

Logistics strategies implemented in manufacturing microenterprises in the city of Barranquilla

Estrategias logísticas implementadas en microempresas manufactureras de la ciudad de Barranquilla Maria Puerto

DOI: <https://doi.org/10.17981/ijmsor.07.01.03>

Article - Reception Date: Enero 23 de 2023. Acceptance Date: Junio 19 de 2023. Publication Date: Julio 3 de 2023.

**Breiner Pertuz Molina¹, Maria Puerto Mendoza¹, Katherine Reales Correa¹,
Carlos Carmona Campo¹ y Luis Roberto Asencio Cristóbal²**

Universidad de la Costa (Colombia)¹ y Universidad de Guayaquil (Ecuador)²

bpertuz3@cuc.edu.co, mpuerto1@cuc.edu.co, kreales@cuc.edu.co, ccarmona@cuc.edu.co, luis.asencioc@ug.edu.ec

To reference this paper:

B. Pertuz, M. Puerto, K. Reales, C. Carmona y L. Asencio, "Logistics strategies implemented in manufacturing microenterprises in the city of Barranquilla", *IJMSOR*, vol. 8, no. 1, pp. 8–16, 2023. <https://doi.org/10.17981/ijmsor.07.01.03>

Abstract— This paper examines the logistics strategies implemented in manufacturing microenterprises in the city of Barranquilla. It analyzes how microenterprises in Barranquilla have implemented logistics strategies to improve their efficiency and competitiveness in the market. The importance of logistics in the companies is defined and how a good logistics management can improve their efficiency and profitability. Then, the problem addressed in the research is presented: the need to improve efficiency in the area of logistics in micro manufacturing companies in the city of Barranquilla. The methodology includes the review of specialized literature, interviews with experts on the subject and the application of surveys to micro manufacturing companies in Barranquilla. The results present the research findings, including the most common logistics strategies used by microenterprises in Barranquilla, such as the optimization of transportation routes, inventory management and the implementation of technology for monitoring logistics processes. It also describes the benefits that companies have obtained by implementing these strategies, such as reduced costs and delivery times, and improved customer satisfaction. Finally, the conclusions and recommendations of the research are presented, including the importance of implementing logistics strategies in microenterprises to improve their competitiveness in the market, and the need to continue researching and updating these strategies to adapt to changes in the business environment.

Keywords— Logistics; microenterprises; manufacturing; Barranquilla; efficiency; competitiveness

Resumen— Este trabajo examina las estrategias logísticas implementadas en las microempresas manufactureras de la ciudad de Barranquilla. Se analiza cómo las microempresas de Barranquilla han implementado estrategias logísticas para mejorar su eficiencia y competitividad en el mercado. Se define la importancia de la logística en las empresas y cómo una buena gestión logística puede mejorar su eficiencia y rentabilidad. Luego, se presenta el problema abordado en la investigación: la necesidad de mejorar la eficiencia en el área de logística en las microempresas manufactureras de la ciudad de Barranquilla. La metodología incluye la revisión de literatura especializada, entrevistas a expertos en el tema y la aplicación de encuestas a microempresas manufactureras de Barranquilla. Los resultados presentan los hallazgos de la investigación, incluyendo las estrategias logísticas más comunes utilizadas por las microempresas en Barranquilla, tales como la optimización de rutas de transporte, la gestión de inventarios y la implementación de tecnología para el monitoreo de los procesos logísticos. También se describen los beneficios que las empresas han obtenido al implementar estas estrategias, como la reducción de costos y tiempos de entrega, y la mejora en la satisfacción del cliente. Por último, se presentan las conclusiones y recomendaciones de la investigación, entre las que destacan la importancia de implantar estrategias logísticas en las microempresas para mejorar su competitividad en el mercado, y la necesidad de seguir investigando y actualizando estas estrategias para adaptarse a los cambios del entorno empresarial.

Palabras clave— Logística; microempresas; manufactura; Barranquilla; eficiencia; competitividad

I. INTRODUCTION

Logistics plays a fundamental role in the management of micro-manufacturing companies, since it directly influences their operational efficiency and competitiveness in the market. In this context, this paper focuses on analyzing the logistics strategies implemented in manufacturing microenterprises in the city of Barranquilla, evaluating their effectiveness and proposing recommendations to improve their logistics performance.

The general objective of this research is to investigate strategies, actions and activities to improve the processes of distribution channels in micro manufacturing companies in the city of Barranquilla. To achieve this general objective, the following specific objectives are proposed.

First, we seek to describe the logistics strategies implemented by microenterprises in the manufacturing sector in Barranquilla. This will involve analyzing the decisions made in terms of inventory management, transportation, supply chain coordination and adoption of information and communication technologies.

Secondly, the aim is to characterize the structure of the strategic distribution processes in the manufacturing microenterprises of Barranquilla. This involves examining the internal organization of the companies in relation to the distribution of their products, identifying the roles and responsibilities involved, and analyzing the interaction with suppliers and customers.

Finally, we seek to evaluate the strategies and structure of the distribution processes in micro manufacturing companies in Barranquilla. This involves analyzing the impact of the strategies implemented in terms of operational efficiency, costs, delivery times and customer satisfaction.

Achieving these objectives will provide a more complete understanding of logistics practices in Barranquilla's manufacturing microenterprises, which will allow us to identify areas for improvement and propose recommendations to strengthen their distribution processes.

II. MATERIALS AND METHODS

The research of this project is qualitative in nature, as it focuses on the collection and analysis of information in relation to the problem statement presented and the object of study of this research project.

Qualitative research refers to research that focuses on the collection and analysis of words (written or spoken) and textual data [15]. In this sense,

information from different sources will be collected and analyzed.

Thus, the present study will seek information in reliable sources of consultation, analyze, summarize and interpret it, in order to meet each of the objectives and solve the question given in the problem statement.

The units of analysis of this project are the manufacturing microenterprises located in the city of Barranquilla, Colombia. According to information from the Barranquilla Chamber of Commerce, in 2021, there were 17 627 microenterprises in Colombia, of which 1 868 are industrial.

The sources of information to be applied are the secondary ones, those that for their development took into account primary sources, such as research from reliable sources; this in relation to primary sources, surveys and interviews; oriented to secondary sources.

The information obtained through the research will be analyzed by means of a statistical summary of the information, determining which strategies are positive and which are negative, which will allow us to solve one of the objectives established in this project.

The data analysis process will be carried out taking into account the following steps:

- Data collection through research.
- Summary and organization of information.
- Analysis of the information obtained, both quantitative and qualitative data; the qualitative data will be analyzed by means of tools such as Excel, where tables and matrices will be created to identify in a concise manner. The qualitative information will be summarized and the respective conclusions will be drawn.

III. THEORETICAL FRAMEWORK

Business logistics is a topic of great importance in supply chain management, and has been the subject of study by several authors who have developed theories and models to improve the efficiency and profitability of companies. The book "*Business logistics/supply chain management*" presents a comprehensive approach to supply chain management, which includes the planning, organization, and control of logistics processes [1]. The book stresses the importance of coordination between the different actors in the supply chain to achieve efficient and cost-effective management.

This text has been a reference in the field of logistics and supply chain management. It emphasizes the importance of strategic planning in the logistics

management of companies [1]. In addition, the results presented in this publication emphasize the need for an efficient organization of resources and adequate supervision and control of the supply chain in order to achieve competitiveness.

In addition, the book *"Logistics & supply chain management"* presents a strategic approach to supply chain management, which includes identifying the company's objectives and goals, assessing the risks and opportunities of the business environment, and implementing strategies to achieve a competitive advantage. It emphasizes the importance of innovation and adaptation to change for effective and profitable management [3].

The importance of logistics management integration to ensure operational efficiency in companies should be considered [3]. An integrated logistics management allows the optimization of material, information and resource flows. In addition, he highlights the relevance of collaboration between the different actors in the supply chain to improve competitiveness and customer satisfaction. On the other hand, the book *"Supply chain management: a logistics perspective"* presents a practical approach to supply chain management, including the identification of critical processes, the evaluation of the costs and benefits of different strategies, and the implementation of measures to improve the efficiency and profitability of the company [4]. The importance of collaboration and communication between the various supply chain actors to achieve efficient and cost-effective management is highlighted [4].

It is necessary to consider how to approach the concept of supply chain management and its relationship with logistics [4]. Emphasizing the importance of efficient management of product, information and cash flows to gain a competitive advantage in the marketplace. Emphasis should also be placed on the need for coordinated management of logistics activities to improve efficiency and reduce costs.

The article *"Issues in supply chain management"* presents a strategic approach to supply chain management, which includes the identification of the company's objectives and goals, the assessment of risks and opportunities in the business environment, and the implementation of strategies to achieve competitive advantage [10]. Emphasizing the importance of integration and coordination among the various supply chain actors to achieve effective and profitable management.

This research explores common challenges and issues in supply chain management [10]. It points out that coordination and collaboration among supply chain actors are fundamental to face the challenges in logistics management. In addition, it highlights

the importance of visibility and transparency in information and material flows to improve efficiency and make informed decisions.

Another article, *"Defining supply chain management"* presents a definition of supply chain management, which includes the coordination and collaboration between the different actors in the supply chain to achieve efficient and profitable management [11]. It highlights the importance of planning and continuous evaluation of logistics processes to achieve efficient and cost-effective management.

These researchers propose a broad definition of supply chain management [11]. According to them, it involves coordination and collaboration between the different actors in the chain, as well as the integration of logistics processes to achieve a competitive advantage. They also stress the importance of a holistic and long-term vision in logistics management to meet customer needs and improve operational efficiency..

Logistics management in manufacturing microenterprises in Barranquilla is based on various theoretical foundations provided by recognized authors in the field. Next, the contributions of the selected authors will be analyzed and their relevant works will be cited to enrich the theoretical framework of this essay.

These contributions contribute significantly to the understanding of the concepts and fundamentals of logistics and supply chain management in manufacturing microenterprises. Their ideas and perspectives allow a better understanding of the approaches and strategies that can be applied in the specific context of Barranquilla. In conclusion, the review of specialized literature in the field of business logistics allows identifying different approaches and strategies to improve the efficiency and profitability of companies.

I. DISCUSSION

This section will analyze the results obtained from the interviews and data analysis. It will discuss the most common challenges faced by manufacturing microenterprises in terms of logistics, as well as the strategies implemented and their impact on efficiency and competitiveness. The opportunities for improvement identified will also be addressed and specific recommendations for optimizing logistics management in this sector will be proposed. It is important to analyze in detail the common challenges faced by this sector and the effects of the logistics strategies implemented on its operational efficiency and competitiveness.

The target population of this study is micro manufacturing firms in Barranquilla. These companies are characterized by their small size, their focus on the production of goods and their participation in the supply chain. Understanding the particularities of this type of companies is fundamental to identify the most appropriate logistics strategies for their context and needs.

First, the importance of efficient inventory management is highlighted. Optimal inventory management can minimize storage costs and ensure adequate product availability [9], optimal inventory management can minimize storage costs and ensure adequate product availability. Also, it should be considered to emphasize the importance of agile inventory management to meet demand in a timely manner and reduce associated costs [7].

Transportation optimization is another crucial aspect in the logistics management of manufacturing microenterprises. The selection of efficient routes and the use of appropriate transportation systems can reduce distribution costs and improve delivery times [2]. In addition, it can be noted how collaboration with external logistics service providers can be an effective strategy to overcome in-house resource constraints and improve operational efficiency [13].

Supply chain coordination is a determining factor for the logistical success of micro manufacturing enterprises. Close collaboration with suppliers and customers can facilitate the synchronization of material and information flows and minimize supply chain disruptions [5]. On the other hand, the implementation of demand management strategies should be proposed to improve planning and forecasting, which contributes to greater logistics efficiency [6].

Finally, it is important to consider the impact of information and communication technologies on the logistics management of micro-manufacturing companies. The adoption of integrated information systems can improve supply chain visibility, streamline communication, and facilitate decision making [14]. In addition, the potential of mobile technologies to improve efficiency in inventory management and shipment tracking is noteworthy [12].

In summary, logistics strategies implemented in manufacturing microenterprises in Barranquilla must address key challenges such as inventory management, transportation optimization, supply chain coordination, and the incorporation of information and communication technologies. By considering the perspectives of the various authors cited, a comprehensive view of approaches and strategies that can improve the operational efficiency and competitiveness of these companies in the specific context of Barranquilla can be obtained.

II. RESULTS

The external factors and problems that most affect the level of service in the routes traveled by the companies are shown in 7 causes: Deterioration of roads due to wear and tear with 27.7%, vehicular flow greater than the capacity of the road 16.0%, closures due to road intervention 7.0%, road affectation due to natural phenomena 6.6%, closures due to public order problems 6.2%, roadblocks and road controls 1.2%, toll payment time 1.1%. The manufacturing sector shows significant figures for distribution, with a time in days of 8.5 days for the supply process and 12.4 days for distribution.

TABLE 1. QUALITY INDEX IN THE INDUSTRIAL SECTOR 2018/2020.

Year	Ordering without damage	Complete orders in quantity	Orders with documentation perfect	On-time orders	Perfect order
2020	92.3%	95.2%	96.1%	91.8%	77.5%
2018	93.1%	95.4%	90.2%	90.2%	74.8%

Source. Own elaboration [16].

The biggest problems in the delivery of orders are transportation problems with 65.8%, followed by delivery problems caused by the customer and theft and criminal activities with 42.1% and 25.8% respectively, being the first three factors reported as problems.

The DNP in the “*National Logistics Survey*” shows that for small companies it is more costly to manage logistics processes and not all companies measure this variable, being the SMEs 96% of the companies in Colombia and are the most unfavorably impacted in terms of logistics benefits and their results, show disadvantages in terms of competitiveness according to the size of the company, is a factor identified as a weakness in the sector [16].

The information consulted organizes, identifies and reveals key aspects such as the economic situation, production, cost, investment and employment, among others, as factors that directly affect the growth of SMEs in the Atlantic.

Surveys reflect a growth in variables such as investment in machinery and equipment, safety, maintaining a rise in employment indicators and growth in production, directly proportional to its investment in machinery; these data still do not favorably affect the unemployment indicator.

In the period 2018 - 2020 increased in the intention of entrepreneurs to make investment, but the results were affected due to high production costs, limitations in financing and low investment in personnel training. Factors negatively affecting the growth rate.

The following is an analysis of the results obtained from the surveys.

TABLE 2. ACOPI INFORMATION REGISTRATION MATRIX 2019-2020.

Author	Report Title	Sector	Sample Size	Thematic
ACOPI	Business-performance-survey- fourth-quarter- 2019.	Small and medium-sized companies associated to ACOPI Nacional, belonging to the macro sectors of manufacturing, services and commerce.	324 companies - december 2019.	production, sales, employment, investment, human capital, foreign trade and economic outlook and expectations.
ACOPI	Business Performance Survey fourth quarter 2020.	Micro, Small and Medium Enterprises associated to ACOPI Nacional, belonging to the macro sectors of manufacturing, services and commerce.	325 Companies December 2020.	production, sales, employment, investment, human capital, foreign trade and economic outlook and expectations.
ACOPI	Performance Survey - Corporate -4to- 2021.	Micro, Small and Medium Enterprises associated to ACOPI Nacional, belonging to the macro sectors of manufacturing, services and commerce.	703 Companies December 2021.	production level, sales volume, investment level, profitability, market share, absenteeism, labor market, foreign trade, economic situation and expectations.
ACOPI	Business Performance Survey 3rd quarter 2022.		953 Companies September 2022.	production, sales, employment, investment, human capital, foreign trade and expectations.

Source. Own elaboration [17].

TABLE 3. ENL 2015-2020 INFORMATION REGISTRATION MATRIX

Author	Report Title	Sector	Sample Size	Thematic
DNP	National logistics survey. Year 2020	Large, medium, small and micro companies in the following economic sectors	3 383 companies Page 6 5th paragraph	<ul style="list-style-type: none"> • Logistical performance. • Regional logistics. • Tercerization. • Logistical perspective. • Foreign trade logistics.
DNP	National Logistics Survey Year 2018	Large, medium, small and micro companies in the following economic sectors	118 companies Page 10	<ul style="list-style-type: none"> • Logistical performance. • Outsourcing. • Foreign trade. • Outlook for logistics services and regional competitiveness.
DNP	National Logistics Survey) Year 2015	Large, medium-sized and small companies in the following economic sectors	768 companies	<ul style="list-style-type: none"> • Business logistics, • logistical performance. • 3 logistics outsourcing. • Logistics technology • foreign trade logistics. • Regional analysis 7 education and employment.
ANIF	The Great Regional SME Reading Survey I 2018 first semester	Small and medium-sized companies Industrial Trade Services	1 791 SME entrepreneurs in the macro sectors of industry, commerce and services,	<ul style="list-style-type: none"> • Sales. • The average annual growth of Sales. • Orders. • Industrial production. • Stocks. • investment in machinery and equipment. • Installed Capacity Utilization. • Costs. • Employment main problem of the industrial sector.
ANIF	The Great Regional SME Reading Survey 2019 first half of 2019	Small and medium-sized companies Industrial Trade Services	4 150 SME entrepreneurs in the macro sectors of industry, commerce and services,	<ul style="list-style-type: none"> • Sales • The average annual growth of Sales • Orders • Industrial production • Stocks • Investment in machinery and equipment. • Installed Capacity Utilization. • Costs. • Employment.

Source. Own elaboration [16].

TABLE 4. ANALYSIS OF THE RESULTS OBTAINED FROM THE SURVEYS.

Survey	Logistics Strategies	Weaknesses	Fortress
ACOPI Business-performance-survey-first-quarter-2019	Economic situation	X	
	Legal procedures	X	
	Production Costs	X	
	Financing	X	
	Exports	X	
ACOPI Business-performance-survey-fourth-quarter-2019	Investment (new machinery and equipment)		X
	Investment (personnel training)	X	
	Investment in new technologies	X	
	Financing	X	
National Survey logistics) Year 2015	Quality in infrastructure Infrastructure		X
	Infrastructure (communications)		X
	Security		X
	Night / urban logistics	X	
	Load restrictions	X	
	Logistics costs (mobilization of goods)	X	
	Personnel training	X	
	Transportation logistics strategy	X	
	(loose cargo)		
Survey National logistics) Year 2020	Personnel training	X	
	Financial	X	
Survey Rhythm corporate 2020 - 2021	Anti-corruption security	X	
	Investment in Machinery or expansion of production capacity	X	
	Input and raw material costs	X	

Source. Own elaboration.

During the periods 2018, 2019, 2020, 2021 the surveys classify the aspects of the logistics processes that directly impact the results of the companies. The weaknesses of the logistics process impact the final results, with negative financial, commercial and social impact; they represent 78.26% of the weaknesses of the manufacturing companies vs. 21.7% of the identified strengths.

One of the major weaknesses is the low investment in personnel training; only 4% of the logistics personnel are professionals with postgraduate degrees, 33% are undergraduate professionals, 42% are technicians or technologists, and 22% are high school graduates. Operational logistics tasks have a high level of high school graduates, but despite being operational tasks, the company needs to improve its academic level in order to increase productivity, skills and personal abilities.

Financial requests to banks represent a weakness due to the high rate of loans that were not approved for the requested amount or were denied in their entirety, the drawbacks to financial access limit its expansion and ability to access international markets. The main sources of financing are reinvestment

of profits, followed by bank loans, microcredit, and suppliers.

72% of the companies report not having an export strategy, which makes their internationalization process difficult. Lack of knowledge of legal procedures is related as a weakness on the part of the entrepreneurs, hindering the possibilities of entering the international market.

High transportation logistics costs are reported at the national level as one of the highest factors in comparison with other regions. The Caribbean region reports having an index above the national level, directly impacting the final value of the sale, largely due to little or no transportation logistics strategy, deficient logistics structure in the measurement of loading and unloading times of merchandise and little or no use of logistics operators.

The data retrieved in the Acopi Survey-of-Business-Performance shows the growth in the production index represents a growth of 23 P. P during 2019 above the other reported variables, a result directly related to the increase in the investment made in New machinery and equipment.

A. Internal and external factors with direct impact on the logistics of manufacturing companies

The internal or external factors organize the variables of the following surveys “Large SME survey regional reading”, “Determinants of the exporting activity of manufacturing SMEs”, “National Logistics Survey”, “Business rhythm ERE 2021”, which corresponds 30.76% to internal factors and 65.38% to external factors; the information recovered identifies a good strategy used by the SMEs to correctly anticipate the inventory levels by regulating their production according to the demand.

The low demand derived from the economic situation added to the costs of raw material inputs generated a deterioration in the income and perception of stability of the SMEs. The optimal development of production depends on their investment in machinery, a variable that remained unchanged and stable, although still below the historical average. Without investment in machinery, there is no growth in the production levels of the companies.

Companies by size were affected, small companies by high taxes while medium-sized companies were affected by the lack of demand. Positively, an increase in hiring is reflected by expanding the personnel plant (20% in 2017 vs. 17% in 2016). As deficiencies are related the high taxes: (26% 2017 vs. 21% 2016) followed by the lack of demand and high input costs, which directly affect the industrial sector.

The behavior with respect to machinery investment corresponds to an internal factor of the SMEs, during the second half of 2017 a decrease in input costs of the companies was reported, which contrasts with the weakness in demand which implies deterioration. Distribution logistics costs focused on logistics strategy represent an important factor in the cost measurement of companies, due to the strategies in each of its phases distribution channels, transportation, storage and delivery to the customer, which mostly do not have infrastructure and logistics strategies for loading or unloading. Ignoring the benefits provided by logistics operators, such as reduced loading and unloading times, control of inspection time, documentary control of goods and real-time monitoring, generating cost reduction and time optimization in each of the processes.

The improvement actions reported correspond mainly to training personnel during 2018, evidencing the greater commitment on the part of medium-sized companies in improving their processes, it is important to reinforce the commitment of small companies in improving and optimizing their processes, which allows an increase in their production indicators and business growth

A high number of companies reporting no improvement activities is directly related to the results of companies reporting unchanged or negative figures in their production indicators. The survey Determinants of the export activity of manufacturing SMEs evidences increases in the export activity of SMEs

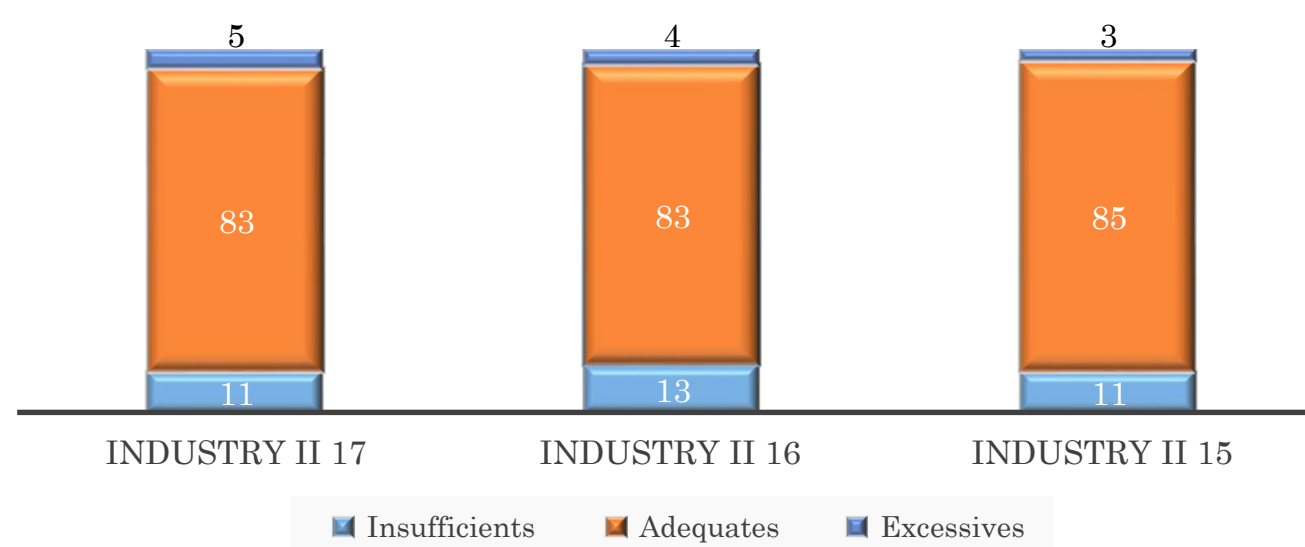


Fig. 1. Stocks.

Source. Own elaboration with information taken from the great Pyme regional reading survey.

over large companies by 3.2%, period 2013-2015, due to the decline in export of large companies, given to the activities of manufacturing tires and rubber tires; manufacture of other types of equipment, transport and manufacture of plastics in primary forms, activities that do not present export data for 2015, during the period 2015-2016 presented declines, then in 2016 and 2017 SMEs accounted for about 50% of exports of large companies.

The Anif 2019 survey explains that 43% of SMEs in Colombia state that they are not interested in trading abroad, because their main interest is the domestic market and their economic activity does not include export activity, internal factors such as high logistics costs of distribution and transportation, acquisition of machinery, expansion of production capacity and production costs directly affect the levels of competitiveness of the company and directly to its export activity or market expansion objective.

According to the results of the research presented by IDB-ATN/ME in 2005 [8], SMEs (small and medium-sized enterprises) face several challenges to stay in the market and compete with large corporations. Some of these challenges are instability in the rules of the game of private economic activity, macroeconomic stability, scarcity, cost of credit, and the need for greater innovation. In addition, SMEs have to overcome barriers to access international markets, such as the absence of an export culture, uncertainty about the supply of raw materials, and the lack of preparation to comply with the technical requirements established in the agreements. These barriers limit the growth and development potential of SMEs, which are an important driver of the economy and employment in many countries.

The information collected corresponds to previous periods 2018 -2019- 2020 -2021, it has been complemented with recent facts of the current behavior of the country. Factors such as the dismantling of fuel subsidies and the increase in taxes on SMEs will continue to deepen the problem of distribution costs in Colombia.

III. CONCLUSIONS

The research and analysis carried out with the manufacturing SMEs of the Atlántico, allowed to evidence through the information recovered in the surveys, the internal and external factors that directly affect the internationalization process; identifying the internal factors as the main weakness due to their high level of incidence and negative impact that prevents the initiation, development and growth in the international market.

The behavior of the surveys reflects slow growth, investment, low personnel hiring and investment in personnel training, which do not contribute positive

value to the business development of the manufacturing sector. It is important to evaluate the capacity of association in clusters on a larger scale within SMEs of the same industrial activity, which allows focusing production and distribution, covering and expanding new markets, together with an innovative and competitive administrative and managerial structure that allows expanding the international vision and entering new markets abroad.

The logistics strategies used by manufacturing SMEs in the Atlantic differ according to their economic activity and geographic location. The timeline shows market research and evaluation activities; these activities include factors such as cost, sales and production studies, which represent the fundamental bases for entering the international market.

The related cost reduction strategy allows to improve the production and distribution costs, increasing revenues for the companies. The identification of strengths and weaknesses mentioned as an initial activity in the chronogram provides a clear picture of the existing tools (strengths) to achieve the internationalization process, and also allows structuring the improvement plan, strategies to overcome the difficulties, weaknesses and junctures that may arise during the production process and entry into the international market.

The concern of businessmen also corresponds to the state support and tariff incentives required by the state to strengthen the manufacturing arm in its export activities, joining forces in the opening of new markets, strengthening the regional trade image and frequent agreements (agreements with new markets), improvement in road infrastructure and public safety correspond to the necessary support requested by businessmen.

Innovation strategies, product quality optimization and competitiveness based on the previous international market study are directly linked to the internationalization process and the requirements of the selected market.

Proposed activities:

- Reuse the space destined for storage, applying underutilization, e.g., reevaluation due to poor planning, misuse of space generates leasing and maintenance costs of the space.
- Warehouse technology tools such as WMS (Warehouse Management System). Centralize inventory control processes and accuracy in stock information, the WMS can be applied independently, it is optimized by unifying with the company's ERP (enterprise resource planning).

- Establish an activity plan for the traceability of processes: the process chain is made visible and the product is traced from its state as raw material, production, finished product and storage) to avoid product expiration or losses during the processes.
- It is important to continue with the training of human talent, as the main element in the improvement of processes and the increase of production rates.

This alternative consists of reducing costs by minimizing storage volume. The supply models are established according to the type of activity of the company. The JIT model (just in time), consists of including the inventory (raw material, in process or finished) in the process just at the moment they are used, it demands the participation of all the departments involved in the process chain. Successfully applied in large companies worldwide.

This JIT model is recommended adjusted to the realities of the context of the Atlantic region according to the economic activity of each company, applying the contexts of the market in Barranquilla, taking into account frequent situations such as road blockages due to stoppages or landslides, in the case of land transport, or restrictions in the navigability of the river due to sedimentation and draft activities in the access channel such as the Magdalena River, regarding river and maritime transport.

REFERENCES

- [1] R. H. Ballou, *Business logistics/supply chain management: Planning, organizing, and controlling the supply chain*. Pearson Education, 2004.
- [2] Y. A. Bolumole, D. J. Closs & M. G. Enz, "Supply chain flexibility, adaptability, and alignment: Empirical evidence from the food industry", *Omega*, vol. 35, no. 3, pp. 289–305, 2007. <https://doi.org/10.1108/IJOPM-04-2016-0173>
- [3] M. Christopher, *Logistics & supply chain management*. Pearson UK, 2016.
- [4] J. J. Coyle, C. J. Langley Jr, B. J. Gibson, R. A. Novack & E. J. Bardi, *Supply chain management: a logistics perspective*. Cengage Learning, 2016.
- [5] I. J. Chen, A. Paulraj & A. A. Lado, "Strategic purchasing, supply management, and firm performance," *J. Oper. Manag.*, vol. 31, no. 5, pp. 359–360, 2013. <https://doi.org/10.1016/j.jom.2004.06.002>
- [6] M. Christopher & D. R. Towill, "Developing market specific supply chain strategies", *Int. J. Logist. Manag.*, vol. 13, no. 1, pp. 1–14, 2002. <https://doi.org/10.1108/09574090210806324>
- [7] J. Fernie & L. Sparks, *Logistics and retail management: Emerging issues and new challenges in the retail supply chain*. Kogan Page Publisher, 2009.
- [8] D., R. Garzón, "Programa sobre operaciones colectivas entre empresas", presentado al *Seminario Iberoamericano sobre Integración Empresarial y Cooperativa: cooperar y exportar para ganar*, BID-ATN/ME, CA, VE, 2005.
- [9] V. Kumar & N. Suresh, "Lean manufacturing: Implementation strategies and evaluation of cost savings", *J. Oper. Manag.*, vol. 27, no. 2, pp. 87–99, 2009.
- [10] A. M. Lambert & M. C. Cooper, "Issues in supply chain management", *Ind. Mark. Manag.*, vol. 29, no. 1, pp. 65–83, 2000. [http://dx.doi.org/10.1016/S0019-8501\(99\)00113-3](http://dx.doi.org/10.1016/S0019-8501(99)00113-3)
- [11] J. T. Mentzer, W. DeWitt, J. S. Keebler, S. Min, N. W. Nix, C. D. Smith & Z. G. Zacharia, "Defining supply chain management", *J. Bus. Logist.*, vol. 22, no. 2, pp. 1–25, 2001. <https://doi.org/10.1002/j.2158-1592.2001.tb00001.x>
- [12] A. N. Mishra, S. Dash & S. Sahoo, "Mobile commerce in supply chain management: A systematic literature review", *Comput. Hum. Behav.*, vol. 75, pp. 322–335, 2017.
- [13] S. M. Rutner, A. Y Akbarov & G. V. Merkuryeva, "The choice of logistics service provider in the context of supply chain management", *Int. J. Manag. Cases*, vol. 14, no. 4, pp. 74–86, 2012.
- [14] P. M. Swatman, P. A. Swatman, M. G. Stevenson & T. S. Teo, "The adoption and diffusion of the internet in Singapore logistics industry", *Inf. Syst. Front.*, vol. 10, no. 1, pp. 103–117, 2008.
- [15] C. Ortega, What is research methodology? *QuestionPro*, 2021. Available: <https://www.questionpro.com/blog/es/metodologia-de-la-investigacion/>
- [16] Mintransporte. *Encuesta Nacional Logística*, 2018. <https://plc.mintransporte.gov.co/Publicaciones/Encuesta-Nacional-Log%C3%ADstica>
- [17] ACOPI. *Encuesta-de-desempeño-empresarial*, 2019-2020. <https://www.acopi.org.co/encuesta-de-desempeno-empresarial/>