

Manufacturing Industry Firm Dynamics of a Southern Region of Colombia, 2012-2017

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Abstract: This study describes the behaviour of manufacturing industry companies registered from 2012-2017, in the state of Huila, Colombia. A retrospective observational descriptive study was performed with the source of information being a national database (Registro Unico Comercial y Social, RUES), taking into account only registered manufacturing industry companies, their economic activity, sizes and locations. A direct association was found between micro and small companies and survival, likewise, a direct association between company size and economic activity was registered. These results may help in design and implementation of future projects that improve companies' development and regional productivity.

Key words: Business success, manufacturing industry firms, business behaviour, small companies, regional development, survival firms, economic development, business survival factors, star up firms

INTRODUCTION

The creation and survival of companies is a fundamental factor for the economic development of a region (Audretsch and Keilbach, 2004). Likewise, the social welfare and wealth of a country is closely related to business success (Wennekers *et al.*, 2005).

Different studies have been conducted with periods of study between 5 and 10 years, to identify the factors that allow the emergence, survival and success of new ventures made with studies between 5 and 10 years in length. These investigations have aimed to identify the determinants of the companies' results which lead to them remain active over time or to failure (Gonzalez-Loureiro and Puig, 2016).

Many of these studies have determined that more than 50% of new businesses fail during the first 5 years of business activity (Johnson, 2005, Mills and Timmins, 2004). In the same way, studies carried out in countries which are part of the OECD (Organization for Economic Co-operation and Development) have found that a portion of half of the new companies fail within the first 2 years of life and the remaining part survives during the following 7 years of operation (Bartelsman *et al.*, 2005; Santerelli and Vivarelli, 2007). There are several factors

that determine business survival: the macroeconomic conditions and the innovation capacity of the company (Audretsch, 1991, 1995, Cefis and Marsili, 2006, Etchebarne *et al.*, 2008, Highfield and Smiley, 1987, Holmes *et al.*, 2010; Huggins *et al.*, 2017), growth rate, size and age of companies (Navaretti *et al.*, 2014, Bentzen *et al.*, 2012; Dunne *et al.*, 1988; Evans, 1987; Hall, 1987; Pervan *et al.*, 2017), level of concentration and reactivity to market changes (Audretsch and Mahmood, 1994, Hannan and Carroll, 1992) and making strategic decisions (Levinthal, 1997; Rauch and Rijsdijk, 2013; Shepherd, 2015).

This scenario is not different in Latin America. According to Colombia's National Association of Chambers of Commerce, more than half of the new companies in different Latin American countries fail in the first 5 years on average, they disappear at a rate between 20 and 30% in the first year with a gradual increase, of 10 points per year. Evidence shows that <50% of companies survive the 5th year. Additionally, only 40% of Colombian firms remain open after this period, evidencing a low company survival (Franco and Urbano, 2010; Montoya *et al.*, 2010) reflected in low productivity and business competitiveness (CEPAL, 2013, Schwab, 2015).

However, in Colombia, the business success panorama is not clear. Different studies are being carried out in various cities (Angel and Pulido, 2010; Sandoval and Marin, 2008; Franco and Urbano, 2010; Hernandez, 2013; Montoya *et al.*, 2010; Rincon-Guio *et al.*, 2018) and only a few of them described survival determinants in specific economic sectors (Jose *et al.*, 2006; Martinez, 2006; Parra, 2010; Manrique *et al.*, 2017). Although, these studies have established a baseline in Colombia, they cannot be considered current since economic conditions change rapidly over time.

Regarding the manufacturing industry sector, the dynamics of these companies are not yet, established. Therefore, the objective of this study is to describe the survival factors of manufacturing industries companies that were included in the National Market Registry between 2012 and 2017 in a state in southern Colombia.

MATERIALS AND METHODS

A retrospective observational descriptive study was performed and the source of information was the Registro Unico Comercial y Social or RUES, National Database. The study took into account only manufacturing industry companies registered between 2012-2017 as well as their economic activity, size and location.

Data analysis was restricted to projects with dates of completion between the study period. The analysis was performed for the UNINAVARRA Research Department team using the statistical program IBM-SPSS®, Version 24.

Central tendency and dispersion measurements were used for the quantitative variables in addition, bivariate analysis was performed to correlate registration, continuous renewal, economic activity, size and location. Various statistical confidence tests were applied such as Spearman's Rho and χ^2 .

Inclusion and exclusion criteria: Company creation dates were determined in the registration database and company closure was determined to be the date the company disappeared from database, whether for cancellation of the registration or due to no new updates of its registration in the following years. Missing data information for the companies was not considered for the study.

RESULTS AND DISCUSSION

Between 2012 and 2017, a total of 26067 companies were registered. From these productive units, 18.91% were legal entities and the constitution average was 19.93% with constitution means ranged between 13.90-23.05% (Fig. 1).

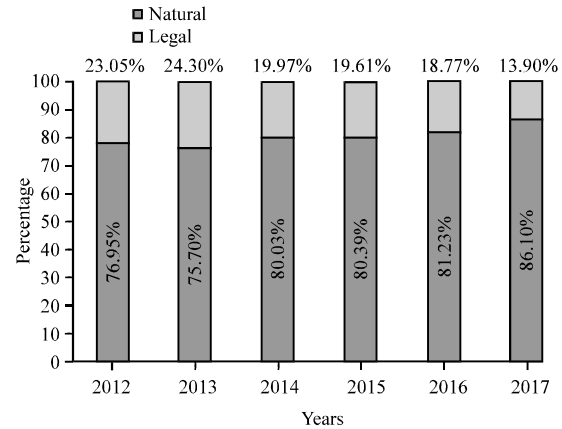


Fig. 1: Type of company registration by period

Table 1: Updating of the merchant registry

Registration years	Registered	Renewed and registered in 2017	Renewed and registered in 2017 per period (%)	Renewed and registered in 2017 of the total (%)
2012	724	540	74.59	10.99
2013	862	623	72.27	12.68
2014	1.063	758	71.31	15.42
2015	1.023	775	75.76	15.77
2016	1.284	1.099	85.59	22.36
2017	1.120	1.120	100.00	22.79
Total	6.076	4.915	80.89	100.00

For the period of 2017, a total of 80.89% of companies were found registered and with an updated commercial registry. Between 2012 and 2016, 66.51% (n = 3.795) updated their commercial registry, forming 77.21% of the total active companies for 2017 (Table 1). Also, data showed that during the 2012-2017 period, the updating of the merchant registry was found to be inversely proportional with the time of creation updating for the first period, companies were 74.59% (n = 540), for the second period 72.27 % (n = 623), for the third period 71.11% (n = 758), for the fourth 75.76 (n = 775) and for the fifth 85.59% (n = 1.099) (Table 1).

During the study period, 66.77% of the companies registered were created in the northern region of the state and 79.10% of the companies were still active at the end of 2017-presenting the lowest renovation rate compared to the other zones of the state. The other regions of the state presented different behavior (Table 2).

At the end of 2017, only five economic sections represented 70.23% of the total companies registered and renewed for that year. These companies were registred in other activities at 22.43%, wholesale trade in 15.65 and 11.47% in professional, scientific and technical activities and 11.32% in construction while agriculture, livestock, hunting, forestry and fishing comprised 9.35%, plus

Table 2: Geographical distribution of companies registered between 2012 and 2017 in the Department of Huila, Colombia

Subregion	Registered	Renewed and registered 2017	Registered (%)	Renewed and registered by area (%)	Renewed and registered with respect to the total (%)
Center	686	554	11.29	80.76	11.27
North	4,057	3,209	66.77	79.10	65.29
West	446	395	7.34	88.57	8.04
South	887	757	14.60	85.34	15.40
Total	6.076	4.915	100.00	80.89	100.00

Table 3: Distribution of companies by size and economic sector

Economic section	Company size*				Total	Participation by sector (%)
	Large	Medium	Small	Micro		
Agriculture, livestock, hunting, forestry and fishing		5	14	549	568	9.35
Exploitation of mines and quarries			2	53	55	0.91
Manufacturing industries		2	24	355	381	6.27
Water distribution, evacuation and treatment of wastewater, waste management and environmental sanitation activities	1	1	66	68	1.12	
Building	2	9	51	626	688	11.32
Wholesale and retail, repair of motor vehicles and motorcycles	1	4	60	886	951	15.65
Transportation and storage			14	156	170	2.80
Accommodation and food services			12	150	162	2.67
Information and communications				159	159	2.62
Financial and insurance activities			4	73	77	1.27
Real estate activities		1	4	87	98	1.61
Professional, scientific and technical activities		2	14	681	697	11.47
Administrative and support services activities		1	15	253	269	4.43
Public administration and defense, compulsory social security plans			1	39	40	0.66
Education		1	2	78	81	1.33
Human health care and social assistance activities	1	2	15	192	210	3.46
Artistic, entertainment and recreation activities		2	3	34	39	0.64
Other service activities		1	6	1356	1363	22.43
Total	4	31	248	5.793	6.076	100

*The total value of assets of the companies was taken into account. Medium: assets between 5,000 SMMLV and 30.000 SMMLV. Small: assets between 500 SMMLV and 5.000 SMMLV. Micro: assets up to 500 SMMLV

Table 4: Type of company registration by period

Period	Person	Legal status	Total firms	Person (%)	Legal status (%)	Legal status per period (%)
2012	205	46	251	7.61	1.71	18.33
2013	234	65	299	8.69	2.41	21.74
2014	353	69	422	13.11	2.56	16.35
2015	412	53	465	15.30	1.97	11.40
2016	512	73	585	19.01	2.71	12.48
2017	596	75	671	22.13	2.78	11.18
Total	2.312	381	2.693	85.85	14.15	15.25

manufacturing industries an additional 9.35%. The most common size of the companies were micro companies, corresponding to 95.34% (n = 5.793) of the total (Table 3).

About 15% of the companies from manufacturing industries in the study period corresponded to a legal entity with an average of 15.25%. The fewest companies under this legal status (11.18%) were in the 2017 period while the highest creation of companies of this type (21.74%) was during the 2013 period (Table 4).

During the study period, 74.66% (n = 221) of the registered companies renewed their registration title for the year 2017 with a mean of 74.66% between 2012 and 2016 (Table 5). The companies registered between

2012-2016 also presented a different average of renovation, ranging between 68.03 and 83.46% (Table 6).

Most of the companies from the 2012 group 69.57% (n = 32) renewed their registration at all periods and the other firms 30.43% (n = 14) updated their registration at some period. Also, the intermediate periods (2012 and 2014) have different behavior patterns and the lowest percent of companies renewed in 2017 (66.15 and 64.15%, respectively) and 2012 had the highest renewed average at the end period of the study (71.74%) (Table 7).

A total of 93.18% (n = 355) companies were micro-companies where 76.62% (n = 271) remained active until the end of the 2017 period while 95.83% of the

Table 5: Company registration and updating by period

Registration year	Registered	Renewed and registered in 2017	Renewed and registered in 2017 per period (%)	Renewed and registered in 2017 (%)
2012	46	33	71.74	11.15
2013	65	43	66.15	14.53
2014	69	49	71.01	16.55
2015	53	34	64.15	11.49
2016	73	62	84.93	20.95
2017	75	75	100.00	25.34
Total	381	296	77.69	100.00

Table 6: Company register updating by period

Constitution period	Renewal period (%)					Average number of companies renewed
	2013	2014	2015	2016	2017	
2012	100	97.83	89.13	80.43	71.74	68.03
2013		98.46	87.69	81.54	66.15	83.46
2014			84.06	79.71	71.01	78.26
2015				75.47	64.15	69.81
2016					84.93	84.93

Table 7: Company register updating following creation

Constitution year	Total companies incorporated	Continuous renewal	Without renewal	Some renewal	Companies with renewal through (2017)	Continuous renewal (%)	Without renewal (%)	Some renovation (%)	Companies with renewal through 2017 (%)
2012	46	32	0	14	33	69.57	0.00	30.43	71.74
2013	65	41	0	24	43	63.08	0.00	36.92	66.15
2014	69	46	9	60	49	66.67	13.04	86.96	71.01
2015	53	32	11	42	34	60.38	20.75	79.25	64.15
2016	73	62	11	0	62	84.93	15.07	-	84.93
Total (Average)	306	213	31	140	221	68.92	9.77	46.71	71.60

Table 8: Company register updating by period by size

Size	Registration	Registered companies (%)	Active 2017	Active companies 2017 (%)	Companies renewed by size (%)
Micro company	355	93.18	272	91.89	76.62
Small company	24	6.30	23	7.77	95.83
Medium company	2	0.52	1	0.34	50.00
Grand total	381	100	296	100	77.69

Table 9: Company registration and updating by state subregion

Subregion	Registration	Registered companies (%)	Active 2017	Active companies 2017 (%)	Companies renewed by area (%)
Center	36	9.45	27	9.12	75.00
North	301	79.00	230	77.70	76.41
West	6	1.57	5	1.69	83.33
South	38	9.97	34	11.49	89.47
Grand total	381	100	296	100	77.69

small-companies renewed their title in 2017. Only one medium company did not renew during the period of study (Table 8).

The region with the highest number of new companies registered was the North region with 79% of the total and this region maintained its representation in the number of active companies in 2017 with 76.41% of the total. The average turnover of companies in the other subregions was 82.60% (Table 9).

The most representative economic activity in all periods was food production with an average representation of 26.79%, followed by installation, maintenance and specialized repair of machinery and equipment companies at 19.14 and finally, 10.65% for metal products manufacturing. Furthermore, the economic

activities registered during all periods was 43.5% (n = 10). Creation of companies in each period represented 87.40% of the total firms created in the period of study (Table 10).

Most of the companies were related to food products, comprising 27.03% of the total and the rest corresponded to installation, maintenance and specialized repair of machinery and equipment and metal products manufacturing. The largest portion of companies were micro-companies at 93.17% (n = 355) and their distribution corresponds with the activities of most common participation. For the 2017 period, 72.29% of the companies were registered for food product production; installation, maintenance and specialized repair of machinery and equipment, metal products manufacturing,

Table 10: Company registration by period and economic activity

Economic activity	2012 (%)	2013 (%)	2014 (%)	2015 (%)	2016 (%)	2017 (%)	Average registration
Printing and reproduction activities from original recordings	2.17			1.89			0.68
Clothing making	4.35	3.08	7.25	3.77	4.11	8.00	5.09
Coking, manufacturing of petroleum refining products					1.37		0.23
Tanning and retanning of hides and leather products manufacturing		1.54		5.66	1.37	1.33	1.65
Preparation of beverages	2.17	1.54	1.45	3.77	4.11	4.00	2.84
Food products making	28.26	43.08	28.99	13.21	20.55	26.67	26.79
Equipment electrical manufacturing	4.35				1.37		0.95
NCP machinery manufacturing		1.54	1.45	1.89		1.33	1.03
Furniture, mattresses and bed bases manufacturing	2.17	4.62	1.45	3.77	4.11		2.69
Other non-metallic mineral products manufacturing	10.87	9.23	10.14	3.77	4.11	2.67	6.80
Paper and paper product manufacturing				1.89			0.31
Rubber and plastic products manufacturing	2.17	4.62	1.45	3.77	1.37	4.00	2.90
Metal products manufacturing, except machinery and equipment	10.87	6.15	15.94	9.43	6.85	14.67	10.65
Pharmaceutical, medicinal chemicals and botanical products for pharmaceutical use manufacturing						1.33	0.22
Computer, electronic and optical products manufacturing			1.45	3.77	1.37		1.10
Basic metallurgical products manufacturing	2.17	1.54			2.74	4.00	1.74
Textile products manufacturing	2.17	1.54			1.37		0.85
Chemical substances and products manufacturing	13.04	7.69	1.45	5.66	12.33	2.67	7.14
Motor vehicles, trailers and semi-trailers manufacturing			1.45				0.24
Installation, maintenance and specialized repair of machinery and equipment	10.87	12.31	17.39	28.30	23.29	22.67	19.14
Other manufacturing industries			2.90	3.77		1.33	1.33
Electricity, gas, steam and air conditioning supply	2.17	1.54	4.35	5.66	4.11	4.00	3.64
Wood transformation and wood product manufacturing	2.17		2.90		5.48	1.33	1.98
Grand total	100.00	100.00	100.00	100.00	100.00	100.00	

Table 11: Company registration and companies registered by economic activity and size

Economic activity	Company registration					Registered and updated companies for the 2017				
	Micro	Small	Medium	Total	Participation (%)	Micro	Small	Medium	Total	Participation (%)
Printing and reproduction activities from original recordings	2			2	0.52	1			1	0.34
Clothing making	20			20	5.25	17			17	5.74
Coking, manufacturing of petroleum refining products	1			1	0.26	1			1	0.34
Tanning and retanning of hides and leather products manufacturing	6			6	1.57	3			3	1.01
Preparation of beverages	11			11	2.89	9			9	3.04
Food products making	94	9		103	27.03	72	9		81	27.36
Equipment electrical manufacturing	3			3	0.79	3			3	1.01
NCP machinery manufacturing	4			4	1.05	4			4	1.35
Furniture, mattresses and bed bases manufacturing	10			10	2.62	4			4	1.35
Other non-metallic mineral products	21	3	1	25	6.56	14	3	1	18	6.08
Paper and paper product manufacturing	1			1	0.26					0.00
Rubber and plastic products manufacturing	9	2		11	2.89	7	1		8	2.70
Metal products manufacturing, except machinery and equipment	38	3		41	10.76	31	3		34	11.49
Pharmaceutical, medicinal chemicals and botanical products for pharmaceutical use manufacturing	1			1	0.26	1			1	0.34
Computer, electronic and optical products manufacturing	4			4	1.05	2			2	0.68
Basic metallurgical products manufacturing	7			7	1.84	6			6	2.03
Textile products manufacturing	3			3	0.79	3			3	1.01
Chemical substances and products manufacturing	23	2	1	26	6.82	16	2		18	6.08
Motor-vehicles, trailers and semi-trailers manufacturing	1			1	0.26	1			1	0.34
Installation, maintenance and specialized repair of machinery and equipment	71	3		74	19.42	60	3		63	21.28
Other manufacturing industries	5			5	1.31	3			3	1.01
Electricity, gas, steam and air conditioning supply	13	1		14	3.67	8	1		9	3.04
Wood transformation and manufacturing	7	1		8	2.10	6	1		7	2.36
Grand total	355	24	2	381	100.00	272	23	1	296	100.00

chemical substances and products manufacturing and other non-metallic mineral products manufacturing. 91.89% (n = 272) of the companies were micro-companies

and these kinds of companies were found to represent the highest proportion of closure (Table 11).

CONCLUSION

The objective of this study was to describe the behavior of companies in the industrial manufacturing sector in the Department of Huila, Colombia. The analysis was carried out for companies created between 2012 and 2017 and which remained active at the end of the study period. The total number of companies registered during the study period was 32.146 of which 6.078 (19.81%) were created as legal entities and of these, 381 (6.3%) correspond to the economic sector under analysis.

The results obtained showed that there is a relationship between the size of the companies and the probability of survival. The companies registered as “micro” and “small” reflected a greater propensity for failure during the period of study in addition to being the majority size of companies created in the same time. Companies cataloged as average size were found to survive in greater degree (Angel and Pulido, 2010; Hernandez, 2013; Martinez, 2006; Melgrajo *et al.*, 2012).

In addition, a direct relationship was found between the size of the companies and the registered economic activity, since, the registration of micro and small companies was concentrated in activities related to food products, installation, maintenance and specialized repair of machinery and equipment and metal products manufacturing. This scenario is the same as that of non-renewed companies, since, the companies in these same activities demonstrated cessation of operations in equal proportions. This finding shows that companies registered in the most preferred sub-sectors have a greater risk of leaving the market (Angel and Pulido, 2010; Hernandez, 2013; Martinez, 2006; Rincon-Guio *et al.*, 2018).

RECOMMENDATIONS

The results found in the study contribute enormously to the theory and practice of business administration, organizational management and economic behavior in addition, they favor political and administrative fields in both a regional and national scope. Lastly, the results serve as a national and international baseline for future studies related to business development and entrepreneurship in developing countries.

Additionally, these guidelines may aid in the design, development and implementation of projects, programs and strategies that propitiate the creation of companies and guarantee their permanence, growth and development in the market.

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