SCIENTIFIC CULTURE
www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 4, (2026), pp. 9090-9096
Open Access. Online & Print

DOI: 10.5281/zenodo.12426894

CHARACTERIZATION OF COSTING SYSTEMS IN FOOTWEAR COMPANIES IN BUCARAMANGA (COLOMBIA)

[1*]Luz Helena Mendoza Castro, [2]Jorge Armando Carreño Bernal , [3]Javier Mauricio Mendoza Paredes, [4]Gerson Alexander Quijano Torres

[1]Contadora Pública – Magíster en Finanzas Email: lmendoza@correo.uts.edu.co Unidades Tecnológicas de Santander Colombia*
[2]Ingeniero Industrial – Magister en Dirección y Administración de Empresas Email: jarmandocarreno@correo.uts.edu.co Unidades Tecnológicas de Santander Colombia
[3]Administrador de Empresas – Magíster en Administración, Email: jmendoza@correo.uts.edu.co Unidades Tecnológicas de Santander Colombia
[4]Contador Público – Magíster en Derecho Tributario Email: gaquijano@correo.uts.edu.co Unidades Tecnológicas de Santander Colombia

Received: **15/11/2025**
Accepted: **08/03/2026**

Corresponding Author: Luz Helena Mendoza Castro (lmendoza@correo.uts.edu.co)

ABSTRACT
This study aimed to analyze the costing systems used by footwear manufacturing companies in the San Francisco neighborhood of Bucaramanga, in order to understand their processes and how they influence profitability. An exploratory and descriptive study was conducted using a mixed-methods approach, combining surveys to obtain quantitative data and literature reviews and interviews for a deeper qualitative analysis. Inductive and deductive methods were applied to generalize the characteristics of the costing systems and validate their benefits. Out of 550 registered companies in Bucaramanga, 210 footwear manufacturers were surveyed. The results showed that these companies apply costing systems based on direct and indirect costs; however, they do so inconsistently. This suggests that a better understanding and standardization of these systems could improve profitability and competitiveness in the sector. Therefore, it is recommended to implement a plan that includes a cost logbook, which would facilitate more efficient business management and highlight the benefits of adopting a preferred costing system.

Keywords: *Costing systems; profitability; footwear industry; cost management; small and medium enterprises (SMEs); direct and indirect costs; business efficiency; Colombia.*

1. INTRODUCCIÓN

The footwear industry in Bucaramanga has grown a lot, but companies still have problems with cost management. Although research has already been done on how costing systems impact decisions and profitability, shoe manufacturers in San Francisco lack standardization and knowledge in this area, which affects their competitiveness. Therefore, it is crucial to investigate and characterize these systems in order to propose improvements (Prada & Lagos, 2025).

This study used a mixed methodology (quantitative and qualitative) to thoroughly analyze the sector's cost systems. Manufacturer surveys, literature reviews, and interviews were conducted to understand both current practices and the qualitative characteristics of the systems used.

The approach was descriptive and exploratory, which allowed the identification of the different cost systems and their effect on profitability. The research culminated in a plan that demonstrates the benefits of implementing an ideal costing system. Not only does this work bring academic knowledge, but it also offers a practical foundation for shoe companies in San Francisco.

1. FRAME OF REFERENCE

1. Historical aspects of footwear

Beyond being a fashion or luxury item, footwear is a fundamental need. Its main function is to protect the feet from the environment, serving as a safe connection with the ground and shelter from its adversities. Since the beginning of humanity, footwear has been essential. Its initial protective function has evolved enormously, becoming today also a status symbol, fashion, and a manifestation of advanced technologies. The oldest evidence of footwear dates back about 10,000 years. They were simple and practical shoes, made with natural materials such as leathers and fibers, and their only function was to protect the feet from difficult terrain and bad weather.

With the progress of societies, footwear design also evolved, adapting to the needs and resources of each culture. Eventually, what began as a basic need was transformed, acquiring higher aspirations and becoming an object of desire. In ancient times, footwear ceased to be just a garment and became a key symbol of status and power in civilizations such as the Egyptian, Greek and Roman, where every everyday object had a meaning. In Egypt, papyrus and leather sandals were common, but pharaohs wore lavish versions with gold and gems. In Greece, leather sandals with straps were popular, while in Rome, military boots (caligae) identified soldiers. In those times, shoe design was not only functional; it also served to mark social differences. Those in higher positions wore shoes made with more luxurious materials and designs, which clearly separated the different classes.

During the Middle Ages, footwear became more complex and elegant, influenced by religion and the feudal system. Boots and closed-toe shoes predominated, offering greater protection due to the weather. The footwear of the nobility and royalty was very elaborate and ornate, contrasting with the simpler and more functional shoes of the peasants. During this time, tanning and sewing techniques improved, resulting in more durable and comfortable shoes; footwear was quite varied: there were sandals, clogs, boots, and the first leggings with long, pointed soles. Men and women wore both leather slipper-type shoes and high- and low-top boots.

The Renaissance brought great innovation in shoe design. With the renewed interest in the classic and the desire to embellish, the shoes were transformed into works of art. Chopines, exaggerated platforms popular in Venice, became a clear symbol of status and wealth. Footwear became bolder in its shapes and decorations. The aristocracy began to use luxurious materials such as velvet, silk and elaborate embroidery; the appearance of heels in women's footwear marked a before and after, transforming shoes into a clear expression of design, elegance and fashion.

The Industrial Revolution radically transformed shoe production. The advent of machinery and mass manufacturing made shoes much more accessible and easier to produce, leaving much of the craftsmanship behind. Materials such as vulcanized rubber revolutionized the industry, allowing the creation of waterproof and sports footwear that prioritized practicality and resistance for various activities.

The twentieth century was a time of great diversification in footwear. Fashion became central, and the shoes reflected the trends of each decade: from the glamorous heels of the 20s to the bold designs of the 60s and 70s, to the functional ones of World War II. Footwear designers gained recognition, and luxury brands elevated the status of the shoe. The mix of fashion, function and technology continued to drive innovation, turning the shoes into a powerful expression of style and a clear reflection of each season's trends.

Today, the commitment to excellence involves integrating advanced technology into design and production. This allows us to not only meet the highest standards, but also pursue sustainability to minimize environmental impact (Romero, 2024). Below are some shoes used during the story.

Figure 1 Shoes through history

World's Oldest Shoe

Egyptian sandals

Medieval shoe

Renaissance shoes

Industrial Revolution Shoes

1920's shoes

1950s Shoes

	1970s Shoes

Note: taken from Regina Romero

1. The footwear sector in Colombia

According to the Colombian Association of Footwear, Leather and Manufactured Industries (Acicam), on average each Colombian buys two pairs of shoes a year, varying however due to the segmentation of markets and the type of consumer and the time of year, for example in the school period or the periods of endowments.

In contrast to the formal growth of this trade, 25% of the market is smuggled and informal, offering products at low prices since they do not comply with tax and customs regulations, which becomes unfair competition for formalized manufacturers and marketers (America Malls & Retail, 2024); Even so, the Colombian footwear market is robust and diversified. This is manifested in a very expensive Colombian production due to tax burdens, the labor factor and access to inputs, if a rise in tariffs with the United States as the main export market is added to this, it would significantly affect marketing, being devastating and not competitive (Arias, 2025).

The introduction of footwear to Colombia arose at the beginning of the twentieth century, at that time the vast majority of the rural population wore shoes only on Sundays to walk around the town or go to mass. Between 1950 and 1980, with the displacement of peasants to the city, the demand for footwear increased, which led to the strengthening of the leather industry (Sarmiento, Rengifo, & Camelo, 2022). In the decade of the 80s, the production of leather goods was reached and the demand for tennis increased; currently, this industry generates around 80,000 managerial jobs and 250,000 indirect jobs, but it continues to face declines due to cheap exports from China.

1. Inputs in the footwear sector

Among the materials used for the manufacture of footwear are both cowhide and goat leather, synthetic material such as PVC and microfibers, as well as cotton, polyester and nylon. These materials are characterized by resistance, flexibility and aesthetics (Fabricación Industrial , 2025). For the soles, the use of rubber, polyurethane and PVC is recurrent, materials that provide resistance to wear, cushioning and adhesion. And in terms of accessories and finishes, the laces, buckles, zippers and some metal or plastic ornaments stand out, these elements being part of the aesthetic and commercial value of the product (Kone, 2024).

In the footwear sector, these inputs range from traditional raw materials such as leather to advanced and sustainable synthetic materials. Its correct selection and application is influenced by quality, cost and competitiveness as a final product. Renata and Síntigo (2025) agree on this by mentioning that leather, synthetic materials and adhesives are fundamental components in the manufacture of footwear. In addition, the modern approach of this industry integrates sustainability and performance in the selection of materials, which has an impact on competitiveness (Acacio & Rangel, 2025).

1. Costing systems

Among the most frequent costing systems are:

Work order costs: When products or services are customized or unique. Costs are allocated directly to each specific order or project, adding up material, labor, and indirect costs. It is common in sectors such as construction, printing or consulting, where each project has a unique style. The exact cost of each individual order can be known with this method, making it easier to control finance in custom activities (Delgado, 2023).

Process costs: Industries that produce standardized goods en masse and continuously, such as food or chemical factories, use process costing. Each department or stage of the production process receives a cost and is divided among all the units produced during a given period of time. This system is ideal for mass production where products are uniform and allows the average unit cost of the units produced to be calculated (Requelme, 2023).

Standard Costs: Standard costing uses predetermined or estimated material, labor, and indirect costs based on efficiency expectations or ideal production conditions. The actual costs are then compared to the standards and differences or variations are looked for to find potential inefficiencies. This system facilitates corrective decision-making when needed and helps businesses plan and control costs (Camones, 2023).

ABC Costs: Activity-based costing (ABC) allocates indirect costs to products or services based on what actually generates those costs. This system allocates costs more accurately by identifying key activities within the production process and the resources they consume. It is ideal for companies with complex processes and many indirect costs because it offers a detailed view of how resources are distributed within the company (Morales, 2021).

1. METHOD

This research was carried out with an exploratory and descriptive methodology and a mixed approach; the costing systems and the footwear

sector of the city of Bucaramanga were inquired about. It is a mixed research because survey (quantitative information) and interview (qualitative information) techniques were applied to a representative sample to present clear results. With the information obtained in the surveys and interviews, an analysis was carried out using spreadsheets, graphs and tables, to finally present the results of the companies under study.

The population is made up of 550 companies with economic activity of manufacturing footwear, leather and leather in the city of Bucaramanga, of which we worked with the San Francisco area and a sample of 210 manufacturers to be studied.

From the above, it can be observed that both primary and secondary sources were used, the latter through articles, books, reports and databases, that is, information that has already been compiled and analyzed by others.

1. RESULTS AND ANALYSIS

Once the surveys were tabulated, it was found that 39% of them have been in the market for between 5 and 10 years, 43% for more than 10 and 20 years are companies that are already positioned in the footwear sector, thus representing a great business maturity, and the rest less than 5 years in operation. In general, in a developing sector, companies with moderate experience are the most predominant.

In terms of the size of the company, most of these companies are small in size, which are made up of between 31 and 100 employees, thus representing 52% of the sector, which indicates that most are companies with a small organizational structure but large enough to generate employment and remain competitive. Micro-enterprises, which have between 0 and 30 employees, account for 25%, which shows that although there are many companies in this sector, they do not have control of the market. This group, while sizable, may represent companies in their early years or that choose to maintain small-scale operations.

19% of the total are medium-sized companies with 101-500 employees. Although they are not common, their presence indicates a transformation in the sector towards more complete structures, with greater productive capacity and potentially greater market penetration. Finally, only 4% of large footwear companies have more than 500 employees, indicating that smaller-scale companies dominate the sector without many large corporations.Regarding the legal constitution, it is evident that the legal constitution of footwear manufacturers in the San Francisco sector, most of them reaches 91%, which operate as natural persons, which indicates that this sector is mainly composed of small individual entrepreneurs. Only 9% of companies are legal entities. This indicates that there are fewer companies formally incorporated or with more complex legal structures.

The study on the knowledge of the distinction between cost and expense among shoe manufacturers in the San Francisco, Bucaramanga sector, revealed that 81% claim to clearly understand this distinction, indicating a high level of understanding of key accounting and finance concepts. However, 19% lack this information, which could indicate the need for additional training in the management of costing systems to improve financial management and optimize resources in the sector.

Now, it was found that 37% of footwear manufacturers prioritize labor as the most important factor when choosing the costs of their products. 16% is dedicated exclusively to raw materials, while 26% includes Indirect Manufacturing Costs (CIF). A small 2% of manufacturers do not take into account any of the cost elements, although 19% consider all cost elements. This shows that although most manufacturers handle some aspects of cost, there is an opportunity to improve the understanding and application of full cost in the sector.

In a company it is very important to know the type of costing system that is used, since, in this way, it will be possible to adapt the collection of information, visualize its efficiency and even look at what problems are being had with profitability, which is why the following question was asked to obtain data on the type of costing system used by footwear companies in San Francisco: Which of these costing systems do you use for your company?

In this response, 41% use process costing, indicating that most companies use this method for products that go through different stages of production. 34% use work order costing, which is likely to focus on custom orders. 20% opt for standard costing, a more controlled and predictable method of cost allocation. Finally, only 3% use ABC (Activity-Based Costing), which is a more complicated and less frequent system that assigns costs based on specific activities, which could represent an opportunity for improvement to increase the accuracy in the determination of costs in some companies in the sector.

The inventory valuation methods used by footwear manufacturers in the San Francisco sector were investigated, and it was observed that 53% use the FIFO (First In, First Out) method, which indicates a trend towards inventory management that seeks to reflect the cost of goods sold more accurately. The weighted average method is a simpler inventory

valuation method, with 42% using it. Only 5% of companies do not use any of these methods, which shows that there is a good inventory management practice in general in the sector. The results together suggest a predominance of methods that facilitate efficient cost evaluation and inventory control.

Footwear manufacturing companies handle different types of hiring of production and marketing employees, thus finding that 43% of companies opt for indefinite-term employment contracts, which indicates a trend towards job stability and long-term commitment to their employees. 27% use fixed-term contracts and 27% use contracts for work, which demonstrates flexibility in hiring at the moment. Only 3% choose service contracts, indicating a preference for more regulated and direct employment relationships. In general, most companies seem to place more importance on forms of contracting that promote stability and continuity in their operations.

Within this research, it is important to mention that 83% of companies know their break-even point, which indicates a solid understanding of their financial situation and the relationship between costs, revenues and sales volume. This high percentage indicates good financial management and the ability of companies to make smart decisions. However, 17% of companies are unaware of this aspect, which could hinder their ability to strategically plan and manage their operations effectively. Overall, most manufacturers seem to be well-positioned to maximize their profitability and long-term sustainability.

In addition, 43% of companies operate with a profit margin between 20% and 30%, indicating moderate and healthy profitability in their operations. 39% work with margins of 10% to 20%, which also indicates responsible economic management. Only 12% of companies have margins of 10% or less, which can indicate problems with their financial sustainability. However, only 6% achieve profit margins of 30% or more, indicating that few manufacturers achieve ideal levels of profitability. Taken together, these data indicate that while most companies enjoy reasonable margins, there is an opportunity to improve profitability and competitiveness in the sector.

To find the selling price, 71% of shoe manufacturers prefer to calculate the selling price based on the desired utility, suggesting a strategic approach to pricing that seeks to maximize profitability. However, 28% of companies simply add a percentage to the cost, which may be a simpler but less adaptable strategy. The fact that only 1% of companies do not use any of these methods shows that almost all companies are aware of the importance of an effective pricing strategy. In general, most manufacturers seem to take a proactive approach to making sure their prices reflect their profitability and cost goals.

In terms of tools used by shoe manufacturers, 77% use software to calculate product costing, indicating significant adoption of technology that can improve accuracy and efficiency in cost management. 18% are still calculating costs manually, which can be inefficient and increase the risk of errors. Only 5% of companies do not have any specific tools for this purpose, which shows that most are well prepared to handle their costs. This increase in the use of software indicates a move towards more modern and efficient accounting and financial management practices.

1. CONCLUSIONS

Once the corresponding research was carried out, based on the analysis of the use of costing systems in footwear manufacturing companies, it was identified that these companies depending on their needs and capacities choose their costing system, that is, various implementations of the systems were found, from the most traditional such as the costing system by production, to the most current ones such as the ABC costing system.

It was also observed that one of the shortcomings that these companies have when using their costing system is in the classification of their direct and indirect costs, thus generating negative results in their strategies and profitability. With this study it can be observed that in most companies when finding their costs they do not take into account important factors and characteristics that each system has, which can benefit the company in a very positive way, but only choose at their convenience or simply do not choose a system.

It was also possible to visualize with the responses of the surveyed companies, that they have knowledge about what the cost is, the expense and identify their break-even point, because 83% recognize it, which allows us to say that there are more entities that have a good management and management of their financial situation, allowing them to make good decisions for their stability and the increase of their profitability. The management that most companies carry out for the calculation of their sales price is a good way to ensure and maximize their profitability, that is, 71% of companies carry out their calculation based on the desired profit, which allows them to have a good strategy for their growth.

Acknowledgements: The authors are grateful for the support in the research of students Leidy Juliana Meza Rodríguez and Stefhany Liseth Ramírez Mantilla.

REFERENCES

1. Acacio, J., & Rangel, D. (2025). Gestión estratégica de la información para la mejora de procesos en la industria del calzado. Revista estrategia organizacional.
2. America Malls & Retail. (2024). Análisis del mercado de calzado en Colombia, tendencias, consumo y desafíos. Obtenido de https://americaretail-malls.com/paises/colombia/analisis-del-mercado-de-calzado-en-colombia-tendencias-consumo-y-desafios/
3. Arias, F. (10 de febrero de 2025). Sector del calzado trabaja a media máquina y requiere unos 30.000 empleados. Obtenido de El Colombiano: https://www.elcolombiano.com/negocios/industria-del-calzado-en-colombia-requiere-mano-de-obra-MG26571195
4. Camones, G. (2023). Diseño de un sistema de costeo para la mejora de la rentabilidad de una empresa de explosivos mineros aplicando el costeo estándar. Obtenido de https://cybertesis.unmsm.edu.pe/backend/api/core/bitstreams/dc82f8aa-7b01-4026-9330-d682b92bd4ec/content
5. Delgado, M. (2023). Contabilidad de costos por órdenes de producción para mejorar la información financiera de la empresa Delgado Vinueza Víctor Manuel de la ciudad de Santo Domingo. Universidad de los Andes.
6. Fabricación Industrial . (15 de noviembre de 2025). Calzado: Descubre cómo se fabrican los zapatos, zapatillas, sandalias. Obtenido de https://fabricacionindustrial.com/calzado/?utm_source
7. Kone. (12 de agosto de 2024). Clasificación de Costos en Fabricación de Calzado. Obtenido de https://kone.com.pe/costo-de-produccion-y-material-para-fabricar-un-zapato/?utm_source
8. Morales, M. (2021). Diseño de un sistema de costo por órdenes de producción para la empresa Prodicereal S.A., del cantón Latacunga, provincia de Cotopaxi. Quito: Escuela Superior Politécnica de Chimborazo.
9. Prada, A. M., & Lagos, Y. A. (03 de febrero de 2025). Diseño e implementación de un sistema de Costos por Ordenes de Producción para la Fábrica de calzado Martha Avello Rodríguez ubicada San Alonso Bucaramanga -proyecto de investigación. Obtenido de Repositorio Institucional RI-UTS: http://repositorio.uts.edu.co:8080/xmlui/handle/123456789/17103
10. Renata, J., & Síntigo, E. (2025). Factores que influyen en la calidad del calzado escolar fabricado por empresas de El Salvador. Anuario De Investigación: Universidad Católica De El Salvador, 75-86.
11. Requelme, L. (2023). Análisis de costos y propuesta de implementación del sistema de costos por procesos en la Empresa Productos Lacteos Tongod EIRL. Universidad Nacional de Cajamarca.
12. Romero, R. (14 de marzo de 2024). El calzado a través de las eras. Obtenido de https://reginaromero.com/blogs/reginaromero/el-calzado-a-traves-de-las-eras?srsltid=AfmBOoo2XyrRiOWItdO6Id_6kY4CqciVtNcMsnBQnGCwLjs-bS8tEigS.
13. Sarmiento, E. C., Rengifo, A. P., & Camelo, S. V. (19 de enero de 2022). Publicación: Principales variables que han afectado las exportaciones del sector del calzado Colombiano, durante el periodo 2020 y 2021. Obtenido de Repositorio Universidad Cooperativa de Colombia: https://repository.ucc.edu.co/entities/publication/e7e160b1-2739-4153-87d6-96e41ddea007