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Article

Analysis of the evolution in the number of manufacturing companies in Portugal between 2009 and 2021 to understand growth and decline trends

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Abstract: This project analyzes the evolution of the manufacturing sector in Portugal from 2009 to 2021, focusing on the variations in the number of active companies across various subcategories, such as food, textiles, and metal product industries. The goal of this analysis is to understand the dynamics of growth and contraction within each sector, providing insights for companies to adjust their market and operational strategies. Key objectives include analyzing the overall evolution in the number of companies, identifying subcategories with notable changes, and providing a comprehensive analysis of observed trends and patterns. The study is based on data from PORDATA 2024, and the research employs temporal trend analysis, linear and quadratic regression, and the Pareto representation to identify patterns of growth and decline. By comparing annual data, the project uncovers periods of growth and decline, allowing for a deeper understanding of the sector's dynamics. The findings also highlight variations in periods of economic crises and during the Covid-19 pandemic, and recommendations for action are presented to support businesses resilience and continuity. These results are valuable for companies within the manufacturing sectors analyzed and policy makers, guiding strategic decisions to navigate the complexities of the market dynamics and to ensuring long-term organizational sustainable success.

Keywords: businesses continuity; businesses growth; data analysis; manufacturing industry

1. Introduction

This project aims to analyze the evolution in the number of companies within the manufacturing sector in Portugal, focusing on the number of active companies between 2009 and 2021. The analysis is segmented by various subcategories within the manufacturing industry, including food, textiles, apparel, leather, wood, cork, printing, and the production of metal products, among others.

The central issue of this project is to understand the dynamics of growth and contraction in the number of manufacturing companies in Portugal in the last twelve years, since the 2009 and after the Lehman Brothers in September 2008, that led to a severe global downturn that reached its most critical point from late 2008 through 2009 (Mawutor, 2014).

This knowledge is relevant for a company operating in the manufacturing sectors under analysis, allowing it to adjust its market and operational strategies according to the observed trends.

The objectives of this work are:

a) To analyze the evolution of the number of companies in the manufacturing sector from 2009 to 2021;

b) To identify the subcategories within the industry that have shown the most significant growth or decline;
c) To provide a detailed analysis of the observed trends, contributing to a deeper understanding of the sector.

The methodology employed in the study involves the collection and analysis of secondary data from official sources in Portugal, PORDATA, 2024. The data was organized and analyzed to identify trends and patterns.

This project addresses the following key questions, which should be examined considering the context of a company within the manufacturing sector:

a) What are the trends of growth and decline in the number of companies in the manufacturing industry in Portugal between 2009 and 2021?
b) Which subcategories within the manufacturing industry demonstrated the greatest resilience or vulnerability during economic crises (such as the 2008/2009 financial crises) and the Covid-19 pandemic?
c) What internal and external factors contribute to the growth or decline in the number of companies in the manufacturing industry in Portugal?

The article is organized as follows:

1) Introduction: This section presents the context, research problem, motivation, objectives, methodology, and the structure of the study;
2) Methodology: This section provides a detailed description of the methods and techniques used for data collection and analysis;
3) Results and discussion: This section presents the main findings of the study, including illustrative graphs and tables, and discusses their implications;
4) Conclusion: This section summarizes the key points of the study, highlighting the conclusions and offering suggestions for future research.

2. Methodology

A quantitative and longitudinal study was conducted to analyze the evolution in the number of companies within the manufacturing sector in Portugal between 2009 and 2021. Samples were taken from the following subcategories within the manufacturing industry:

a) Food Industries;
b) Textile Industries;
c) Clothing Industries;
d) Leather Industries;
e) Wood and Cork Industries;
f) Printing Industries;
g) Metal Products Industries.

The analysis included public companies with commercial activities, corporations, sole proprietorships, and independent workers. The samples were selected using stratified sampling, where companies were categorized by industry sector. This approach allowed for a detailed and representative analysis of each subcategory within the manufacturing industry.

The samples included annual data on the number of active companies in each subcategory of the manufacturing sector. The main characteristics of the samples are as follows:

1) Companies of varying sizes and organizational structures;
2) Data covering the period from 2009 to 2021;
3) Variations in the number of companies due to economic crises and specific events, such as the Covid-19 pandemic.

Data was collected from official sources, namely PORDATA, which compiles statistical information on companies in Portugal. The use of secondary data ensured the accuracy and reliability of the information analyzed.

The primary variable analyzed was the number of active companies annually by sector. Other variables included: annual percentage variation in the number of companies; growth and contraction trends; the impact of significant economic events (such as economic crises and the Covid-19 pandemic).

The results were measured using temporal trend analysis to identify patterns of growth and decline in the number of companies, as well as through the comparison of annual data to highlight significant variations.

The following statistical tests and methods were employed:

a) Temporal trend analysis and graphs to visualize variations over time;
b) Linear and quadratic regression to model the evolution in the number of companies and predict future trends;
c) Statistical significance tests to compare different periods and identify significant changes.

The research was based on official documents and statistical reports provided by PORDATA, in addition to literature on the economic impacts on specific industrial sectors. Data collection was carried out from official sources, ensuring the validity and reliability of the data used.

To facilitate the understanding of the methods and results, illustrative graphs and tables were utilized:

a) Line graphs to show the annual evolution of the number of companies;
b) Tables to summarize annual data and percentage variations;
c) Pareto diagrams to identify the industries most affected by bankruptcies.

3. Literature review

The landscape of company creation has undergone significant changes over the years, influenced by economic, technological, and societal shifts (Audretsch et al., 2019). Understanding this evolution provides insights into the broader economic trends, the impact of innovation, and the changing nature of entrepreneurship.

The rise of digital technologies has played a pivotal role in this transformation. Digitalization has lowered the barriers to entry for new businesses, enabling more individuals to start companies with less capital and fewer resources. This democratization of entrepreneurship has led to an increase in the number of startups, particularly in the technology sector (Giones and Brem, 2017).

Furthermore, the concept of “lean startups” has gained prominence, this approach emphasizes rapid prototyping, customer feedback, and iterative design, has

revolutionized the way companies are launched and scaled. The lean startup methodology allows entrepreneurs to test their ideas quickly and pivot when necessary, reducing the risks associated with traditional business models (Bortolini et al., 2021; Ries, 2012).

Understanding the existence of company lifecycle is valuable for several reasons. It provides insights into the changing nature of entrepreneurship and the factors that influence business success (Liñeiro et al., 2024) and can create new business sectors like creative and cultural industries (Kézai and Rechnitzer, 2023). By studying these trends, policymakers can better support entrepreneurs, create environments conducive to innovation and growth (Saha et al., 2022) and use them as best practice for improving public services (Buics and Süle, 2020).

Analyzing the development of firm creation can help identify the impact of technological advancements on business models and industries (Audretsch et al., 2023). The integration of digital technologies has not only transformed how businesses are started but also how they operate and compete. This knowledge is crucial for businesses seeking to adapt to an increasingly digital world (Cumming and Vismara, 2018).

The trends of company creation sheds light on the broader economic and societal changes that are occurring (Agudelo et al., 2019). For instance, the rise of social entrepreneurship reflects a growing recognition of the importance of creating businesses that address social and environmental challenges. This trend underscores the shifting priorities of entrepreneurs and consumers alike, with significant implications for the future of business (Saebi et al., 2019).

The development of enterprise creation has also been influenced by shifts in global demographics and consumer behavior. As populations in various regions age, there is a growing demand for products and services that cater to these specific groups. Companies are increasingly required to innovate not only in terms of technology but also in how they understand and engage with diverse consumer bases. This demographic shift can lead to the rise of businesses that are more inclusive and tailored to the unique needs of different consumer segments, further diversifying the entrepreneurial landscape (Zhang and Chang, 2021).

Another key factor in the changing landscape of business creation is the globalization of markets. The interconnectedness of global economies has enabled startups to think beyond local or national markets from their inception. Today's entrepreneurs have access to a global customer base, international supply chains, and the ability to leverage cross-border partnerships. This globalization has intensified competition but has also opened up vast opportunities for growth and innovation. Companies are now able to scale rapidly and operate across multiple geographies, often with leaner operations and more flexible business models (Vebeke et al., 2018).

Moreover, the rise of ecosystems and innovation hubs around the world has facilitated the growth of new companies. These ecosystems offer more than just funding; they provide access to talent, mentorship, and networks that are crucial for the success of new ventures. The clustering of companies within these hubs creates synergies that drive further innovation and economic growth, reinforcing the importance of place in the modern entrepreneurial journey (Sharma and Meyer, 2019).

The increasing importance of data and analytics in decision-making has also transformed the way companies are created and managed. With the advent of big data, entrepreneurs can now base their decisions on empirical evidence rather than intuition (Szukits and Móricz, 2023). Data-driven strategies enable companies to better understand their customers, optimize operations, and identify new market opportunities. This shift towards data-centric decision-making has been particularly impactful in sectors such as e-commerce, finance, and healthcare, where the ability to analyze and act on large volumes of data is a critical success factor (Shabbir and Gardezi, 2020).

Additionally, the shift towards remote work and distributed teams has altered the traditional model of company creation. The COVID-19 pandemic accelerated the adoption of remote work, leading to a rethinking of how companies are structured and managed (Tursunbayeva et al., 2022). This shift has made it possible for startups to tap into global talent pools, reducing the need for a physical presence in expensive urban centers. Remote work has also changed the dynamics of team collaboration and company culture, requiring new approaches to leadership and communication (Morrison and Ruiz, 2020).

The growing emphasis on sustainability and corporate social responsibility (CSR) has also impacted company creation. Consumers and investors are increasingly prioritizing businesses that demonstrate a commitment to environmental sustainability and social good (Amoako, 2021). This has led to the rise of green startups and companies that integrate CSR into their core business models. Entrepreneurs are now recognizing that long-term success is not only measured by financial performance but also by the positive impact they have on society and the environment (Asiaei et al., 2021).

Technological advancements in artificial intelligence (AI) and automation are also reshaping the landscape of company creation (Aldoseri et al., 2024). AI-driven tools and platforms are enabling startups to automate routine tasks, optimize processes, and personalize customer experiences at scale. This has led to the emergence of new business models that leverage AI to deliver innovative products and services. The ability to harness AI and automation is becoming a key differentiator for startups, driving competitive advantage in an increasingly crowded marketplace (Wirtz and Pitardi, 2023).

The role of government policies and regulations in shaping the environment for company creation cannot be overlooked. Regulatory frameworks can either facilitate or hinder entrepreneurship. In recent years, governments around the world have introduced policies aimed at fostering innovation and supporting startups (Sadeh et al., 2021). These include tax incentives, grants, and simplified regulatory processes. However, navigating the complex and often fragmented regulatory landscape remains a challenge for many entrepreneurs, particularly in highly regulated industries such as finance and healthcare (Cai et al., 2023).

The cultural perception of entrepreneurship has evolved, influencing the rate and nature of company creation. In many parts of the world, entrepreneurship is increasingly seen as a viable and desirable career path, driven by the success stories of high-profile entrepreneurs and the allure of innovation (Kara and Dheer, 2023). This cultural shift has been supported by educational institutions, which are placing greater

emphasis on entrepreneurship programs and incubators. As a result, more individuals are being equipped with the skills and mindset needed to start and grow their own businesses, further fueling the entrepreneurial ecosystem (Donaldson, 2021).

The Portuguese manufacturing industry's evolution between 2009 and 2022 was shaped by a mix of internal and external factors. Internally, labor market reforms introduced greater wage flexibility and cost control, though productivity issues remained. Some of these productivity challenges were linked to slow technology adoption and limitations in operational scaling, affecting overall efficiency in the sector (Ferraz, 2024). The industries that have a strong commitment to R and D tend to have a higher growth rate (Oliveira and Fortunato, 2017). Financial access was another key internal factor: following the 2008 financial crisis, many firms faced limited credit availability, hindering growth and modernization efforts (Lemos, 2017). To mitigate this, EU-backed initiatives, such as Portugal 2020 that provided essential funding for technological upgrades, helping companies enhance their competitive edge (Adams and Portela, 2021)

Externally, global economic changes significantly impacted the industry. The 2008 financial crisis had long-lasting effects, dampening demand and contracting the number of firms, the tax policy that followed this crisis increased the demand for government funding and banks started to offer more expensive funding, which led to the increase of Portuguese government debt (Sérgio and Sousa, 2016). Additionally, the COVID-19 pandemic disrupted global supply chains, exposing the industry's reliance on imported raw materials and energy (Younis et al, 2023). The Ukraine conflict in 2022 led to increases in energy and raw material costs, further straining manufacturers' operational budgets and impacting their profitability (Srai et al, 2023).

While Portugal's manufacturing sector benefited from financial support and labor reforms, persistent productivity challenges, exposure to economic European and global constrains impacting operations and businesses of manufacturing companies.

The landscape of company creation is a dynamic and multifaceted phenomenon influenced by a wide range of factors, including technological innovation, globalization, demographic shifts, and societal changes. As these forces continue to evolve, so too will the ways in which companies are created, managed, and scaled. Understanding these trends relevant for entrepreneurs, investors, policymakers, and educators who seek to navigate and shape the future of business.

4. Results and discussion

By analyzing the data on the evolution of the number of companies in Portugal between 2009 and 2021, it is possible to observe the variations in the different industrial sectors over this period. This analysis can help identify possible causes for these variations, including industries that may be facing difficulties, whether due to technological advancements or other factors.

To facilitate the graphical visualization of the data, the variables were coded. This coding is presented in **Table 1**.

Table 1. Variables coding.

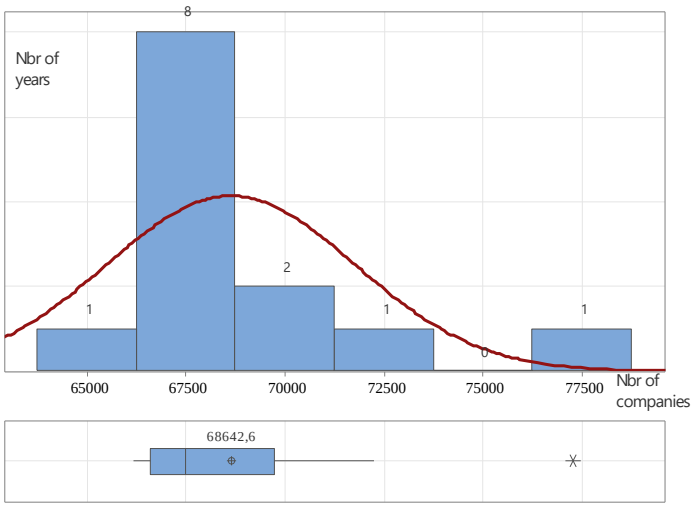
Code	Description
A0	Total
A1	Food Industries
A2	Textile Manufacturing
A3	Clothing Industry
A4	Leather and Leather Products Industry
A5	Wood and Cork Industries and Their Products, Except Furniture; Basketry and Wickerwork Manufacturing
A6	Printing and Reproduction of Recorded Media
A7	Manufacture of Other Non-Metallic Mineral Products
A8	Manufacture of Metal Products, Except Machinery and Equipment
A9	Furniture and Mattress Manufacturing
A10	Repair, Maintenance, and Installation of Machinery and Equipment
A11	Others

The data used to analyze the evolution of the number of companies in Portugal between 2009 and 2021, can be found in **Table 2**.

Table 2. Evolution of the number of companies in Portugal [2009–2021].

Years	A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
2009	77,278	9828	3946	10,266	2858	7175	3245	4975	14,210	5973	3087	11,715
2010	72,273	9428	3661	9284	2696	6579	3024	4669	13,190	5512	3097	11,133
2011	70,625	9322	3556	8940	2919	6250	2884	4409	12,913	5252	3136	11,044
2012	67,485	9165	3394	8510	2957	5790	2694	4173	12,148	4880	3117	10,657
2013	66,423	9208	3436	8481	3041	5526	2559	4025	11,684	4573	3167	10,723
2014	66,201	9289	3383	8492	3129	5258	2509	3930	11,450	4489	3400	10,872
2015	66,729	9337	3480	8594	3182	5208	2500	3918	11,437	4446	3583	11,044
2016	66,953	9296	3517	8710	3234	5047	2453	3831	11,508	4414	3749	11,194
2017	67,555	9327	3509	8821	3266	4991	2403	3840	11,553	4421	3931	11,493
2018	68,214	9445	3542	8754	3187	5031	2396	3802	11,817	4438	4140	11,662
2019	68,832	9566	3578	8747	3087	5070	2412	3819	11,927	4479	4381	11,766
2020	66,469	8883	3463	8480	2856	4892	2287	3650	11,741	4366	4330	11,521
2021	67,317	9186	3527	8308	2760	4892	2297	3690	11,990	4417	4518	11,732

Analyzing the overall evolution of companies in Portugal, between 2009 and 2021, we obtain the graph shown in **Figure 1**.



Anderson-Darling Normality Test

A-Squared	1,27
P-Value	<0,005
Mean	68643
StDev	3140
Variance	9859061
Skewness	2,05755
Kurtosis	4,38483
N	13
Minimum	66201
1st Quartile	66599
Median	67485
3rd Quartile	69729
Maximum	77278

95% Confidence Interval for Mean

66745	70540

95% Confidence Interval for Median

66647	69397

95% Confidence Interval for StDev

2252	5183

Figure 1. Graphical summary of the total number of companies in Portugal between 2009 and 2021.

In **Figure 1**, we observe that the average number of companies is 68,643, with a standard deviation of 3140, indicating significant variation in the number of companies during this period. Notably, the outliers are 77,278 companies, which represent the initial number of companies in Portugal in 2009 in the considered industrial sector.

The first analysis conducted was a direct comparison between the years 2009 and 2021. The results of this comparison are presented in **Table 3**.

Table 3. Growth of different industries between 2009 and 2021.

A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
−12.89%	−6.53%	−10.62%	−19.07%	−3.43%	−31.82%	−29.21%	−25.83%	−15.62%	−26.05%	46.36%	0.15%

Analyzing **Table 3** alone, one might be misled into concluding that only two industries grew during this period, while the remaining ones experienced a continuous and significant decline.

To verify whether this is indeed the case, **Figure 2** was created representing the evolution of the number of companies in Portugal, between 2009 to 2021.

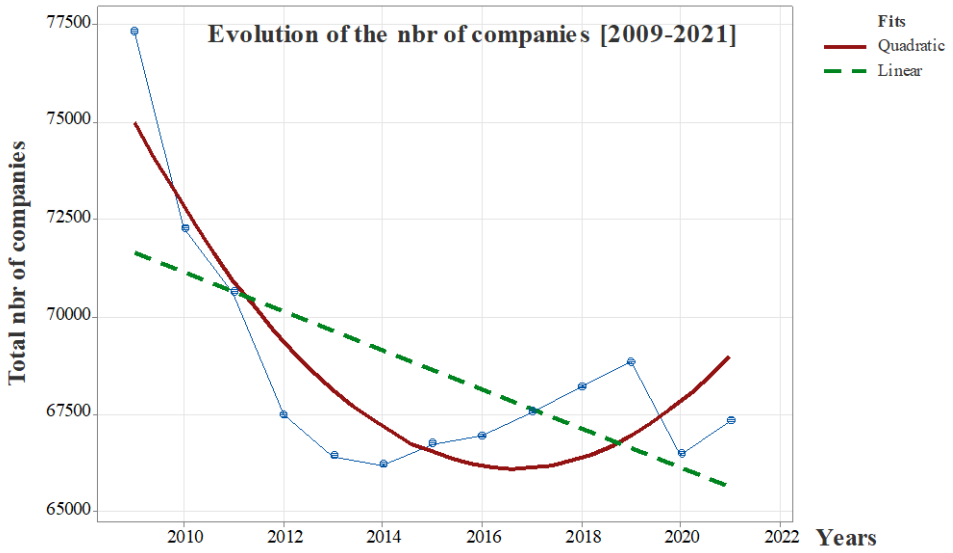


Figure 2. Graph of the evolution of the number of companies from 2009 to 2021.

In **Figure 2**, the actual trend of the data is observable, showing a significant decline between 2009 and 2014, coinciding with the 2008/2009 economic crisis and the presence of the "Troika" in Portugal. The "Troika" in Portugal refers to the collective involvement of three international institutions-the International Monetary Fund (IMF), the European Central Bank (ECB), and the European Commission (EC)-in overseeing Portugal's financial bailout program from 2011 to 2014. Following the 2008 financial crisis, Portugal faced escalating public debt, high unemployment, and economic instability (Sérgio and Sousa, 2016).

Between 2014 and 2019, after the intervention of "Troika" the number of companies increased, reflecting a period of economic growth in the country. This growth period was largely driven by a mix of internal reforms, improved financial stability, and favorable external economic conditions (Neves et al., 2020). Overall, a combination of stabilized public finances, low-interest rates, higher consumer demand, and EU support fostered an environment conducive to entrepreneurship and business expansion in Portugal from 2014 to 2019 (Figueira et al., 2023).

In 2020, there was a noticeable drop in the number of companies, and a recovery in the following year, 2021. This decline is most likely attributed to the Covid-19 pandemic (SARS-CoV-2).

It is also noticeable that a linear regression does not fit our data well and cannot be used to make future predictions about the number of companies, but it does provide evidence of the decline in the number of companies in Portugal. In contrast, a quadratic regression better approximates our data and may be used for an approximate forecast, providing evidence of an inflection in the latest years, which can lead us to infer that the number of companies will continue to grow if the conditions are maintained and no economic crises or other type of crises occurs.

The variations described in the number of companies can also be observed in **Figure 3**.

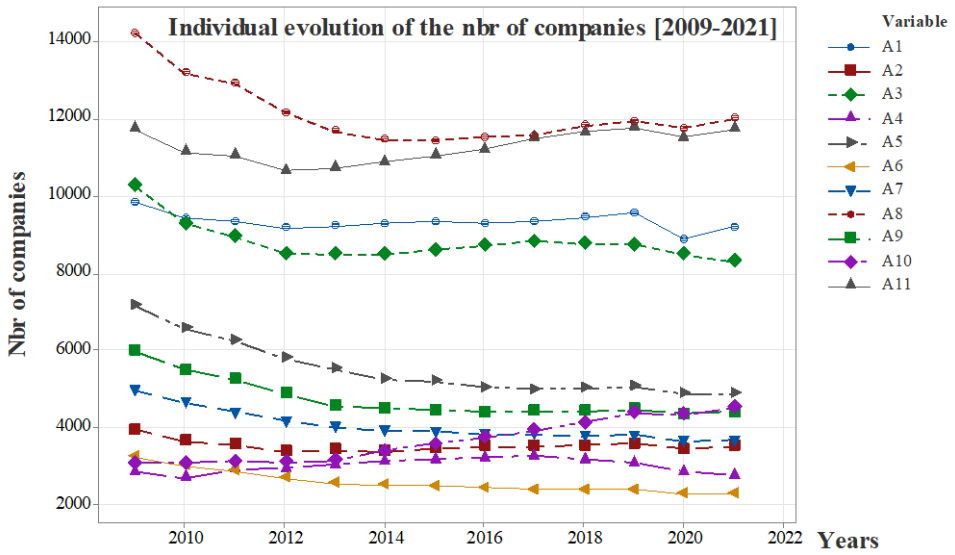


Figure 3. Evolution of the number of companies in Portugal between 2009 and 2021, by industry.

The following three industrial sectors are the ones with more active companies: A8. Manufacture of Metal Products, A1. Food Industries, and A2. Furniture and Mattress Manufacturing.

The industrial sector A8. Manufacture of Metal Products, since 2015 had a more stable trend in the total number of companies.

The Manufacture of Metal Products (A8) is also the industrial sector that is more prevalent in the Portuguese industrial economy.

Considering the number of companies that closed-down between 2009 and 2021, the Manufacture of Metal Products (A8) is also the industrial sector with the higher number companies that closed-down, which along the years was compensated by the creation of more companies in the same sector, maintaining a relatively stable number of companies.

The volatility of raw material prices and dependence on sectors like construction and automotive may have contributed to the high rate of closed-down companies in the Manufacture of Metal Products (A8).

To analyze which industries are the most resilient the graph in **Figure 4** was created.

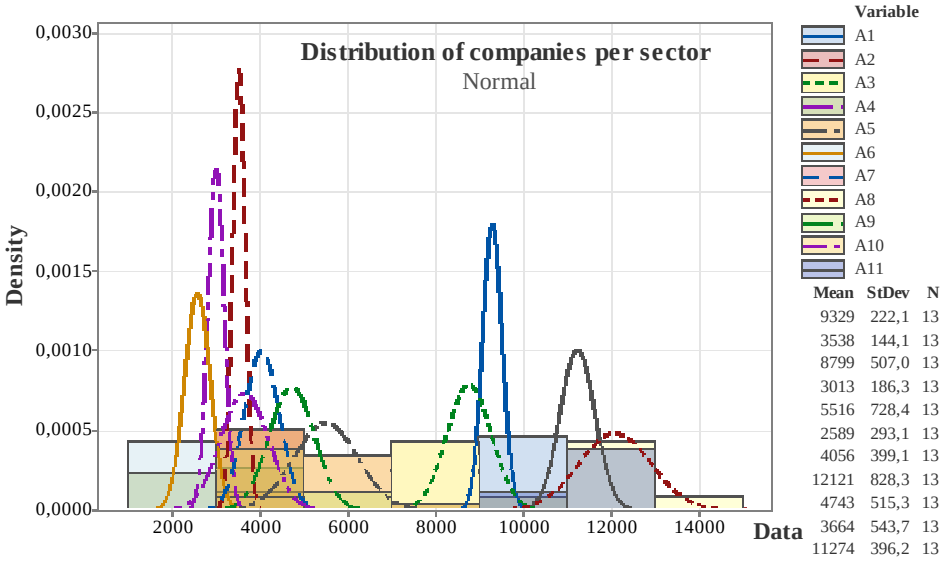


Figure 4. Graph of the distribution of the number of companies by sector.

Figure 4 reveals which industries experienced greater dispersion, indicating larger variations in their numbers during the analyzed period. Notably, industries A8 and A5- "Manufacture of Metal Products, Except Machinery and Equipment" and "Wood and Cork Industries and Their Products, Except Furniture; Basketry and Wickerwork Manufacturing"-showed the highest variability in the number of companies (with the largest standard deviations). These industries were the most affected by the events occurring during this time span.

Conversely, industries with lower dispersion, indicating greater resilience during the analyzed period, include A2 and A4- "Textile Manufacturing" and "Leather and Leather Products Industry". These industries had lower standard deviations, suggesting that they were less impacted throughout the period.

To further understand which industries were most affected (experiencing the greatest decline in the number of companies), a Pareto diagram was created (**Figure 5**).

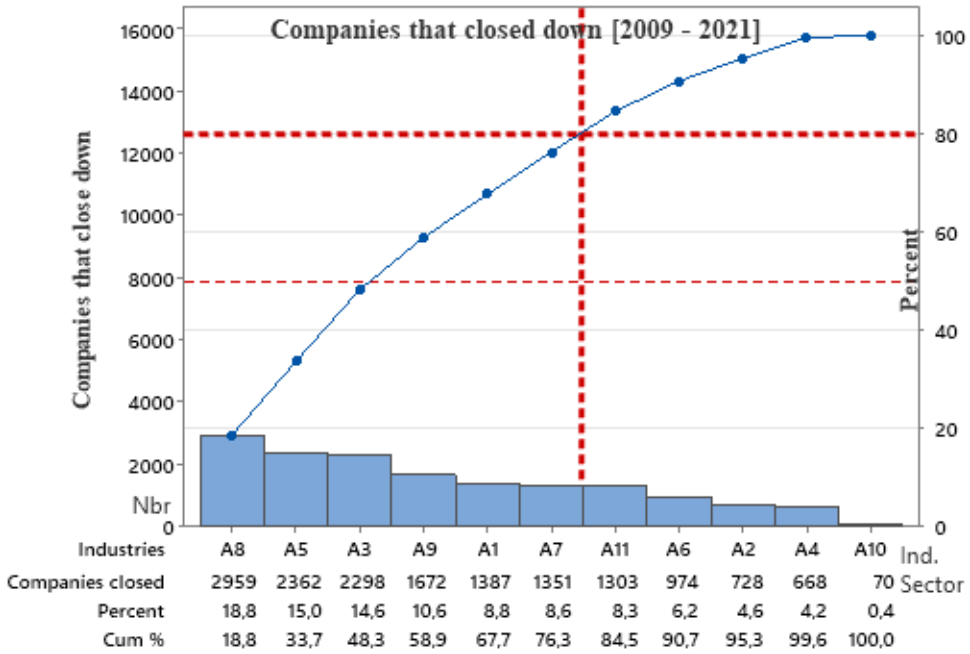


Figure 5. Pareto diagram–company closed in Portugal between 2009 and 2021.

The Pareto diagram is a useful tool for analyzing companies that closed, as it helps identify the industrial sector that most significantly contribute to the decline in the number of companies. Classifying industries into classes A, B, and C helps prioritize corrective actions, focusing initially on Class A industries due to their greater impact.

The Pareto analysis shows that the following three industries classified as Class A account for 50% of companies that closed down: 1) Textile Industry (A3); 2) Manufacture of Metal Products (A8); 3) Wood and Cork Industry (A5).

Also included in Class A are industries A9, A1, A7, and A11. In contrast, industries A6 and A2 are classified as Class B, while the remaining industries fall into Class C, representing the final 5%.

Textile Industry (A3): This sector faces challenges such as global competition, changing fashion trends, and high production costs when compared to other countries with employees with lower salaries (Abbate et al., 2024).

Manufacture of Metal Products (A8): The volatility of raw material prices and dependence on sectors like construction and automotive may contribute to the high rate of companies close down. Prices and their volatility are largely influenced by shifting demand patterns exposing economies to economic risk, if their economy is dependent on mineral production (Renner and Wellmer, 2020).

Wood and Cork Industry (A5): Issues such as the sustainability of raw material sources and competition from alternative materials are relevant factors impacting the decrease of companies.

The identification of nearly 50% of companies that closed in just three sectors. A8, A5 and A3, suggests the need for targeted policies to mitigate risks in these areas. Effective measures may include government support programs, technological innovation, and improvements in management practices.

5. Conclusion

The study on the evolution of the number of manufacturing companies in Portugal between 2009 and 2021 met the following objectives:

1) To analyze the evolution of the number of companies: The study successfully identified and documented variations in the number of active companies across different industrial sectors. Fluctuations were observed, influenced by economic events such as the 2008/2009 financial crisis, the Troika intervention, and the Covid-19 pandemic.
2) To identify industrial sectors with greater growth or decline: The analysis revealed which industrial sectors exhibited greater resilience or vulnerability. For instance, the manufacture of metal products, wood and cork industries, and machinery repair demonstrated resilience, whereas other sectors showed more pronounced declines.
3) To figure out growing and declining trends: Using graphs, tables, and statistical analyses, growth and contraction trends were identified. This information is valuable for businesses to adjust their market and operational strategies, contributing to a deeper understanding of each industrial sector.

The manufacture of metal products stands out as a pivotal Portuguese industrial sector with the highest number of active companies. Despite experiencing relevant company closures, this sector maintained stability due to a consistent influx of new companies created. However, external factors such as raw material price volatility and reliance on sectors like construction and automotive likely contribute to the high companies' closure rate. Conversely, sectors like textile manufacturing and leather products exhibited greater resilience, with lower variability, indicating more stability even during economic disruptions. Manufacture of metal products, Textile and leather industries, given their prevalence and resilience, are good candidates for targeted growth programs, including export incentives and innovation support to strengthen their position particularly in international markets.

Additionally, and based on the results the following transversal recommendations are made:

1) Tax Incentives for vulnerable industries: Implement tax reduction and fee waiver policies for industries sectors facing persistent declines, helping stabilize struggling companies and encouraging reinvestment during recovery periods.
2) Sector-specific training and development: Develop tailored training programs aimed at enhancing operational efficiency, modern management practices, and technical skills. Collaborations with industry experts can provide, especially in the areas of digitalization, automation and robotics, support to cope with technological and economic shifts.
3) Investment in innovation and technology: Allocation of funding for research and development to support modernization within the manufacturing sector. Focus on digital transformation and processes optimization to improve productivity and competitiveness.
4) Support international expansion: Establish programs to help resilient companies to access new international markets. This could include export benefits,

international trade partnerships, and participation in global trade shows to expand the sector's reach and enhance its competitive edge.

Together, these actions aim to strengthen both vulnerable and resilient sectors, enhance adaptability, and improve the resilience of the manufacturing landscape.

Despite the findings and recommendations the study faced limitations:

1) Quality of secondary data: Relying on secondary data from official sources may have introduced limitations in the accuracy and timeliness of the information.
2) Temporal scope: The analysis was limited to the period from 2009 to 2021, which may not capture all long-term trends.
3) Unconsidered variables: Additional external factors, such as specific government policies or technological changes, may have influenced the results and were not deeply analyzed.

To address these limitations and enhance the depth of research, future studies, should consider the following:

1) Extension of the analysis period to capture long-term trends and the continuous evolution within each industrial sector.
2) Incorporation of external variables, including additional factors, such as changes in government policies, advancements in technology, and global economic status, to provide a more holistic analysis on the depth and growth in the number of industrial companies.
3) Conduct comparative international studies, analyzing similar sectors in other countries and initiatives to favor its resilience and sustained success, to figure out effective strategies and practices that may be valuable for the Portuguese industries, offering insights into potential improvements and growth opportunities.

Implementing these recommendations could strengthen and enhance the resilience of Portugal's manufacturing sector, promoting sustainable growth and adaptation to future economic crises.

Conflict of interest: The authors declare no conflict of interest.

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