Sustainable Development in Manufacturing SMEs: Evidence from Bogotá's Industrial Sector

René Leonardo Mora Rojas[1], Jairo Jamith Palacios Rozo[2], Lugo Manuel Barbosa Guerrero[3]

Abstract

SMEs in the manufacturing sector face numerous challenges with significant implications for growth, innovation performance and overall competitiveness. Achieving sustainability objectives requires addressing financial, informational, and regulatory barriers, while also promoting enabling factors such as government support and technological innovation in SMEs. This approach can enhance their sustainability performance across the economic, environmental, and social dimensions, where the continuous adoption of sustainable practices is essential for long-term success. The purpose of this study is to identify the main challenges faced by SMEs in the manufacturing sector in Bogotá, by reviewing and analyzing publications from expert sources in the country. This approach aims to develop a comprehensive understanding of the nature of these companies and the key factors that consistently affect their long-term survival.

Keywords: *Business survival, financial insolvency, SMEs in the manufacturing sector.*

Introduction

Among the key dimensions of sustainability, three dimensions are evident: 1) Economic sustainability is often the most emphasized dimension, representing the highest percentage in the sustainable development index (SDI) for SMEs (Garbie, 2016). The second dimension is environmental sustainability which involves minimizing resource consumption, reducing emissions and effectively managing waste (Graczyk, 2022) (Maldonado et al., 2024). The practices such as life cycle analysis, eco-labeling and compliance with environmental standards are essential (Seidel et al., 2006). As also green business process management (Green BPM) and green manufacturing practices are increasingly adopted to reduce the environmental footprint (Sohns et al., 2023) (Chithra, 2023). In third dimension is social sustainability, where labor rights, human capital development and community relations are included (Saygili et al., 2023) (Schmidt et al., 2018) (Schmidt et al., 2018). In which the SME often focused on creating value for employees and ensuring fair labor practices (Saygili et al., 2023).

Three barriers to sustainability are found in this study: 1) financial constraints, where limited access to capital and resources is a major barrier for SMEs (Saygili et al., 2023) (Alayón et al., 2022) (Natarajan & Wyrick, 2012). 2) the lack of experience and information, where SMEs often lack the necessary expertise and information to efectively implement sustainable practices (Natarajan & Wyrick, 2012). 3) Regulatory and market pressures, where the SME may face challenges due to regulatory requirements and market demands for sustainable products (Chithra, 2023). (Natarajan & Wyrick, 2012). In the process, three enablers of sustainability were found as 1) government support and policies among which incentives, subsidies and government support programs can facilitate the adoption of sustainable practices (Jangali & Nagesha, 2025) (Alayón et al., 2022), 2) collaboration and partnerships i.e. collaborations with universities, research institutions and other companies can provide SMEs with the necessary knowledge and resources (Seidel et al., 2006) and 3) Technological innovations where the adoption of new technologies such as industrial robotics can improve sustainability by improving efficiency and reducing waste (Epping & Zhang, 2018).

[1] Doctor en Administración, Magíster en Ciencias Financieras y de Sistemas. Docente de pregrado y postgrado en diferentes universidades del país en el área financiera, gestión de proyectos y planeación estratégica. Consultor y asesor de empresas. Directivo Universitario. rleonardomora@universidadmayor.edu.co. https://orcid.org/0000-0001-5434-195X
[2] Doctorando en Socioformación y Sociedad del Conocimiento – CIFE, Magíster en Educación, especialista en administración de empresas, docente de planta de la Universidad Colegio Mayor de Cundinamarca, jjpalacios@universidadmayor.edu.co. https://orcid.org/0000-0002-1437-9838
[3] Doctorando en Administración Universidad de la Salle, magíster en informática educativa, Docente de planta de la Universidad Colegio Mayor de Cundinamarca, lmbarbosa@universidadmayor.edu.co. https://orcid.org/0000-0002-0871-8637

The following are sustainability indicators and assessment: 1) triple bottom line approach, where sustainability indicators for SMEs typically follow the triple bottom line approach, which encompasses economic, environmental and social dimensions (Saygili et al., 2023) and 2) evaluation models, where various models and frameworks —such as the Life Cycle Engineering (LCE) framework and fuzzy inference systems— are used to evaluate and improve sustainability practices (Maldonado et al., 2024) (Singh et al., 2014). Among the case studies and empirical evidence are regional and sectoral variations, where sustainability practices and challenges can vary significantly depending on regional factors and the specific industry sector (Avanesian & Nino, 2020) (Liu et al., 2023). Case studies and empirical research provide information on the practical implementation of sustainability practices and the effectiveness of different strategies (Seidel et al., 2006) (Yacob et al., (2022) (Fatoki, 2019).

Methodology

An exhaustive research of publications in the country by entities specialized in the subject was carried out to compile, validate and compare this information in order to draw the possible conclusions and identify the most significant problems. The sample was selected from the publications of the entities that have carried out the largest number of studies on the subject, such as the Bogota Chamber of Commerce, the National Association of Financial Institutions, Dinero Magazine, Portafolio Magazine, Bavaria Foundation, DANE, among others.

Results

SMEs, like any other organization, have as a fundamental mission, their sustainability and growth over time, in order to create an economic benefit not only for their owners but also for their social environment. However, currently 80% of SMEs are failing within five years, Molina Castillo (2012), in most cases due to the lack of knowledge to face the different types of systematic and non-systematic risks of business activities, as well as the lack of implementation of risk measurement indicators that allow them to know their current financial behavior and future prediction. Within the article Why do SMEs fail in Colombia, published by Dinero magazine in 2017, it cites four aspects that impede the development of these ventures, in the first instance business arrogance; where managerial thinking in SMEs, has established that the old strategies of 20 years ago, will always work, with a continuous resistance to change; secondly, the difficulty in applying for financial support from the government, due to cumbersome procedures, thus preventing SMEs from accessing new aid and, when this approach is possible, there is a lack of confidence in the belief that such financing will be very costly; A third aspect is the family-business relationship, where 95% of the SMEs have a family nature, resulting in the great majority of families integrating all their daily expenses (rent, utilities, market, clothes, car payment, etc.) in the company's expenses, making it a difficult task to differentiate the company's expenses from those of the family; finally, the lack of strategic alliances, because there is a great fear of making partnerships with other companies or other sectors, these alliances are vital for the development of an organization, in addition there are still a kind of fiefdoms in organizations, which are quite selective and do not treat employees properly. When a company presents impossibility in the payment of its debts and compliance with its obligations outside the established deadlines, it is possible to declare that it is in insolvency regime (Superintendencia de Sociedades, 2017). A very common way to establish the status of a company is used by financial institutions in Colombia when studying a credit application, according to ASOBANCARIA, a key point is to evaluate the credit history before the credit bureaus such as Data credit or CIFIN, any negative report in these entities can lead to the rejection of the application, but this is not the only factor taken into account, in addition, the entities require that the information provided in the application form must be truthful and verifiable (ASOBANCARIA, 2017). They also have in mind a good debt capacity and an adequate debt-to-income ratio, for this they suggest the application of the following formula (ASOBANCARIA, 2017).

$$Debt\ capacity = Revenues * 40\% - Expenditures\ (monthly\ averages)$$

The result of this equation is a guide to determine how much you can borrow and what you have available to borrow. A line of credit above this value will result in the application being denied. A tool also used for

credit approval in financial institutions is scoring, an automatic help system for credit decision making, established by means of a statistical model (BBVA, 2017). This model generates a score where a good rating established by the main credit bureaus, Data crédito and Cifin have established different scores that serve as a reference (ASOBANCARIA, 2017), scores between 600 and 750 is considered medium risk and above 750 points it is possible to be considered as a low risk customer (El Colombiano, 2017), this score can be consulted in the banking entities or in points of attention of the credit bureaus, by any person. The credit bureau in Colombia, Data Crédito, currently provides particular services called monthly credit profile plan, where the entity for a monthly fee helps you control and improve your credit life with services that include credit history consultation, improve credit score, create savings and spending plans and control of credit information through alerts (Expertian Colombia S.A., 2017). According to the Banco de Desarrollo Empresarial y Comercio Exterior de Colombia (BANCOLDEX), in Colombia there is a classification in the business sector between micro, small, medium and large companies, regulated in Law 590 of 2000 and its amendments Congress of the Republic (2004). "Through which Law 590 of 2000 on the promotion of the development of micro, small and medium Colombian enterprises is modified and other provisions are issued".

known as the Mipyme law, where it is established that the group of small and medium-sized companies with total assets greater than 500 minimum legal salaries in force (SMLV) and up to 30,000 SMLV are considered SMEs (Bancoldex, 2017).

**Table 1. Classification of SMEs in Colombia according to the SMLV.**

SMEs classification				
Type	**Employees Number**	**Total assets in SMLV**	**Colombian pesos**	**Dollars**
Microenterprise	Up to 10	<to 501 SMLV	COP 439.779.303	USD 123.170,22
Small Business	Between 11 and 50	>to 501 and < to 5001	COP 4.389.892.803	USD 1.229.489,65
Medium Business	Between 51 and 200	> to 5001 and 15000	COP 13.167.045.000	USD 3.687.731,41
SMLV(2021)	$ 877.803,00			
Dollar col. March 18-2021	$ 3.570,50			

Source: Update to the paper given by the author in May 2016 at the University of Celaya Guanajuato Mexico (Mora Rojas, 2016).

The National Department of Statistics (DANE) has established that SMEs are responsible for around 67% of employment and contribute 28% of the country's gross domestic product. (Dinero Magazine, 2016). In Colombia there are 2.5 million micro, small and medium-sized companies, where, according to Confecámaras, 66% of this productive segment is located in Bogotá, Cundinamarca, Atlántico, Antioquia, Valle del Cauca and Santander (Dinero Magazine, 2016). Bogota is the main focus of MSMEs in the country with a number of 740,069, equivalent to 29.38% of the national total, where 399,659 correspond to companies and 340,410 to individuals (Dinero Magazine, 2016). Colombian Confederation of Chambers of Commerce- Confecámaras, estimates that the average life of large companies in Colombia ranges between 18 years, while SMEs have a shorter life of 12 years; the companies with more longevity belong to the industrial and agricultural sector (Dinero Magazine, 2014). The survival of companies also changes according to the size of the company; companies within the segment of large companies present a rate of 71.4%, medium-sized 68%, small 60% and with micro companies, survival is 29.1%, with respect to micro companies it means that, out of every 100 companies with these characteristics in 2011, only 29 will survive to their first.

For the survival of SMEs, it is also important for entrepreneurs to understand the need to manage based on plans and goals, to manage indicators as a support tool for fundamental decision making as a source of information in the design of strategies. The indicators are simple to calculate and guide the company towards the creation of value, allowing the realization of a diagnosis based on the company's results and to be compared against the dynamics of the sector (Jiménez Sánchez, 2016). A study by the Bavaria Foundation in 2017 determined the following perceptions of SME entrepreneurs regarding the evaluation of competition and customers in the development of their activities. Seventy-three percent (73%) of the entrepreneurs considered the price of the products as an important aspect in the evaluation of the competition, followed by 32% in the market share, quality came in third place with 11%, while 22% of the respondents do not measure or do not know about their competition. These measurements are made with the help of surveys with 74% and the review of accounting systems with 44% of use (Fundación Bavaria, 2017). The study also identified the degree of knowledge that the entrepreneurs have of the business processes, presented in the following graph.

Figure 1. Degree of knowledge of the business process.
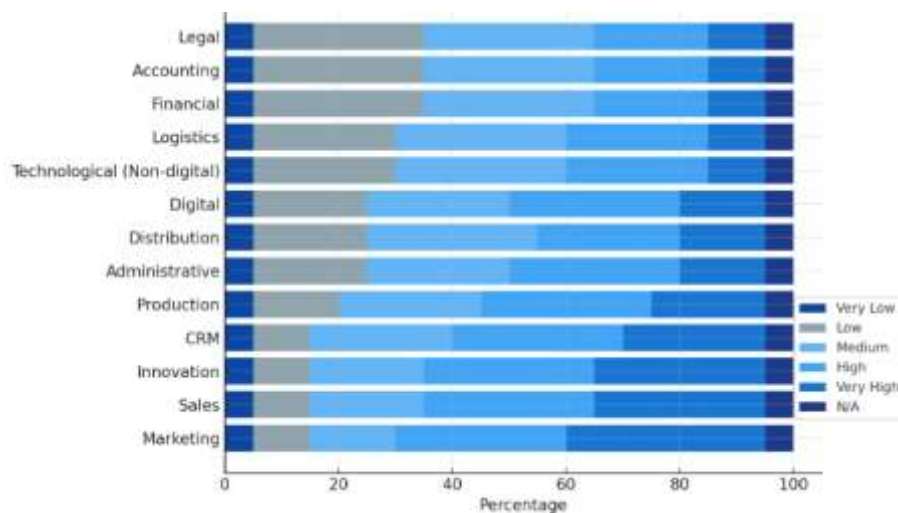
Source: Bavaria foundation (2017).

The business processes with the lowest level of knowledge on the part of SME entrepreneurs are Legal, Accounting and Financial, with medium knowledge are the Technological processes (with and without digital component) and Distribution, finally with the Administrative processes, Production, CMR, Innovation, Sales and Marketing present a higher level of knowledge. Failure in ventures is due to a mixture of causes, which can be external or internal, the former are related to the environment, these are usually unpredictable, while the latter have their origin in the company's own characteristics and these can be prevented in advance (Redacción Economía y Negocios, 2016). According to information provided by SuperSociedades, the lack of liquidity, among other factors, especially affects small and medium-sized companies, causing them to request reorganization processes before the entity (Portafolio, 2016). For SuperSociedades a company is liquidated or intervened when the creditors do not see the business as viable, do not accept the formula and make the decision not to continue commercial relations, if this occurs it goes from renewal to liquidation (Portafolio, 2016). In Colombia this failure in SMEs can be classified according to the study conducted by Fundación Bavaria in 2016, summarized in the following table.

Table 2. Classification of failures in Colombian SMEs.

Classification	Cause of Failure

|	
First	This is due to the financial issue, since the Colombian government and financial entities do not have effective strategies for entrepreneurs to access seed credits. 67% of these companies arise with their own resources.
Second	This includes the way in which the entrepreneurs assume the organization and management of the company. 31.8% of the projects fail due to deficient execution and planning.
Third	Marketing is one of the fundamental tools to make the product known, in this point the failures in the promotions, the market study and the weakness in the points of sale are the causes of the failure of the enterprise.
Fourth	The choice of human talent, the collaborators who participate in the venture must be committed and motivated by the business.
Fifth	The economic and political crisis was 21.1% of the cause of failure in entrepreneurship.
Sixth	Inconveniences and problems with suppliers and contractors are 16% of the reasons why SMEs tend to fail.
Seventh	The entry of competitors corresponds to 12.6% of the cases in the failure of an SME.
Eighth	The management of processes and raw materials, especially problems due to size, installed capacity, technical requirements, with 47% and, of course, inadequate management of raw materials with 33%.

Source: Made by author based on (Redacción Economía y Negocios, 2016).

The Bogota Business Climate Survey is a tool developed by the Bogota Chamber of Commerce to provide all stakeholders (authorities, entrepreneurs and the community) with information of interest, presenting an overview of the city's business activity. Based on this report, the size and sector distribution of the companies in Bogota is shown below.

Figure 2. Size and sector of the companies in Bogota.
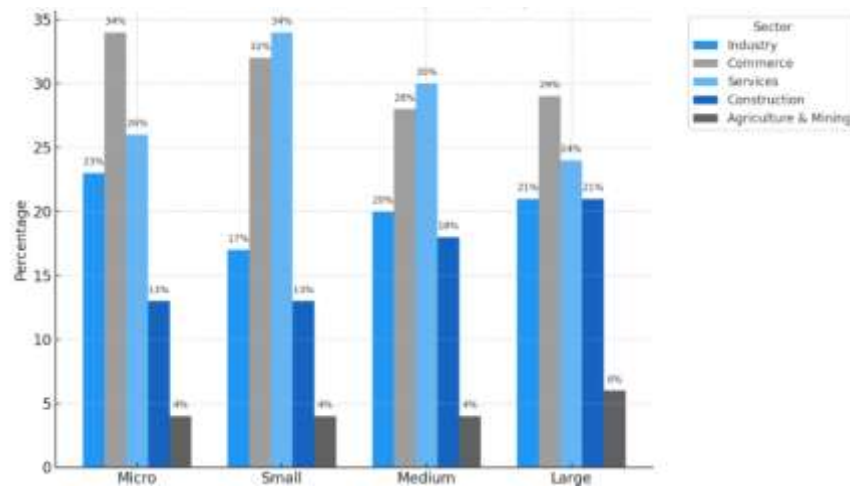
Source: Cámara de Comercio de Bogotá (2015).

Within the perceptions expressed by the entrepreneurs in the survey, the following figures show the obstacles they generally face in commercializing their products in the local and national market.

Figure 3. Obstacles to the distribution of products or services within the local market.
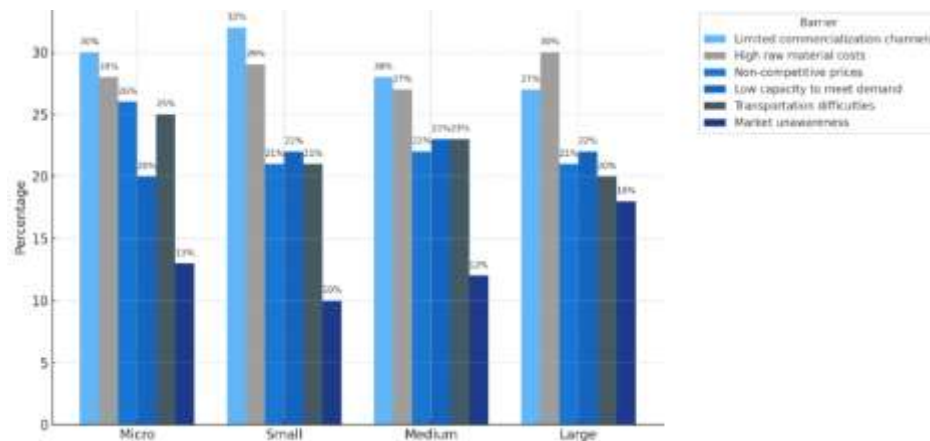
**Source:** Cámara de Comercio de Bogotá (2015).

Figure 4. Obstacles to the distribution of products or services within the domestic market.
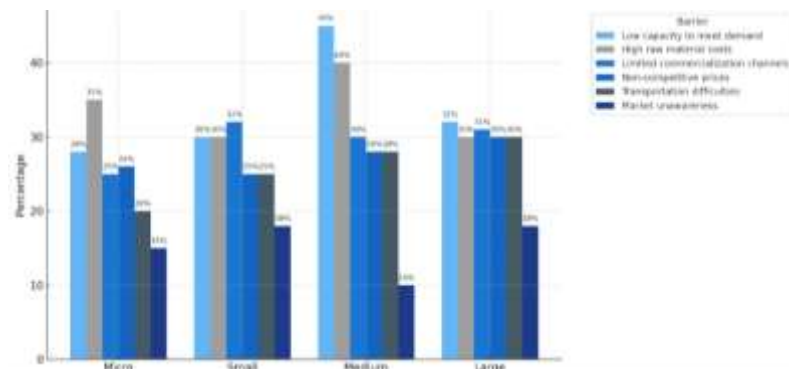
Source: Cámara de Comercio de Bogotá (2015)

Respect to financing, Colombian SMEs are financed mainly with their own resources, short-term liabilities and, to a lesser extent, long-term debt (Vera-Colina, Melgarejo Molina and Mora Riapira, 2014). The Gran Encuesta Pyme is a survey conducted every six months by the National Association of Financial Institutions (ANIF), with the support of the Inter-American Development Bank (IDB), Bancóldex and the Banco de la Republica in order to provide complete, updated and reliable statistical information on SMEs operating in the country, with a sample size of 3653 companies, of which 147 companies belong to the manufacturing sector in the city of Bogota. In its latest publication the large Regional SME Survey I 2019 presents the situation of these companies for the second half of 2018, where entrepreneurs determined the main problems faced by manufacturing SMEs in Bogota, represented in the following graph:

**Figure 5. Main problems faced by manufacturing SMEs in Bogota (%)**
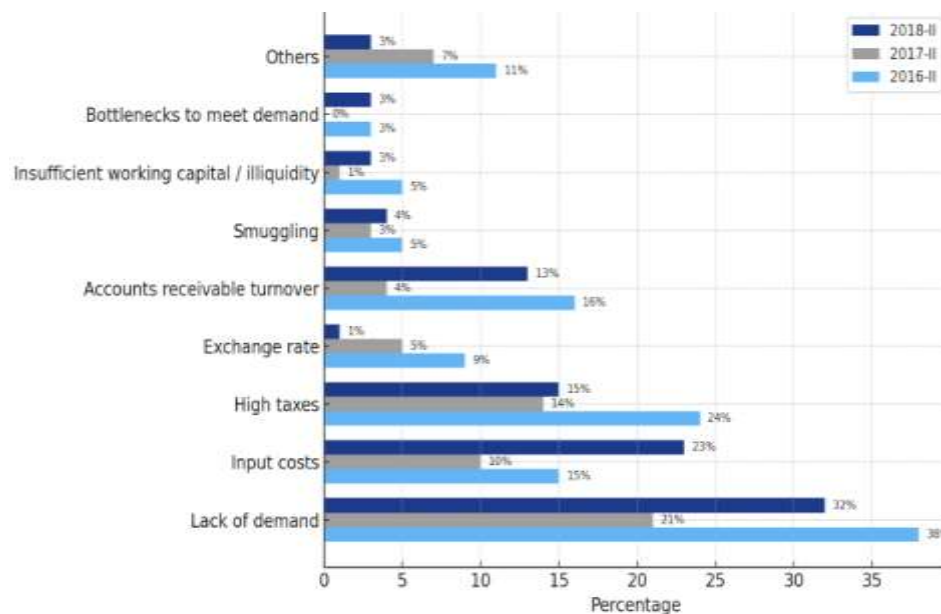
Source: Made by author based on National Association of Financial Institutions (2019).

According to the results of the Great Survey, 49% of those surveyed applied for credit with the financial system, where the approval rate was 46% for medium-term loans, 36% for long-term loans and 16% for short-term loans. The following figure shows the sales behavior for the second half of each year, from 2010 to 2018.

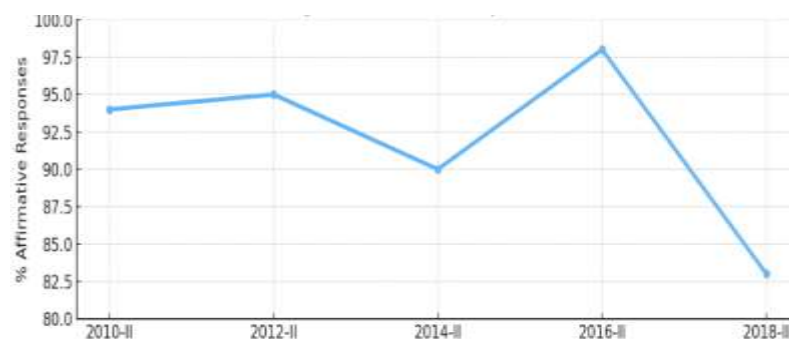**Figure 6. Sales (Balance of responses) (%)**
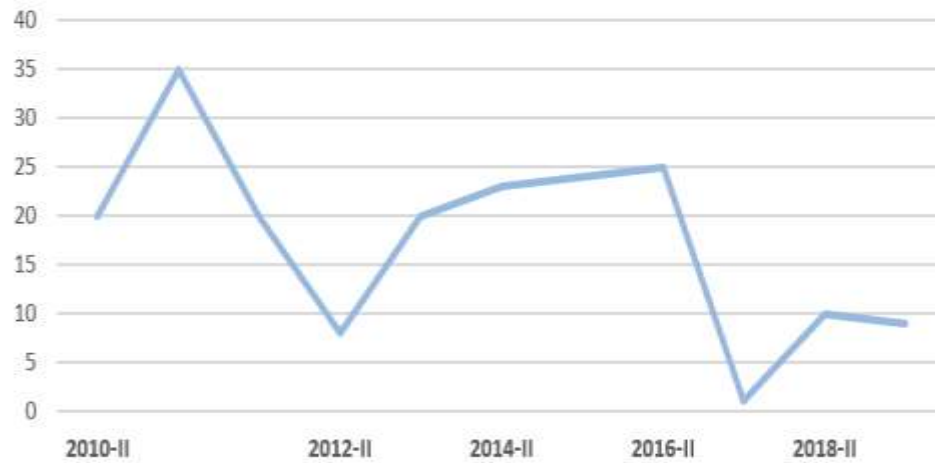
Source: Made by author based on National Association of Financial Institutions (2019).

Respect to financing, in the Great Survey, the entrepreneurs were asked if they have applied for credit with the financial system; the percentage of affirmative answers is shown in the following figure.

Figure 7. Credit application with the financial system (% of affirmative answers)
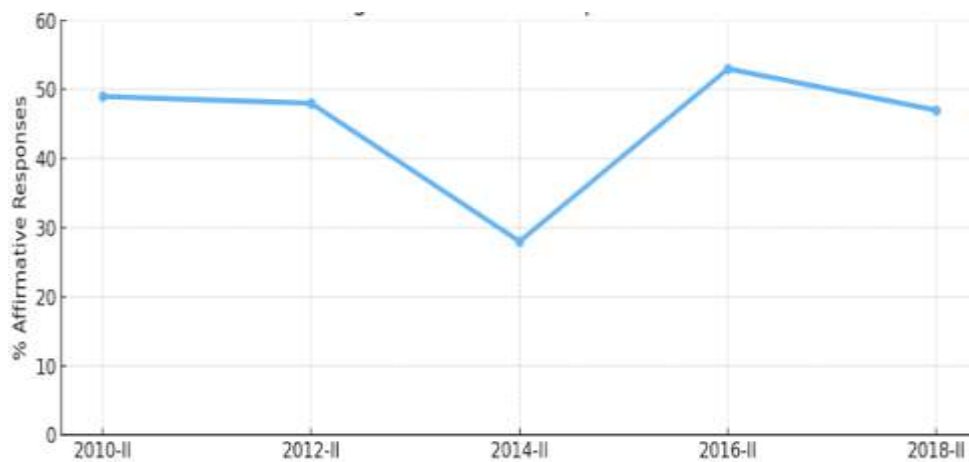
Source: Made by author based on National Association of Financial Institutions (2019).

For these credit applications at financial institutions, the percentage of approval of your credit request is presented in the following figure.
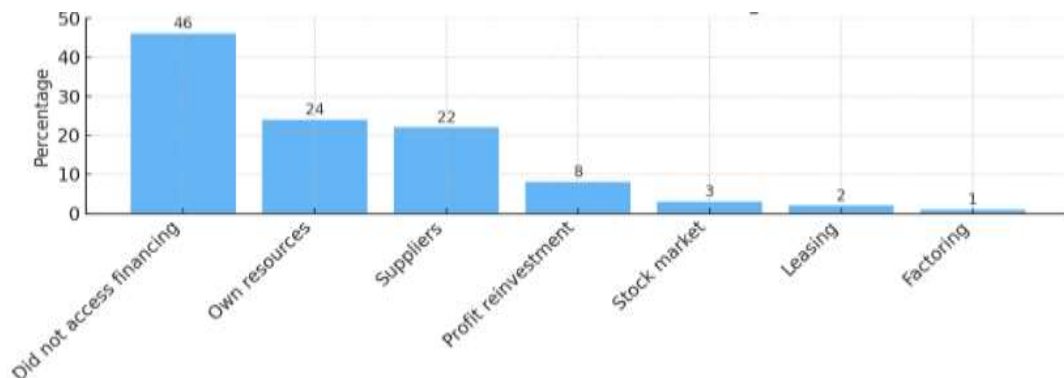
Figure 8. Approval of the credit requested (% of affirmative responses)

Source: Made by author based on National Association of Financial Institutions (2019).

Entrepreneurs also indicated other sources of financing used and this was recorded in the following figure.
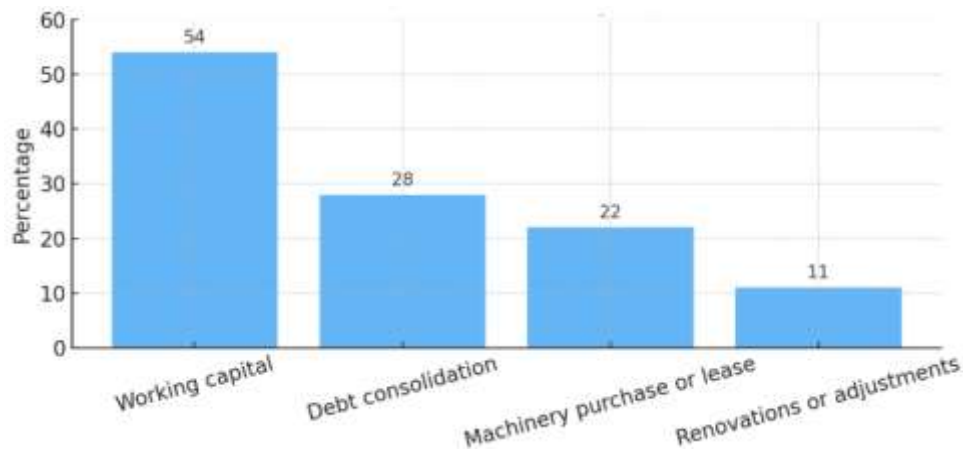
Figure 9. Alternative sources of financing to financial institutions.

Source: Made by author based on National Association of Financial Institutions (2019).

With the resources acquired, the entrepreneurs identify how they use this financing in the following figure.

Figure 10. Destination of resources requested from the financial system (% 2018 II).

Source: Made by author based on National Association of Financial Institutions (2019).

In relation to the implementation of improvement plans, the entrepreneurs determined the following actions recorded in the following figure.

Figure 11. Improvement actions first half of 2018 and 2019 (%).
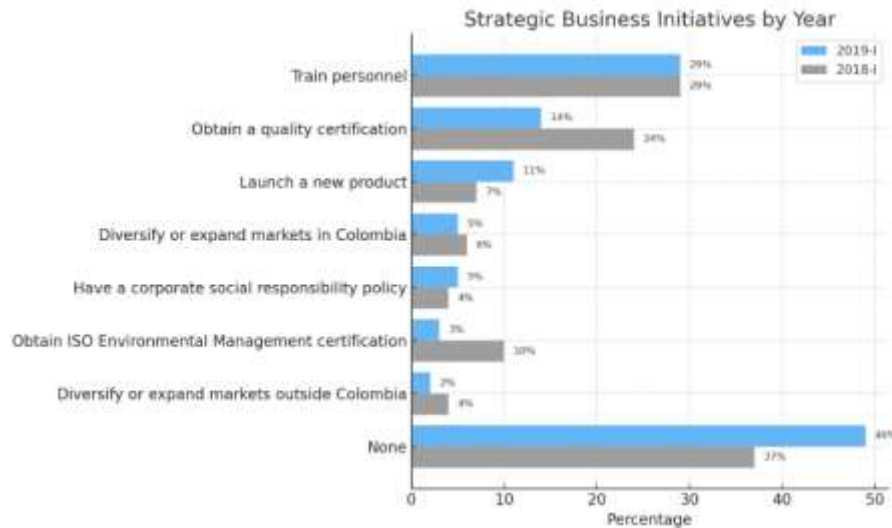
Source: Made by author based on National Association of Financial Institutions (2019).

The recommendations of the National Association of Financial Institutions expressed in an article in Dinero Magazine, state that owners and managers should learn to use credit to finance innovative activities and not be afraid to take on long-term debt (Dinero Magazine, 2016). According to the 2017 study on key issues for entrepreneurs Colombia issued by the Bavaria Foundation, 55% of the creations of a venture is due to an opportunity that has been found to satisfy a market need and 32% is the result of improving a solution that already exists (Bavaria Foundation, 2017).

Discussion

When trying to answer the question "Why do businesses fail? It is necessary to reflect on each of the problems that an entrepreneur faces and must overcome, according to the nature of his company. An SME of a manufacturing nature presents various challenges in terms of infrastructure, raw materials, labor, inventory management, distribution and marketing, etc., making its establishment and survival relatively more complex and special than with companies of a commercial and service nature. By contrasting the results of the research carried out on the studies of different entities on the general situation of SMEs in the manufacturing sector in the city of Bogota, according to the bibliography of the entities consulted, SMEs face a huge problem in terms of demand creation, access to new sources of financing, the lack of confidence of the financial system in meeting their needs, low levels of technology and innovation, as well as enduring different crises such as those experienced in recent years.

Based on the above, it is important to reflect on different aspects that can contribute to the sustainability, growth and development of manufacturing SMEs in Bogota, in this sense it is important that the Colombian state takes more into account this engine of the economy, given what was exposed in the theoretical framework, as these companies have become a broad generator of employment and industrial development, to which the state should contribute with tax rules and benefits. On the other hand, the financial system could contribute with new FinTech-type credit lines that reduce the credit approval process, enabling a better integration between industry, individuals and the financial sector. The findings found by consulting the extensive bibliography on the subject of SMEs allow us to broaden the perception of the problems they face, changing any preconceived idea that the only problem in this type of company is the lack of capital.

Conclusions

Among the most representative problems in manufacturing SMEs in the city of Bogota, according to what was stated by entrepreneurs in the Gran Encuesta Pyme Regional I 2019, is the lack of demand, corroborated by the decrease in sales of products throughout each period. The cost of the inputs needed to manufacture the products and the high taxes generated by the functioning and operation of the company are generating significant complications in the development of this type of company. Lack of liquidity or insufficient working capital is registered as a problem faced by these SMEs, but it is not one of the most important ones; it is at the bottom of the list. Credit applications to financial entities, despite having decreased over time, are the first financing option for SMEs; as optional sources of capitalization, entrepreneurs turn to their own (or family) resources, suppliers and reinvestment of profits.

There is still resistance on the part of the financial entities to the credit requests of the SMEs, a perception expressed by the businessmen, noticing a tendency in the decrease of the margin of approved credits. The lack of interest of businessmen in the implementation of improvement actions within the SMEs is notorious, causing a risk to their future survival, due to the lack of reaction and updating to the possible changes in the current market. Among the improvement actions implemented, the training of the SME's personnel stands out, together with obtaining a quality and/or environmental certification, either in its process or product. The resources requested from the financial sector are used in the first instance for working capital, followed by the consolidation and replacement of liabilities, and finally the purchase or lease (through a leasing system) of machinery. Any economic, political or social crisis directly and forcefully affects this type of enterprise. A clear example of this is the current Covid-19 pandemic, which has resulted in the partial or permanent closure of several companies of this nature. Based on the analysis of the study conducted on SMEs in Bogota, there is a great lack of knowledge in the area of finance, administration and marketing among entrepreneurs, thus incurring in wrong actions that threaten the useful life of the company. It is evident in the analysis of the study that entrepreneurs show a lack of resilience to the difficulties generated by the short term in terms of their working capital needs.

References

Alayón, C. L., Säfsten, K., & Johansson, G. (2022). Barriers and Enablers for the Adoption of Sustainable Manufacturing by Manufacturing SMEs. Sustainability (Switzerland), 14(4), 14042364. https://doi.org/10.3390/su14042364

ASOBANCARIA. (2017). ¿Qué es el score o puntaje de crédito y cuál es su importancia? Recuperado de http://www.asobancaria.com/sabermassermas/que-es-el-score-o-puntaje-de-credito-y-cual-es-su-importancia/ .

Avanesian, E., & Nino, J. (2020). Regional factors of sustainable development of small and medium-sized businesses. E3S Web of Conferences, 208, 2025. https://doi.org/10.1051/e3sconf/202020808003

Bancoldex. (2017). ¿Qué es pyme? Recuperado de https://www.bancoldex.com/Sobre-pymes/Que-es-Pyme.aspx.

BBVA. (2017). El scoring: el sistema informático que aprueba tu crédito. Recuperado de http://www.bbvacontuempresa.es/servicios-bancarios/el-scoring-el-sistema-informatico-que-aprueba-tu-credito.

Celaya Figueroa, R. y López Parra, M. E. (2004). ¿Cómo determinar su riesgo empresarial? Revista Escuela Administración de Negocios, 5, 70-75.

Chithra, M. (2023). Green management practices by small and medium enterprises. Sustainability, Green Management, and Performance of SMEs, 211-226. https://doi.org/10.1515/9783111170022-012

Confecámaras. (2016). Nacimiento y supervivencia de las empresas en Colombia. Recuperado de http://www.confecamaras.org.co/cooperacion-y-competitividad/analisis-economico.

DANE. (2016). Departamento Administrativo Nacional de Estadística. Recuperado de http://formularios.dane.gov.co/Anda_4_1/index.php/catalog/MICRODATOS.

Epping, K., & Zhang, H. (2018). A sustainable decision-making framework for transitioning to robotic welding for small and medium manufacturers. Sustainability (Switzerland), 10(10), 10103651. https://doi.org/10.3390/su10103651

Expertian Colombia S.A. (2017). Plan Perfil de Crédito. Recuperado de https://www.midatacredito.com/#!/perfilcredito.

Fatoki, O. (2019). Drivers and barriers to sustainability manufacturing practices by small and medium enterprises in South Africa. Academy of Entrepreneurship Journal, 25(3), 2025.

Fundación Bavaria. (2017). Estudio sobre temáticas claves para emprendedores colombianos. Bogotá, Colombia: Fundación Bavaria.

Garbie, I. (2016). Sustainability in small and medium-sized manufacturing enterprises: An empirical study. Journal of Engineering Research, 13(1), 42-57. https://doi.org/10.24200/tjer.vol13iss1pp42-57

Graczyk-Kucharska, M. (2022). Achieving Sustainable Manufacturing and Green Organizations: Preliminary Research on Green Competencies. Management and Production Engineering Review, 13(3), 118-126. https://doi.org/10.24425/mper.2022.142389

Liu, Y., Khan, A. J., Iqbal, J., Hameed, W. U., & Ahmed, T. (2023). Strategic management of natural resources through human, technological, and institutional resources: Sustainable curing the resource curse. Resources Policy, 86, 104233. https://doi.org/10.1016/j.resourpol.2023.104233

Natarajan, G., & Wyrick, D. (2012). Environmental sustainability in Manufacturing SMEs in West Texas. Annual International Conference of the American Society for Engineering Management 2012, ASEM 2012 - Agile Management: Embracing Change and Uncertainty in Engineering Management, 856-861.

Molina Castillo, J. (2012). Más de 34 empresas se registran cada hora en cámaras de comercio. Recuperado de https://www.larepublica.co/empresas/mas-de-34-empresas-se-registran-cada-hora-en-camaras-de-comercio-2025239.

Mora Rojas, R. L. (2016). La innovación y la gestión financiera, factores determinantes para el emprendimiento, la sostenibilidad y crecimiento de las pymes. Celaya, Guanajuato, México: Universidad de Celaya.

Portafolio (2016). Este año, menos empresas han entrado en reorganización o liquidación. Recuperado de Este año, menos empresas han entrado en reorganización o liquidación: http://www.portafolio.co/negocios/empresas/razones-por-las-que-mueren-las-empresas-501247.

Revista Dinero (2014). Una empresa en Colombia vive en promedio 12 años. Recuperado de http://www.dinero.com/empresas/articulo/mortalidad-empresas-colombia/200984.

Revista Dinero (2016). Las mil Pymes ganadoras. Dinero, 47.

Revista Dinero (2016). Mipymes generan alrededor del 67% del empleo en Colombia. Recuperado de Mipymes generan alrededor del 67% del empleo en Colombia: http://www.dinero.com/edicion-impresa/pymes/articulo/evolucion-y-situacion-actual-de-las-mipymes-en-colombia/222395.

Revista Dinero (2017). ¿Por qué fracasan las pymes en Colombia? Recuperado de http://www.dinero.com/economia/articulo/pymes-colombia/212958.

Saygili, E., Uye Akcan, E., & Ozturkoglu, Y. (2023). An Exploratory Analysis of Sustainability Indicators in Turkish Small- and Medium-Sized Industrial Enterprises. Sustainability (Switzerland), 15(3), 15032063. https://doi.org/10.3390/su15032063

Schmidt, F. C., Zanini, R. R., Korzenowski, A. L., Junior, R. S., & do Nascimento, K. B. X. (2018). Evaluation of sustainability practices in small and medium-sized manufacturing enterprises in Southern Brazil. Sustainability (Switzerland), 10(7), 10072460. https://doi.org/10.3390/su10072460

Seidel, R., Shahbazpour, M., & Oudshoorn, M. (2006). Implementation of sustainable manufacturing practices in SMEs – Case study of a New Zealand furniture manufacturer. Proceedings of the 13th CIRP International Conference on Life Cycle Engineering, LCE 2006, 249-254.

Singh, S., Olugu, E. U., & Fallahpour, A. (2014). Fuzzy-based sustainable manufacturing assessment model for SMEs. Clean Technologies and Environmental Policy, 16(5), 847-860. https://doi.org/10.1007/s10098-013-0676-5

Sohns, T. M., Aysolmaz, B., Figge, L., & Joshi, A. (2023). Green business process management for business sustainability: A case study of manufacturing small and medium-sized enterprises (SMEs) from Germany. Journal of Cleaner Production, 401, 136667. https://doi.org/10.1016/j.jclepro.2023.136667

SuperSociedades (2016). Superintendencia de Sociedades de Colombia. Recuperado de http://www.supersociedades.gov.co/.

Vera-Colina, M. A., Melgarejo Molina, Z. A. y Mora Riapira, E. H. (2014). Acceso a la financiación en Pymes colombianas: una mirada desde sus indicadores financieros. Innovar 24 (53), 149-160.

Yacob, P., Peter, D., & Chin, K. S. (2022). Sustainable business practices in manufacturing SMEs: The mediating effect of dynamic capabilities. International Social Science Journal, 72(243), 73-89. https://doi.org/10.1111/issj.12303

.