differentiation, and entry barriers. These three factors shape the market structure and the strategic choices that companies make for the use of their resources (behavior).

As Porter (2008) notes, it is necessary to understand the underlying structure of the industry in which the entrepreneur ventures, taking as a reference the five competitive forces: the threat of new entrants, threat of substitute products or services, bargaining power of suppliers, bargaining power of buyers, and rivalry among existing competitors.

Following Porter's assumption that higher intensity of competitive forces translates into lower returns on investment, entering intensely competitive industries would be equivalent to higher chances of a premature business closure.

Table 3
Competitive forces that shape the strategy and the factors that shape them

Competitive strength	Factor	Item
Threat of new competitors	Supply-side economies of scale	AE1
	Demand-side benefits of scale	AE2
	Low switching costs for customers who change suppliers	AE3
	Capital requirements	AE4
	Advantages of established players regardless of size	AE5
	Unequal access to distribution channels	AE6
	Restrictive government policies	AE7
Power of suppliers	Concentration	PP1
	Low dependence on the sector for income	PP2
	Participants bear the costs of changing supplier	PP3
	Suppliers offer differentiated products	PP4
	There is no substitute for what the supplier offers	PP5
	The threat of integrating into the sector in a more advanced manner	PP6
Buyer power	There are few buyers, or they buy in large volumes	PC1
	The products of the sector are standardized or not differentiated from each other	PC2
	Customers incur low costs for switching suppliers	PC3
	Buyers can be integrated backward into the supply chain.	PC4
	The group of suppliers seeks to lower costs	PC5
	The quality of the customer's product/service is not affected by the quality of the products of the industry	PC6
	Sector product has little impact on buyer costs	PC7
Threat of substitute products	They offer an attractive price/service ratio	APS1
	The cost for the buyer to swap for the substitute is low.	APS2
Rivalry among existing competitors	There are several competitors similar in size and power	RCE1
	The growth of the sector is slow	RCE2
	Exit barriers are high	RCE3
	Companies are not able to understand each other's signals well	RCE3
	Rivals are highly committed to the business or aspire to be leaders	RCE4
	There is price competition	RCE5

Source: created by the author based on Porter, 2007

Markets and spatial interaction: The importance of localization

If, when choosing the line of business, the entrepreneur decides the competitive environment he will face by choosing the location of his company, he translates into spatial factors some of the competitive forces of the market and can enhance advantages or neutralize threats.

Small businesses are particularly sensitive to the location factor. However, manufacturing-focused businesses can also be affected by the location of their facilities, particularly for issues related to their supply chain. This element is enhanced when it is taken into account that microbusinesses often depend on the loyalty of a limited customer base in relatively small geographic spaces. Therefore, choosing a convenient location and estimating the potential of the place where it is planned to install the business project can be vital for its success or failure.

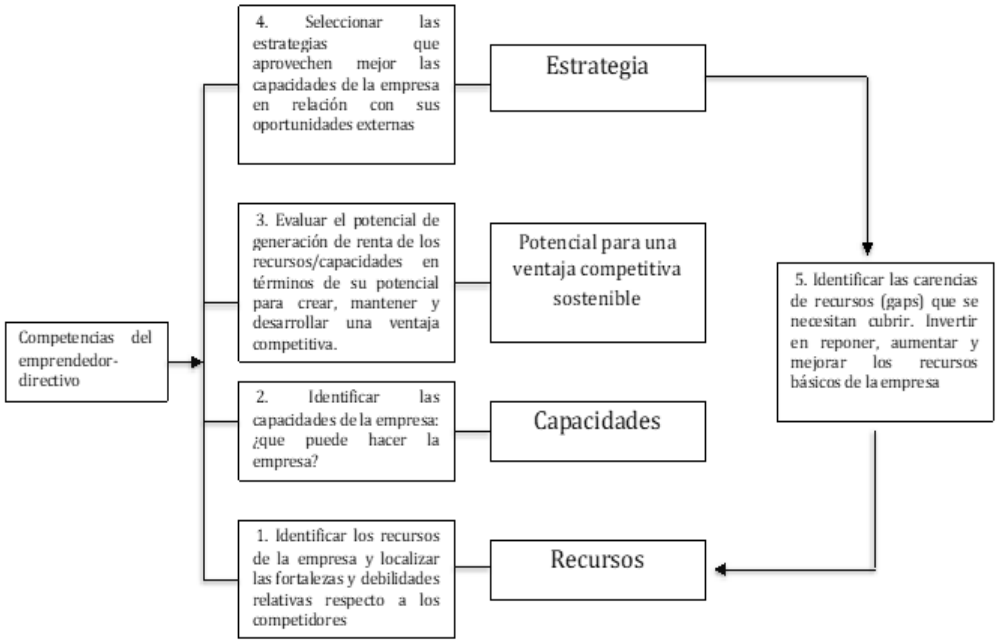
Grasland (2004) notes that the calculation of the potential of a place is based on a spatial interaction hypothesis: the probability of arrival of customers occurs in relation to distance, which refers to a measure of accessibility that aims to assess the variation in the number of relationship opportunities as a function of position.

Garrocho (2003) points out that the location of a business can determine the success or failure of a business project. He synthesizes the postulates of the Spatial Interaction Theory (SIT) as follows: the number of consumers attracted by a commercial unit depends simultaneously on two forces: the transportation costs for consumers to access the business and the attractiveness of the business.

In other words, the greater the distance or difficulty in accessing an establishment, the higher the cost for the consumer and the lower the incentive to access it. However, this factor interacts with the degree of attraction the business exerts on the customer. The author considers that although location is a strategically important factor for the success of a business, it is usually defined based on the intuition and practical knowledge of the entrepreneur rather than on informed analysis. On the other hand, factors such as the personal convenience of the owner (proximity to home or having a store) can also influence location decisions.

Entrepreneurial behavior and strategic decisions

In contrast to the structure-behavior-result approach, whose emphasis is on the analysis of factors external to the organization, the resources and capabilities theory (Grant, 1991, cited by Ibarra & Suárez, 2002) suggests that the development of internal factors is the key to the development of strategy and the construction of competitive advantages.



	4. Select strategies that best leverage the company's capabilities in relation to its external opportunities.	Strategy	
Skills of the managerial entrepreneur	3. Evaluate the income-generating potential of resources/capabilities in terms of their potential to create, maintain, and develop a competitive advantage.	Potential for a sustainable competitive advantage	5. Identify resource gaps that need to be filled. Invest in replenishing, increasing, and improving the basic resources of the company.
	2. Identify the company's capabilities: what can the company do?	Capabilities	
	1. Identify the company's resources and locate the relative strengths and weaknesses with respect to competitors.	Resources	

Figure 1. Entrepreneurial competencies and their practical relationship with strategic analysis within the theory of resources and capabilities framework
Source: Adapted from Grant, 1991; Ibarra and Suárez, 2002

The context of microenterprises, especially those focused on commerce, is one of the scarcities of resources and limited capabilities. Thus, the profile of the entrepreneur-manager and, more specifically,

entrepreneurial behavior, could be considered as the basic or essential capability from which the strategy and, therefore, the possibilities of survival and growth of this type of enterprise can be defined (Figure 1).

Shane and Venkataraman (2000) and later Pedrosa (2015) define entrepreneurial behavior as "the discovery, evaluation, and exploitation of opportunities that enable the introduction of new products, services, processes, organizational forms or markets in society."

Although the distinguishing characteristic of an entrepreneur is the creation of business units, learning, innovation, uncertainty, and risk are components that seem to be strongly linked to the profile of the entrepreneur.

Regarding the motivations for entrepreneurship, it is said that there is a profile of the entrepreneur, whose main features are related to attitudes. Formichella (2002) points out that the difference between the entrepreneur and the common individual is determined by a different propensity to take risks, face problems, discover hidden opportunities, create communication networks, form teams, and overcome fears.

There are different ways of organizing these traits and, therefore, defining the entrepreneur's profile. Among the first approaches to the subject is the work of Hornaday (1982), who proposed a list of 42 traits. Sanchez (2017), taking as references Covin and Slevin (1989), Cromie (2000), and Vecchio (2003), reduces the list to four traits which are Locus of control, Self-Efficacy, Risk, and Proactivity.

For this research, the classification proposed by Pedrosa (2015) is taken as a basis. Pedrosa in turn takes as a reference the model of Rauch and Frese (2007), which gives an overall picture of entrepreneurial behavior. It integrates general traits with other more specific traits of entrepreneurial behavior. Thus, to the traits already mentioned in the previous paragraph are added those of Motivation to Succeed, Innovation, Optimism, and Stress Tolerance. Based on this model, the questionnaire "Computerized Adaptive Test for the Evaluation of Entrepreneurial Personality (CAT)" was developed and was used as a data collection instrument in this study.

Molina (2009), referencing the proposal of Bruyat and Julien (2001), proposes a classification of entrepreneurs according to the level of risk they are prone to assume: reproduction, imitation, valorization, or adventure entrepreneurs. This classification can help understand why not all entrepreneurs succeed in turning their project into a larger or even a surviving enterprise. However, it also opens up other questions, such as whether there are psychological models that can help us characterize the behavior of entrepreneurs; and whether, in addition to personality traits, there are values or attitudes that may be particularly related to entrepreneurship.

Materials and methods

Quantitative research with an explanatory scope and cross-sectional design was conducted. XLSTAT 2016 software was used for the statistical analysis.

The objective of the research is to understand how the variables entrepreneur profile, competitive intensity of the sector, location, and concentration of similar businesses interact with the variable business survival.

This work presents the hypothesis as follows:

Ho: The difference between the means of subsamples G1 and G2 for the variables Entrepreneurial Profile, Market Research, Competitive Market Intensity, Location Potential, and Concentration of direct competitors is equal to zero.

H1: The difference between the means of subsamples G1 and G2 for the variables Entrepreneurial Profile, Market Research, Competitive Market Intensity, Location Potential, and Concentration of Direct Competitors is different from zero.

Table 4
Operationalization of variables

Variable	Dimensions	Indicators
Entrepreneur profile	Motivation to succeed	Score in the corresponding dimension of the CAT
	Risk-taking	Score in the corresponding dimension of the CAT
	Innovation	Score in the corresponding dimension of the CAT
	Autonomy	Score in the corresponding dimension of the CAT
	Internal locus of control	Score in the corresponding dimension of the CAT
	Self-efficacy	Score in the corresponding dimension of the CAT
	Stress tolerance	Score in the corresponding dimension of the CAT
	Optimism	Score in the corresponding dimension of the CAT
Competitive intensity of the sector	Threat of new competitors	Number of factors in Table 3 observed
	Power of suppliers	Number of factors in Table 3 observed
	Buyer power	Number of factors in Table 3 observed

	Threat of substitute products	Number of factors in Table 3 observed
	Rivalry among existing competitors	Number of factors in Table 3 observed
	Traffic	Flow of passers-by
Location potential	Cumulative attraction	Micro-location: In a corner, in a shopping mall, etc. Socioeconomic level of the area Population density
	Compatibility	Existence of related or complementary businesses in the area
	Accessibility	Parking Road
Concentration of direct competitors	Number of direct competitors in the area	Number of direct competitors within a range of 100 meters
Market research	Doing a market research study	Doing a market research study

Source: created by the author

A sample of 100 companies located in the State of San Luis Potosí was obtained, of which 93 provided valid data. Of these companies, 70% remain in operation and have been in business for at least five years, while 30% ceased operations in 2017. This condition made it possible to compare the values of the two subsamples.

Table 5
Sample segmentation by sector and sub-sector of economic activity

Sector	%	Subsector	%	% G1	% G2
Trade	49	Retail trade of groceries, food, beverages, ice, and tobacco	26	15	11
		Retail trade of stationery, recreational, and other personal use items	12	9	3
		Retail trade of hardware, plumbing, and glass products	2	2	0
		Retail trade of textile products, costume jewelry, clothing accessories, and shoes	7	4	3
		Retail trade of health care articles	2	2	0
Manufacturing industries	28	Production of bakery products and tortillas	14	10	4
		Printing and related industries	7	7	0
		Manufacture of furniture, except office and shelving	2	1	1

		Other manufacturing industries	5	5	0
		Repair and maintenance of cars and trucks	7	4	3
Private non-financial services	23	Other services/Laundromats and dry cleaners	2	2	0
		Beauty salons and clinics	2	2	0
		Food and beverage preparation services	12	7	5

Note: G1=Sample 1 (companies that remain in operation); G2=Sample 2 (companies that closed during 2017)
Source: created by the author

The sampling method was simple random, taking as the universe the database of the National Directory of Economic Units (Spanish: Directorio Nacional de Unidades Económicas, DENUE) of the National Institute of Statistics and Geography (Spanish: Instituto Nacional de Estadística y Geografía, INEGI). Companies with ten workers or less were selected, so they correspond to the category of microenterprises. The data collection instruments were applied in person, interviewing the founder-owner or main manager in the office. This condition is relevant because one of the elements analyzed is the psychological model of the entrepreneur. It should be noted that using a single informant is convenient to reduce errors related to the existence of different perspectives on the same phenomenon.

Measuring scales

Three measurements were performed. First, the questionnaire "Computerized Adaptive Test for the Assessment of Entrepreneurial Personality (CAT)" formulated by Pedrosa (2015) was applied. This questionnaire consists of 107 items organized into eight categories: motivation to succeed, risk-taking, innovation, autonomy, self-efficacy, stress tolerance, internal locus of control, and optimism. As a result, a cumulative score was obtained—here, it will be called Entrepreneurial Profile—which summarizes the degree to which an individual possesses the traits and attitudes associated with the successful implementation of a business. To provide evidence of content validity, this work resorted to the judgment of experts who analyzed the relevance and representativeness of the items, obtaining a mean score of 3.85 on a scale of 1 to 5 to assess the significance of the items (Pedrosa, 2015), whose discrimination indices were distributed between 0.24 and 0.66 and their factor weights between 0.24 and 0.73, also displaying adequate fit indices (Table 6).

The overall reliability of the battery, estimated by Cronbach's alpha coefficient for ordinal data, was 0.96.

Table 6
Psychometric properties of the CAT subscales

	n	ID	a	Factor weights	GFI	RMSR	ET	Exp. Var.
Motivation to succeed	15	0.37-0.63	0.88	0.4-0.66	0.99	0.04	0.054	36%
Risk taking	15	0.24-0.59	0.84	0.3-0.61	0.98	0.05	0.054	29%
Innovation	15	0.33-0.61	0.85	0.37-0.61	0.98	0.053	0.053	31%
Autonomy	14	0.26-0.54	0.82	0.27-0.67	0.97	0.067	0.054	28%
Internal locus of control	9	0.27-0.61	0.85	0.43-0.73	0.99	0.043	0.053	43%
Self-efficacy	20	0.28-0.66	0.98	0.27-0.62	0.98	0.045	0.054	30%
Stress tolerance	14	0.29-0.57	0.81	0.24-0.68	0.92	0.1	0.054	27%
Optimism	11	0.40-0.62	0.85	0.4-0.72	0.99	0.046	0.054	38%

Note: ID=Discrimination indices; GFI=Goodness of fit index; RMSR= Root mean squared residuals; ET=Typical error; Exp. Var.=Explained variance
Source: Pedrosa, 2015

Second-order Exploratory Factor Analysis was also used to determine the existence of a general factor called "Entrepreneurial Profile" related to the nine specific traits. Table 7 displays the existence of such a factor that explains 49% of the variance with adequate levels of adjustment.

Table 7
Exploratory Factor Analysis of the factor scores of each subscale of the CAT

	Entrepreneurial profile
Self-efficacy	0.92
Motivation to succeed	0.88
Innovation	0.74
Internal locus of control	0.63
Optimism	0.6
Autonomy	0.55
Risk-taking	0.55
Stress tolerance	0.49
Explained variance	49.07
GFI	0.97
RMSR (Standard error)	0.07 (0.06)

Note: GFI= Goodness of Fit Index; RMSR (Root Mean Square Residuals)
Source: Pedrosa, 2015

This questionnaire added the question "Have you conducted market research at the beginning or during the development of your entrepreneurship project?" thus evaluating the variable Market research.

To evaluate the location potential, a questionnaire called "Template to evaluate the location factors of a business" was designed (see Table 8). To validate the content of this instrument, the model proposed by De Juan (2005), who proposes the dimensions of traffic, cumulative attraction, compatibility, and accessibility as criteria for deciding the location of points of sale, was taken as a reference. The reliability analysis of this questionnaire obtained a Cronbach's Alpha coefficient of 0.706.

Table 8
Template for assessing business location factors

Dimension	Indicator	Measurement scale	
Traffic	Flow of passers-by	Very high (More than 50 people per minute)	4
		High (30 to 50 people per minute)	3
		Medium (ten to thirty people per minute)	2
		Low (Less than ten people per minute)	1
	Micro localization	Inside a market/shopping mall	4
		On the outside of a market or shopping mall	3
		On a corner	2
		Midblock	1
Cumulative attraction	Socioeconomic level of the area	High	3
		Medium	2
		Scarce resources	1
	Population density	Very high (more than 4185 people per AGEB)	4
		High (From 2870 to 4185 persons per AGEB)	3
		Average (from 1952 to 2870 persons per AGEB)	2
		Low (less than 1952 persons per AGEB)	1
Compatibility	Compatibility of the area with the type of business.	Very high (there are more than three related or complementary businesses within 100 meters of each other)	4
		High (there are two to three related or complementary businesses less than 100 meters away)	3
		Medium (there is at least one related or complementary business less than 100 meters away)	2
		Low (no related or complementary businesses within 100 meters distance)	1
Accessibility	Parking	The premises have five or more parking spaces exclusively for customers.	4
		The store has 1 to 5 parking spaces for customers.	3
		The facility does not have parking spaces, but it is easy to park on nearby streets.	2
		The facility does not have parking spaces, and it is difficult to park on the surrounding streets	1
	Road	On the road/highway	4
		On a main avenue (with median and lanes in both directions)	3
		On a one-way street	2
		On sidewalk or pedestrian street	1

Source: created by the author

Construct validity was determined by exploratory factor analysis, using the maximum likelihood method for factor extraction. As displayed in Tables 9 and 10, it is confirmed that four factors explain 56% of the accumulated variance. The extraction of four factors is consistent with that proposed by the theoretical model.

Table 9
Exploratory Factor Analysis of indicators of location potential

	Initial configuration matrix				Configuration matrix after Varimax rotation			
	F1	F2	F3	F4	D1	D2	D3	D4
Micro localization	0.516	-0.520	-0.098	0.106	0.106	0.251	0.660	0.217
Road	0.499	-0.231	0.090	0.090	0.305	0.160	0.393	0.213
Compatibility of the area with the type of business	0.382	-0.320	-0.368	0.296	0.002	-0.092	0.680	0.023
Socioeconomic level of the area	0.556	0.474	-0.305	0.059	0.322	-0.613	0.185	0.342
Parking	0.538	-0.035	-0.289	-0.309	0.004	-0.150	0.300	0.598
Population density	0.733	0.375	0.481	0.293	0.972	-0.109	0.080	0.180
Flow of passers-by	0.599	0.063	0.143	-0.477	0.276	0.077	0.008	0.727
Variability (%)	27.081	13.930	8.892	6.661	15.405	11.773	15.154	14.172

The values in bold correspond for each variable to the factor for which the squared cosine is the largest.
Source: created by the author

Table 10
Goodness-of-fit test of the Exploratory Factor Analysis of the Indicators of Location Potential

Chi-square (Observed value)	Chi-square (Critical value)	GL	p-value	alpha
5.327	5.991	2	0.070	0.05

Note:
H0: 4 common factors are sufficient to describe the data.
Ha: More factors are needed to describe the data.
Since the calculated p-value is greater than the significance level alpha=0.05, the null hypothesis H0 cannot be rejected.
Source: created by the author

As a result, a score is obtained that would indicate how advantageous the location is. It should be clarified that factors such as e-commerce, social networks, and websites, which influence the accessibility of the business without transportation costs for consumers to access and visualize the attractiveness of the business, were not evaluated.

The question “Number of direct competitors within 100 meters of the location” was added to this questionnaire and was used to evaluate the variable Concentration of direct competitors.

Finally, Table 3 of this article, based on Porter’s Competitive Forces model, was used to determine the competitive intensity of the sector into which the entrepreneurial projects have ventured.

Each factor gives rise to a Yes/No response, resulting in 1/0 binary variables indicating the presence or absence of each of the characteristics associated with the competitive forces. This questionnaire obtained a Cronbach's Alpha coefficient of 0.897.

As a basis for validating the contents of the list, reference is made to Porter 2008, who cites each of the items included in the list as factors of competitive intensity. So, this indicator results from the sum of the factors observed in the different sectors and subsectors included in the sample.

Construct validity was performed using the Exploratory Factor Analysis technique for the set of responses to the questionnaire items, examining the factor structure of the scores and identifying the sources of variation in the observed measures. The aim was to confirm the existence of an underlying construct grouping most of the items and explaining the reasoning behind the confidence interval.

For the instrument "Competitive forces and their component factors," the extraction obtained five factors, of which the first explains 76% of the variability. This number of factors is consistent with Porter's theoretical model.

Table 11
Exploratory Factor Analysis of the questionnaire "Competitive Forces and their component factors"

	Initial configuration matrix					Configuration matrix after varimax rotation				
Item	F1	F2	F3	F4	F5	D1	D2	D3	D4	D5
ANE1	0.517	0.497	-0.039	-0.097	-0.258	0.484	0.572	-0.098	-0.081	0.117
ANE2	0.261	0.678	0.033	0.257	-0.080	0.225	0.574	-0.271	0.307	0.232
ANE3	-0.101	0.711	-0.008	0.209	0.222	-0.127	0.457	-0.088	0.436	0.431
ANE4	-0.264	0.451	-0.121	0.621	-0.089	-0.253	0.375	-0.261	0.631	-0.100
ANE5	-0.127	-0.118	-0.694	-0.597	0.190	-0.045	0.027	0.935	-0.163	-0.029
ANE5	-0.069	0.247	-0.507	-0.404	-0.131	-0.030	0.427	0.549	-0.124	-0.055
ANE7	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
PP1	0.364	0.337	0.323	-0.104	0.521	0.305	-0.034	-0.110	0.062	0.723
PP2	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
PP3	0.156	0.230	0.731	0.168	-0.268	0.049	0.142	-0.786	-0.200	0.178
PP4	-0.166	0.389	0.661	-0.222	0.419	-0.271	-0.019	-0.305	-0.152	0.807
PP5	0.253	0.171	0.550	-0.383	-0.402	0.154	0.261	-0.409	-0.647	0.159
PP6	0.305	0.755	0.173	-0.021	-0.206	0.237	0.698	-0.292	-0.003	0.326
PC1	-0.992	0.058	0.092	-0.020	-0.006	-0.997	0.008	0.027	0.026	-0.010
PC2	-0.274	-0.532	-0.309	-0.060	-0.071	-0.206	-0.335	0.331	-0.071	-0.438
PC3	-0.080	0.728	-0.246	0.138	-0.459	-0.088	0.872	-0.078	0.198	-0.112
PC4	-0.240	0.282	-0.315	0.776	0.166	-0.187	0.137	-0.093	0.887	-0.127
PC5	-0.168	0.662	-0.389	-0.238	0.128	-0.156	0.596	0.422	0.175	0.321

PC6	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
PC7	0.026	-0.421	-0.004	0.038	-0.240	0.046	-0.233	-0.053	-0.166	-0.388
APS1	-0.199	0.502	-0.436	-0.190	-0.308	-0.177	0.685	0.318	0.020	-0.102
APS2	0.283	0.281	-0.333	0.556	0.344	0.329	0.088	0.036	0.756	0.099
RCE1	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
RCE2	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
RCE3	-0.992	0.058	0.092	-0.020	-0.006	-0.997	0.008	0.027	0.026	-0.010
RCE4	0.992	-0.058	-0.092	0.020	0.006	0.997	-0.008	-0.027	-0.026	0.010
RCE5	0.307	0.502	0.052	-0.563	0.261	0.258	0.341	0.245	-0.265	0.649
RCE6	-0.245	0.736	-0.074	-0.419	0.082	-0.283	0.625	0.249	-0.083	0.500
Variability (%)	32.458	18.092	10.526	9.946	5.403	32.031	14.476	10.165	9.859	9.894

Source: created by the author

Table 12
Goodness-of-fit test of the Exploratory Factor Analysis of the Competitive Forces their component factors instrument

Chi-square (Observed value)	Chi-square (Critical value)	GL	p-value	alpha
2.351	3.841	1	0.125	0.05

Note:
H0: 5 common factors are sufficient to describe the data.
Ha: More factors are needed to describe the data.
Since the calculated p-value is greater than the significance level alpha=0.05, the null hypothesis H0 cannot be rejected.
Source: created by the author

As seen in Table 11, it is confirmed that five factors explain 76.4% of the accumulated variance. The extraction of five factors is consistent with what was proposed by the theoretical model. Finally, a second-order factor analysis was performed on the factor scores of each of the subscales, and it was found that there is a factor that explains 44% of the variance, which could be identified as competitive intensity.

Statistical analysis

First, z-hypothesis and t-tests were applied to determine if there is a difference in means between subsamples G1 and G2.

Table 13
Two-sample z-tests and t-tests

Variable	Sub-sample	Mean	Standard Deviation	z	| z | Critical value	p-valor (bilateral)	t	| t | Critical value	p-valor (bilateral)	alpha
Entrepreneurial profile	G2	3.535	0.490	-2.722	1.960	0.006	-2.678	1.986	0.009	0.05
	G1	3.840	0.510							
Market research	G2	0.179	0.390	-2.776	1.960	0.006	-2.514	1.986	0.014	0.05
	G1	0.446	0.501							
Competitive intensity	G2	19.200	4.315	0.387	1.960	0.699	0.400	2.024	0.692	0.05
	G1	18.600	4.048							
Location potential	G2	13.900	3.414	-1.192	1.960	0.233	-1.278	2.026	0.209	0.05
	G1	15.345	2.967							
Concentration of competitors	G2	2.400	0.843	0.104	1.960	0.917	0.097	2.024	0.923	0.05
	G1	2.367	0.964							

Source: created by the author

As can be seen, the z and t-tests demonstrate a difference in means between the subsamples for the variables Entrepreneurial profile and Market research since the bilateral p-value is less than the alpha level of significance. The above is not true for the Competitive Intensity, Location Potential, and Competitor Concentration variables.

Subsequently, in order to deepen the analysis, a non-linear regression model with a qualitative response, Logit, was used. These types of models are those where the dependent variable can be qualitative while the independent variables can be qualitative, quantitative, or a mixture of both (Moscote & Rincón, 2012).

The general form of the logit model is

$$E(y) = \frac{e^{x'\beta}}{1+e^{x'\beta}} \quad (1)$$

where x is the vector of independent variables and β is the vector of parameters. The logit transformation of the probability pi is performed as follows:

$$E(y) = \frac{1}{1+e^{-x\prime\beta}} \quad (2)$$

$$pi = \frac{1}{1+e^{-x'\beta}} \tag{3}$$

$$1- pi = \frac{1}{1+e^{x'\beta}} \tag{4}$$

$$\frac{\pi i}{1-\pi i} = \frac{1+e^{x'\beta}}{1+e^{-x'\beta}} = e^{x'\beta} \tag{5}$$

Finally, taking the natural logarithm, the following is obtained:

$$Ln\left(\frac{\pi i}{1-\pi i}\right) = x'b \tag{6}$$

Figure 1 presents the graphical form of the logit model, where it is possible to see that the values of the dependent variable are between 0 and 1.

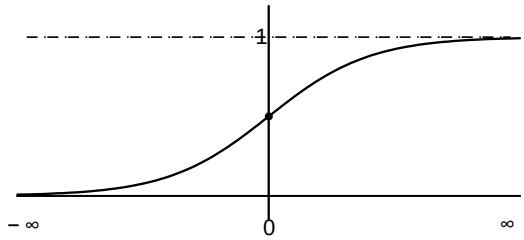


Figure 2. Logit function
Source: Moscote and Rincón, 2012

Parameter estimation was performed using the maximum likelihood method (Green, 2001, cited by Moscote & Rincón, 2012), obtaining the following results:

Table 14
Descriptive statistics of the survival variable

Variable	Categories	Frequencies	%
Business survival	0	28	30.108
	1	65	69.892

Source: created by the author

Table 15
Descriptive statistics of the independent variables

Variable	Remarks	Remarks with missing data	Remarks without missing data	Minimum	Maximum	Mean	Standard deviation
Entrepreneur profile	93	0	93	2.337	4.830	3.748	0.521
Competitive intensity of the sector	93	0	93	11.000	23.000	18.750	2.649
Location potential	93	0	93	10.000	22.000	14.974	1.997
Concentration of direct competitors	93	0	93	1.000	4.000	2.375	0.602

Source: created by the author

Table 16
Goodness-of-fit statistics

Statistic	Independent	Complete
Remarks	93	93
Sum of weights	93.000	93.000
GL	92	87
-2 Log(Likelihood)	113.790	102.909
R^2(McFadden)	0.000	0.096
R^2(Cox and Snell)	0.000	0.110
R^2(Nagelkerke)	0.000	0.156
AIC	115.790	114.909
SBC	118.322	130.104
Iterations	0	6

Source: created by the author

Table 17
Test of the null hypothesis H0: Y=0.699 (Survival variable):

Statistic	GL	Chi-square	Pr > Chi^2
-2 Log(Likelihood)	5	10.881	0.050
Score	5	10.312	0.060
Wald	5	9.185	0.100

Source: created by the author

Tables 16 and 17 provide indicators of the quality of the model or quality of fit. In this case, the most significant value is the Chi^2 associated with the log (likelihood). Since the probability is 0.05, it can be deduced that the model provides a significant amount of information.

Table 18
Model parameters

Source	Value	Standard error	Wald Chi-square	Pr > Chi²	Wald Lower limit (95%)	Wald Upper limit (95%)	Odds ratio	Odds ratio Lower limit (95%)	Odds ratio Upper limit (95%)
Interception	-2.511	3.124	0.646	0.421	-8.633	3.611			
Entrepreneur profile	0.918	0.485	3.581	0.058	-0.033	1.868	2.503	0.968	6.475
Competitive intensity of the sector	-0.050	0.093	0.289	0.591	-0.233	0.132	0.951	0.793	1.142
Location potential	0.038	0.132	0.083	0.774	-0.221	0.297	1.039	0.802	1.346
Concentration of direct competitors	0.012	0.408	0.001	0.978	-0.789	0.812	1.012	0.454	2.252
Market research	1.037	0.585	3.144	0.076	-0.109	2.183	2.820	0.896	8.872

Source: created by the author

Table 9 provides details about the model and is useful for understanding the effect of the different variables on the response variable categories. It presents an intercept for each category of the response variable and a set of coefficients since it is assumed that the hypothesis of parallel curves will be confirmed.

Here it is possible to observe that according to the probability associated with the Wald Chi² tests, the variable that most influences the probability of business survival is the entrepreneur's profile, followed in importance by the completion of the market study. This is confirmed when analyzing the graph of standardized coefficients.

The odds ratios demonstrate that a business for which market research has been conducted would have 2.8 times more chances of survival, while a high entrepreneurial profile means 2.5 times more chances of survival. In Table 19, it is possible to see that, according to the probability associated with the Chi² tests, the most influential variable is the entrepreneur's profile, followed in importance by the completion of a market study. The competitive intensity of the sector plays a significant role, although with a negative sign.

Table 19
Standardized coefficients (Survival variable)

Source	Value	Pr > Chi²
Entrepreneur profile	0.262	0.05
Competitive intensity of the sector	-0.073	0.59
Location potential	0.042	0.77
Concentration of direct competitors	0.004	0.97
Conducted market research	0.275	0.07

Source: created by the author

Survival model equation

Pred (Survival) = 1/(1+exp(-(-2.511+0.917*Profile of the entrepreneur-0.05*Competitive intensity of the sector+0.037*Potential of the location+0.0115*Concentration of competitors+1.036*Conducted market research-1)))

The application of the model reveals that when the entrepreneur's profile is poor or when no market research is conducted, the probability of survival of the business decreases significantly; greater competitive intensity has a negative impact on the probability of survival but to a lesser degree.

Conclusions

Statistical analysis makes it possible to visualize how the characteristics of entrepreneurs interact with the market structure as determinants of microbusiness survival.

The z and t hypothesis tests show, in principle, that the average values of the G1 and G2 subsamples are significantly different for the variables Entrepreneurial Profile and Market Research. However, these differences are not significant for the variables Competitive Intensity of the Market, Location Potential, and Concentration of Direct Competitors.

This finding is confirmed when using the Logit logistic regression model, as can be seen in Table 19 and in the equation of the model, which reveals that the factors that have the greatest influence on the chances of survival of a business are the entrepreneur's profile and the carrying out of the market study.

This finding is consistent with Grant's assumption that connects successful business performance with the entrepreneur's competencies, such as identifying resources, capabilities, and opportunities to achieve advantage and profitability and designing strategies that link resources and capabilities with external opportunities. It also seems to be consistent with the model proposed by Morales et al. (2015), in which the entrepreneur's profile interacts with the ability to establish connections with customers, shaping the key attributes that make it possible to remain in the market.

As can be seen in the Logit model results, the competitive intensity variable of the sector has a negative but moderate influence on the probability of business survival. One hypothesis that would explain its lower relative importance, as well as that of the location potential variable, is that the characteristics of the entrepreneur and the knowledge of the market allow the owner or manager to act strategically, managing the organizational resources in such a way that the restrictions imposed by the market or by the geographic space can be adequately overcome. Thus, even in the case of having ventured into a highly competitive business sector, in a disadvantageous location, the skill and, if applicable, the perseverance

of the entrepreneur or manager would be the determining factors for the survival of the business. It is worth mentioning that the study only presents the survival variable, but not the profitability or growth of the business, meaning that it provides information on a productive segment that remains in the market even when its profits are reduced. It should also be clarified that in the evaluation of the location potential, e-commerce, social networks, and web pages that modify the accessibility of the business without transportation costs were not considered.

On disaggregating the Entrepreneurial Profile variable and comparing the average values obtained in each subsample, it was found that the characteristics where statistically significant differences were observed were optimism, motivation to succeed, locus of control, innovation, and autonomy, which makes it possible to appreciate that the attitudinal component, as well as some personality traits of the entrepreneurs and managers, play a significant role in the permanence of the business units. It should be noted that no statistically significant differences were observed in the traits of stress tolerance and risk tolerance (which could be more related to profitability and growth).

The above could provide a guideline for implementing programs for the development of entrepreneurs and the technical training that needs to be offered to them.

Finally, the concentration of competitors seems to exert little significant influence on the survival probabilities of this type of business.

These findings lead to the conclusion that the development of entrepreneurial skills and market research is crucial to improving the chances of survival of a microenterprise.

Further studies can explore these findings to determine if they are generalizable to larger companies or if they can overcome market barriers and location limitations through e-commerce tools.

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