

## Productivity efficiency from the perspective of internal and external customers in plastic recycling companies in la Guajira Department, Colombia

Eficiencia en la productividad desde la perspectiva del cliente interno y externo en las empresas recicladoras del plástico en el Departamento De La Guajira, Colombia

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#### Abstract

**Objective:** This article analyzes productivity efficiency from the viewpoint of internal and external customers in plastic recycling companies in the La Guajira Department, Colombia. **Methodology:** First, we determined the impact of internal customers, i.e., the employees of recycling companies and the main recipients of the organizational vision, mission, and strategies formulated to achieve external customer satisfaction. **Results:** On one hand, all employees are internal customers as they receive their inputs, information, or tasks from their co-workers. On the other hand, the external customer is a vital point for any company and is known in a business cycle as a target audience that evolves from a potential customer to an occasional customer and, ultimately, to a regular customer. **Conclusions:** This shows moderate level of productivity in terms of the resources and logistics owned by internal customers to satisfy the needs, wants, and expectations of their external customers. Simultaneously, strategic marketing guidelines are generated to enhance the production process of this business sector.

**Keywords:** Efficiency, Internal Customer, External Customer, Productivity, Recycling Companies.

#### Resumen

**Objetivo:** Este artículo analiza la eficiencia de la productividad desde el punto de vista de clientes internos y externos en empresas de reciclaje de plástico en el departamento de La Guajira, Colombia. **Metodología:** Primero, determinamos el impacto de los clientes internos, es decir, los empleados de las empresas de reciclaje y los principales destinatarios de la visión, misión y estrategias organizacionales formuladas para lograr la satisfacción del cliente externo. **Resultados:** Por un lado, todos los empleados son clientes internos, ya que reciben sus aportes, información o tareas de sus compañeros de trabajo. Por otro lado, el cliente externo es un punto vital para cualquier empresa y es conocido en un ciclo empresarial como un público objetivo que evoluciona de un cliente potencial a un cliente ocasional y, en definitiva, a un cliente habitual. **Conclusiones:** Esto muestra un nivel moderado de productividad en términos de los recursos y la logística que poseen los clientes internos para satisfacer las necesidades, deseos y expectativas de sus clientes externos. Simultáneamente, se generan pautas estratégicas de marketing para potenciar el proceso productivo de este sector empresarial.

**Palabras claves:** Eficiencia, Cliente interno, Cliente externo, Productividad, Empresas de reciclaje.

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## Introduction

Productivity is one of the main concerns of the business managers of this century, which crosses the border of powerful countries like the United States and extends worldwide. Even Japan, admired for its productivity enhancements, currently focuses on maintaining its competitive edge in the global market. In Latin America, this involves productivity measurement, an essential step in the control process. Based on productivity, the entrepreneur determines the input-output relationship used to assess workshop, machinery, equipment, and employee performance. Koontz and Weihrich [1] argue that productivity requires efficiency in individual and organizational performance and that it is the achievement of the goals with the least amount of resources. Hence, an organization is considered productive when it achieves its goals while transforming its inputs into products at the lowest cost to satisfy internal and external customers.

This research determines productivity efficiency from the viewpoint of internal and external customers in the plastic recycling companies in La Guajira Department, Colombia, to make optimum use of the substantial amount of recyclable plastic generated on the Colombian-Venezuelan border. The final purpose was planning the recycling activity, since it is currently carried out informally and is marked by the social stigma borne by those who work with solid waste, without conducting efficient production processes.

In La Guajira, Colombia, approximately 1,029 tons of solid waste is generated daily, of which 35% is plastic, and according to the ICBF (Guajira Regional Family Welfare Institute) (2015), it amounts to 360 tons per day. Of this, 85% is dumped in sanitary landfills due to lack of a rational site selection process that may be used as raw material by individuals and companies engaged in recycling.

In La Guajira Department, almost 2,000 people dedicated to plastic recycling stockpile certain amounts of plastic to be processed and marketed. However, they face problems such as lack of social security and low cultural and educational levels due to their limited possibilities to collect enough solid waste daily. They usually lack the necessary equipment, storage places, or diversified markets. In short, they do not have adequate information or access to credits to form small recycling companies, which are, therefore, considered determining factors to guarantee productivity efficiency. As it may be seen, the people or internal customers that are part of plastic recycling companies have poor working conditions.

Since most plastic recyclers do not process the recovered material, when selling the waste, they have to abandon the most profitable phase of the process. According to the SENA (National Learning Service) [2], small businesses or individuals located in La Guajira Department carry out recycling activities in a disorganized manner with no planning processes for

the use and marketing of recyclable plastic. They lack plans for the efficient and effective management of the large amount of plastic generated in this region.

In terms of productivity efficiency in recycling, we must predetermine the influence of internal customers on external customers, which appears at the company's threshold where the internal customer has already conducted all the necessary activities within the organization's value chain in support units and operating units. The internal customer's goal is to process all the value-adding activities to fulfill the expectations, perception, needs, and wants of the companies that buy the recycled plastic produced and marketed by plastic recycling companies in La Guajira Department, Colombia. Stanton [3] argues that "satisfaction lies in the comparison that the customer makes between expected performance and perceived performance when consuming the product."

Thus, the research conducted identifies the satisfaction levels of external customers, i.e., the companies that buy the recycled material produced and marketed by the plastic recycling companies in La Guajira Department, Colombia. If the internal customer's performance fails to meet the external customer's expectations, needs, wants, and perceptions, the latter will be dissatisfied; if the internal customer meets them, the external customer will be satisfied. Furthermore, if the external customer's expectations are exceeded, it will be highly satisfied. Kotler [4] states that "the fulfillment of needs begins with the search for the customers' actual needs, stimulating them to acquire most of the offer made."

Based on the research "Gerencia estratégica de mercadeo como herramienta de productividad en las empresas recicladoras del plástico en el departamento de La Guajira" (Strategic Marketing as a Tool for Productivity in Plastic Recycling Companies in the Department of Colombia Guajira), conducted by the authors of this article, productivity efficiency from the viewpoint of internal and external customers was determined as a specific objective.

In this sense, according to the Regional Autonomous Corporation of La Guajira [5], the recycling companies discontinuously carry out the production and trade process of recycled plastics products because they lack the resources necessary to carry out this activity properly and optimally. Recyclers often lack the financial resources to purchase the required materials to guarantee a satisfactory and profitable negotiation to stay in the market. They mostly do not have the capacity to deliver the material required by buyers or customers, i.e., they fail to satisfy their demand since they lack enough money to guarantee a profitable business.

Moreover, recyclers lack adequate technology to implement the plastic transformation process [2]. They only act as intermediaries to sell the recycled material and are unable to deliver the processed products to a

demanding market. Additionally, as these organizations lack proper efficiency and effectiveness to achieve their objectives and goals, they sell at a very low price, which often leads to withdrawal from business activity or bankruptcy. Productivity efficiency from the viewpoint of internal and external customers could generate the competence levels necessary for the organizational and commercial development of plastic recycling companies.

The Regional Autonomous Corporation of La Guajira [5] states in its population census that there are 32 recyclable plastic buyers in the cities of Santa Marta, Barranquilla, and Cartagena, which process more than 4,500 tons per day. This shows a huge demand, which can be considered the potential external customers of the new products generated by the recycling companies in this department. However, optimal productivity processes are required to achieve excellent customer perception.

This study consists of the following sections: literature review; methodology used in the research, defining the research epistemological approach, type, design, population, and sample; and results and conclusions.

## Literature review

The literature review is based on two bibliographic edges, starting with a review of the research background and the relevant theory foundations, to determine productivity efficiency from the perspective of internal and external customers. Thus, the research background is presented, supported by articles from specialized journals and research related to the study variables. These are detailed below:

The article “El reciclaje del plástico Pet botella a botella tiene futuro” (PET bottle-to-bottle recycling has a future) (2015) shows that Aproplast processes 1,800 tons of PET plastic per year, which it rescues from sanitary landfills to convert it into high-value products. Jaime Giraldo, the company’s manager, says that everything collected undergoes a technical process of sorting, processing, decontamination, and cleaning, to be later transformed (already conducted in other industries) into new boxes, containers, tableware, brooms, plastic tiles, sheets, preformed packages, short fiber, and even toys. Therefore, intensive social work is carried out, since the sorting and cleaning tasks are performed by a cooperative of recyclers mostly comprising female heads of households. Raising recycling awareness is sustained by the FOMIPYME (Colombian Fund for Modernization and Technological Development of Micro, Small and Medium Enterprises).

Furthermore, the article, “El reciclaje: una opción para minimizar la generación de residuos sólidos urbanos domiciliarios” (Recycling: an option to minimize the generation of solid urban household waste) [6] asserts that recycling can be used to reduce environmental impact. Findings show that

despite most of the population being informed of environmental care, the percentage of the population that carries out recycling activities from their houses is minimal. The study concludes with proposals for creating proper spaces and conditions for a true recycling culture.

The article published by REDALYC.ORG (Network of Scientific Journals from Latin America and the Caribbean, Spain and Portugal) and entitled “El reciclaje, La Industria del Futuro” (Recycling, the Industry of the Future) conducted by Berenguer et al. in Havana, Cuba (2009) shows that the recycling industry is a major supplier of raw materials for the manufacture of the most diverse everyday products or long-lasting equipment. It also protects the environment by saving mineral resources and energy. Developed countries are the pioneers of the recycling industry, known as the “Industry of the Future,” since million tons of metal scrap elements and scrap are incorporated into the recycling process daily. This article highlights the importance of production processes that make use of the high solid waste generation rates in today’s world [7].

The conceptual research “Logística inversa un proceso de impacto ambiental y productividad” (Reverse logistics, a process with environmental and productivity impacts) conducted by Rodrigo Andrés Gómez Montoya and published by Universia magazine (2015) describes and analyzes reverse logistics for national and international processes and applications, including the relationship with green supply chain management. In addition, the article contains decrees and standards that regulate waste management in Colombia. This recovery or reverse logistics in some industries and/or sectors has become mandatory for environmental protection and an opportunity for creating value and economic benefits.

Pacheco [8] conducted a research project entitled “Efectividad Gerencial y Productividad en las organizaciones de mantenimiento” (Managerial effectiveness and productivity in maintenance organizations) to obtain a PhD in Management Science. The purpose was to determine the relationship between managerial effectiveness and productivity in maintenance organizations of cement manufacturing companies. This is an applied, descriptive field research, with a nonexperimental, transactional, and correlational design. Laguna [9] carried out a study entitled “La Gerencia y la Productividad en los Institutos Tecnológicos Oficiales del Estado Zulia” (Management and productivity in the official technological institutes of the State of Zulia) to obtain a PhD in Management Science from Rafael Beloso Chacín University, Maracaibo. This research guided the theoretical foundations of the present study, as both have the same methodological framework.

Furthermore, Machado [10] conducted the research “Influencia del perfil gerencial y la productividad laboral del personal del sector de salud de los hospitales públicos” (Influence of the managerial profile and labor productivity of healthcare workers in public hospitals) to obtain a PhD in

Management Science. This is a descriptive, field, explanatory, and nonexperimental research, with a population of 44 subjects that represented the entire medical management and nursing personnel. This study was used as a research background, since efficiency and productivity variables will also be treated in the plastic recycling industry in La Guajira department.

After detailing the research background, the theories used as theoretical support are presented, for example, the one that defines efficiency as the ability to achieve an end using the best possible means [11]. Likewise, this is the sufficiency of doing things based on the results sought, taking as reference the goals to be achieved. Administrative efficiency leads to organizational efficiency, which is achieved upon attaining results through essential decision-making. In the same vein, efficiency is associated with the business mechanisms used to establish determined links in the goal fulfillment, considering the level of customer satisfaction and resource management.

Kotler [4] states that a company provides efficient service to customers when the latter perceive that their problems are solved in the best possible way, i.e., the company is interested in and concerned about satisfying their needs and providing credibility. Lamb et al. [12] argue that the employees who treat customers with respect and make them feel that a promise made will be honored are an example of trust.

Efficiency is a qualitative adjective applicable to logistics processes or to any area in general, since in ordinary conditions it tends to be toward optimization. This involves efficiency, and in extraordinary conditions, the mission must be fulfilled even at the expense of the means, without becoming a pyrrhic victory, because high efficiency depends on the strict observance of planning guidelines. Efficiency quantifies goal fulfillment achieved either efficiently or effectively.

Chiavenato argues that since efficiency is determined by the amount of resources used for a product, a manager's task is basically integrating and coordinating sometimes corporate and other times conflicting organizational resources such as people, material, money, time, and space to effectively and efficiently reach the goals set. Efficiency, thus, measures the cost of resources associated with goal achievement over time. Labor cost is a common efficiency measure, which can also include the use of equipment, facility maintenance, and return on investment.

Harrison et al. [13] define productivity as the relationship between the quantity of goods or services produced and the amount of resources used, and serves to assess workshop, machinery, work equipment, or employee performance. Thus, it is a synonym of performance in case of employees. For machinery and equipment, it is part of its technical characteristics. Various

factors affect organizational productivity, either internal or external [11]. The internal factors are specific to the company and are handled by the management structure, for instance, land and buildings, materials, energy, machinery, equipment, and human resources. External factors are not directly managed by the organization but depend on external conditions, for example, availability of raw materials, skilled labor, state policy regarding allocations, tariff, existing infrastructure, availability of capital and interest, and applied adjustment measures.

Davies and Newstrom [14] state that productivity rises when it is possible to generate more products with the same amount of input or the same amount of products with the same input. This does not necessarily imply increased production and is rather a measure of the degree of efficiency with which the desired output is generated, regardless of quantity. Productivity is the share of output (goods and services) divided by input (resources such as labor and capital). Thus, in the work of a director of operations, the ratio between output and input is potential. Enhanced productivity means improved efficiency, and this can be achieved in two ways: reducing input with output remaining constant or increasing output with input remaining the same. Both imply increase in productivity from an economic perspective.

Productivity allows the entrepreneur to determine the input-output ratio used to assess the workshop, machinery, work equipment, and employee performance. In this respect, Koontz and Weihrich [1] argue that productivity implies efficiency in individual and organizational performance. Furthermore, efficiency is the achievement of the goals with the least amount of resources, while effectiveness is the achievement of objectives.

Thus, an analysis of productivity in the plastic recycling companies in La Guajira Department, Colombia, is required to determine the level of efficiency in the individual and organizational performance. This can help us determine how they fulfilled their objectives and achieved their goals using their resources in the recycling process to define the relevant input-output relationship for ensuring optimal productivity.

Furthermore, in this literature review, the customer not only has a business relationship with the company and requires a significant customer value but also falls into a similar or more important category for the company, which serves as support for increasing its profit and positioning its business and products. For a few years now, there has been an increase in theoretical references to concepts such as relationship marketing, internal marketing, or internal customer, all of which are related to each other. The use of these new concepts shows a new approach to the customer relations that sometimes cannot be realized on a day-to-day basis. In particular, the expression "internal customer" only shows a new way of understanding the productivity process in companies that provide goods and services and the relationships generated within the organization [4].

In this regard, each employee becomes an internal customer as he/she receives input, information, or tasks from a co-worker. In turn, he/she becomes a supplier to one or more other internal customers until reaching the threshold where external customers emerge, in whom the product and service quality will become a fact, reflecting the organizational culture experienced by internal customers [15]. Thus, each employee must be fully aware of their role within the company, i.e., of the actions to be carried out aimed at materializing the organizational vision and mission such that they provide a quality product or service to the external customer.

Llanos argues that training plays a key role, since it involves transmitting knowledge, skills, and attitudes to employees and workers for proper work performance; complete compliance with daily work functions; and achieving effectiveness, efficiency, and quality, focusing on the dignity of work.

Furthermore, motivation plays a significant role and is defined by Chiavenato as the product of internal or psychological factors inherent in the individual, depending on the subject characteristics and the causes that trigger and motivate certain processes or behavior. Managers must complement actions such as communication, compensation, and recognition, aimed at strengthening motivation, such that the staff in their charge adopts or modifies certain attitudes or actions. Davis and Newstrom [14] define organizational commitment as the degree to which a manager or employee identifies with the organization and wants to continue actively participating in it. It often reflects the employees' belief in the firm's mission and goals, their willingness to expend effort in their accomplishment, and their intentions to continue working there.

Regarding the conditioning factors of resources and logistics, Harrison et al. [13] argue that resources are the material means that can be made available for use by a company in a given business process. Meanwhile, Ballou considers that business logistics is all movement and storage that facilitates the flow of products from the point of purchase of the materials to the point of consumption as well as the information flow set in place to give the customer the right level of service at a reasonable cost. The work environment of an organization comprising human beings as employees is rather subjective and influenced by several variables, with various interactions, depending on the circumstances and individuals, which make use of various factors, in turn, influenced by internal and external issues.

The importance of internal customers highlights the priority they have in external customer-oriented organizations. A company's employees are the best sellers of its goods and services, and to such end, they require proper organizational culture involving time, perseverance, and commitment.

Domínguez [15] defines external customers as intermediaries who have a direct relationship with the company and to whom strategic actions should be targeted to show notable added value and quality of the product and



service, which truly makes a difference. Likewise, Kotler [4] includes in the external customer category the end consumer or user of the service, i.e., the one who will ultimately validate what is said or advertised about the service. The authors share similar opinions, since Domínguez [15] argues that external customers comprise intermediaries directly related to the company, Kotler [4] identifies them with end consumers or users of the service, and Stanton [3] sees them a vital point for any company.

Thus, business survival and prosperity depend on gaining in-depth knowledge about the external customer's needs, wants, expectations, and perceptions, and finding the best way to satisfy them with appropriate strategies in a time of changing business environments. Lambin defines need as a state of felt deprivation with regard to general satisfaction linked to basic human needs, thus covering the notion of generic need. It can be presumed that there is a generic need for each trend that manages individuals' lives. Thus, it is not related to marketing and preexists to either latent or express demand.

A want can be considered a means of satisfying a need. Generic needs are stable and limited, while wants are multiple, changing, and influenced by culture. On one hand, as societies evolve, the level of wants of members increases, which translates into potential demand for specific products when accompanied by purchasing power and willingness to purchase. On the other hand, expectations imply the hope that something will be achieved. Customers form their expectations based on the following: past experiences; advice of friends, relatives, acquaintances, and opinion leaders, among others; and marketers' and competitors' information and promises [4]. Furthermore, perception "is the process by which an individual selects, organizes, and interprets information input to create a meaningful picture of the world" [4]. Finally, "the process of receiving, organizing, and assigning meaning to information or stimuli steered by our five senses is known as perception and plays a major role in buying decisions" [3], where alternatives are identified.

This study, resulting from the research "Gerencia estratégica de mercadeo como herramienta de productividad en estas empresas recicladoras" (Strategic Marketing as a Tool for Productivity in Plastic Recycling Companies in the Department of Colombia Guajira) determines if the needs, wants, expectations, and perceptions of the Colombian Caribbean plastic buying companies, current potential external customers of the products resulting from the production and trade activity of the plastic recycling companies in La Guajira Department, Colombia, satisfy their requirements and specifications.

## Methodology

The research was conducted through a positivist epistemological approach that intended to understand and explain, and therefore underline, the human mind as an active and formative participant in what it knows. Additionally, this approach takes into account formal logic in the analysis of information as a valid and fundamental procedure for achieving objectivity. This is based on the inductive approach to research, which refers to the recognition processes initiated through the observation of phenomena, facts, or people to obtain general premises and conclusions that can be applied to similar situations. An institutional position was established, wherein rationality is based on scientism and rationalism, provided it determines a relationship of independence between the subject who knows and the known object.

This research was classified as descriptive, because it naturally specified all the significant properties found in the main components of productivity efficiency from the perspective of internal and external customers in the plastic recycling companies in La Guajira Department, Colombia. Based on the proposed objectives and theories, the study was also defined as having a nonexperimental, descriptive, field, and cross-sectional design since data was collected at one single moment in time. To this end, the two predetermined variables were operationalized and the relevant information is shown in Table 1.

General Objective: To analyze productivity efficiency from the perspective of internal and external customers in the plastic recycling companies in La Guajira Department, Colombia.

**Table 1.** Variable Operationalization

Specific Objectives	Variable	Dimensions	Indicators
To determine productivity efficiency from the perspective of internal customers in the plastic recycling companies in La Guajira Department, Colombia	Productivity Efficiency	Internal Customers	Resources and Logistics: Infrastructure Economic Capacity Trade Capacity Human Resources Raw Material Input Equipment Machinery
Identify productivity efficiency from the perspective of external customers in plastic recycling companies in La Guajira Department, Colombia		External Customers	Needs Wants Expectations Perceptions
Generate strategic guidelines to enhance productivity efficiency from the perspective of internal and external customers in plastic recycling companies in La Guajira Department, Colombia	Strategic guidelines that will be designed based on the results of the previous objectives		

**Source:** Prepared by the authors

The sample comprised the twenty-six (26) plastic recycling companies located in La Guajira Department. Another sample considered comprised the thirty-two (32) Colombian Caribbean companies that sell or buy recyclable plastic in the cities of Santa Marta, Barranquilla, and Cartagena.

The sample is made up of the total population of plastic recycling companies in La Guajira Department and the Colombian Caribbean plastic purchasing companies, because this population consists of few members and a sample is not required. For this reason, a population census was conducted by applying the instrument to the total of each population.

Two questionnaires were applied: the first was directed to the plastic recycling companies in La Guajira, consisting of sixty-three (63) items with five (5) response alternatives. The second questionnaire targeted the Colombian Caribbean plastic purchasing companies, consisting of thirty (30) items directed to the recycled plastic selling companies.

## Results

The results are presented below to analyze productivity efficiency in these recycling companies from the perspective of internal and external customers. These results originate from data tabulation, analysis, and interpretation, following the application of these instruments. They are based on the categories of analysis of mean interpretation, where the range represents the relationship of the response classification, with five (5) representing the highest score and one (1) implying the lowest score.

Likewise, a table summarizing the behavior of each dimension was designed with a preestablished range, with its respective categories, which was calculated based on the length of the interval between the values assigned to the response alternatives, namely, Always (5), Almost Always (4), Sometimes (3), Almost Never (2), and Never (1) in the arithmetic mean of all scores. These categories are shown in Table 2.

**Table 2.** Categories of Analysis for Mean Interpretation

Alternatives	Range	Interval	Category
Always	5	4.21-5.00	Very High Level
Almost Always	4	3.41-4.20	High Level
Sometimes	3	2.61-3.40	Moderate Level
Almost Never	2	1.81-2.60	Low Level
Never	1	1.00-1.80	Very Low Level

**Source:** Prepared by the authors

Regarding internal customers, in terms of resources and logistics, the arithmetic mean was 2.58, which belongs to the interval 1.81–2.60 of Rank 2, i.e., the low-level category, with a median of 3 and mode of 2. This shows that plastic recycling companies in La Guajira almost never have the necessary resources or a logistics system that ensures an optimal productivity process. Table 5 shows that 68.8% of the respondents stated that recycling companies almost never have proper infrastructure to produce and market recycled products nor do they develop adequate storage for the marketing process of their products, 6.20% chose never, 18.8% chose sometimes, and 6.20% selected almost always. In this regard, the Caribbean plastic buyers agree with the recycling companies, because there is no relevant infrastructure to ensure a good level of productivity efficiency.

In terms of trade capacity, 39.6% of the surveyed sample stated that the recycling companies almost never have the necessary transportation service to guarantee the distribution process of their products, due to which they do not have the trade capacity to offer products when required. Next, 24% of those surveyed responded never, while 33.3% believed that this was sometimes the case, and 3.10% chose almost always. Negative trends are recognized in these results.

Regarding human resources (HR), 70.8% of the selected companies that sell or buy recyclable plastic consider that recycling companies almost never have the appropriate personnel to produce and market the recycled products, 6.30% responded never, 17.7% chose sometimes, and 5.20% selected almost always. There is moderate discordance with the recycling companies, as they select the option sometimes but still remain in the low-level trend.

In relation to raw material, 68.8% of the plastic recycling companies recognize that they count almost always on the necessary raw material to guarantee their productivity process because a considerable volume of recyclable plastic is generated. Furthermore, 15.6% of the respondents chose never, while 15.6% selected sometimes. Thus, they agree with the plastic buying companies since they state that a great amount of this recyclable material is generated in this department.

In terms of inputs 68.8% of the companies that sell or buy recyclable plastic surveyed stated that sometimes, the recyclable companies have the required input to guarantee their production process, while 31.2% stated that they almost never do. They agree with the recycling companies because they also selected sometimes, although with a positive trend.

With respect to equipment, 84.4% of the respondents considered that the

recycling companies almost never possess the relevant equipment to recycle plastic and that it is mostly obsolete. They also stated that they do not have the capacity to acquire high-tech equipment; 3.10% considered that they never do, while 9.4% stated that they sometimes have equipment, and 3.10% stated almost always. Thus, without the necessary equipment, the recycling companies will not be able to achieve efficiency in their productivity processes. Likewise, in terms of machinery, 37.5% of the plastic recycling companies almost never have the necessary equipment to carry out their production processes, 22.9% responded that this is never the case, 10.4% stated sometimes, 24.0% said almost always, and 15.20% responded always. The results in Table 3 show that these business units lack machinery to guarantee efficiency of their productivity processes.

**Table 3.** Internal Customers

Resources and Logistics	Alternatives (%)				
	Always	Almost Always	Sometimes	Almost Never	Never
Infrastructure	0.00	6.20	18.8	68.8	6.20
Trade Capacity	0.00	3.10	33.3	39.6	24.0
Human Resources	0.00	5.20	17.7	70.8	6.30
Raw Material	15.6	68.8	15.6	0.00	0.00
Input	0.00	0.00	68.8	31.2	0.00
Equipment	0.00	3,10	9,40	84,4	3,10
Machinery	5.20	24,0	10,4	37,5	22,9
Trend	3.0	15,8	24,9	47,5	8,80
Mean	2.58				
Median	3				
Mode	2				
Category	Low Level				

**Source:** Prepared by the authors

In terms of personal condition in the internal customer dimension, the arithmetic mean was 3.26 (interval 2.61–3.40 of Rank 3), which falls in the moderate level category with a median of 3 and mode of 5. Thus, the employees of the plastic recycling companies in La Guajira are sometimes concerned about training to enhance the performance of productivity processes, although they feel motivated and committed to what they do. Regarding training, Table 6 shows that 40% of the informants almost never receive training to achieve the necessary knowledge for improving their work performance, 20.0% stated that they never do, 15.0% chose sometimes, 15.0% selected almost always, and the remaining 10% considered that they are always trained. Thus, the recyclable plastic buying companies and the recycling companies acknowledge that they do no benefit from proper training to improve the productivity of the recycling activity in La Guajira.

Regarding motivation, the results showed that 40% of the surveyed sample is always motivated because a significant volume of recyclable plastic is generated, which guarantees productivity. Next, 30% of the respondents chose almost always, 20% selected sometimes, and 10% chose almost never. Thus, the employees of the recycling companies feel motivated, a predetermined factor in internal customer satisfaction. Furthermore, regarding commitment, 42.0% of the selected plastic recycling companies consider that the personnel is almost always committed to the tasks undertaken, because they are identified with their daily duties, 35% chose always, 15% selected sometimes, and 4% each preferred never and almost never. Thus, the employees of the recycling companies are committed to their work.

In terms of work environment, the results showed that 40.0% of the respondents recognize that there is almost never a healthy work environment within the plastic recycling companies due to the location conditions, lacking minimum requirements to work comfortably; 25% state that there are never optimal work conditions; 15.0% believe that there is always a proper environment; and 10% each chose almost always and sometimes. This suggests internal customer dissatisfaction; thus, personal conditions are included in the moderate level category. The above results are shown in Table 4.

**Table 4.** Internal Customer

Personal Condition	Alternatives (%)				
	Always	Almost Always	Sometimes	Almost Never	Never
Training	10.0	15.0	15.0	40.0	20.0
Motivation	40.0	30.0	20.0	10.0	0.00
Commitment	35.0	42.0	15.0	4.00	4.00
Work Environment	15.0	10.0	10.0	40.0	25.0
Trend	25.0	24.25	15.0	23.5	22.25
Mean	3.26				
Median	3				
Mode	5				
Category	Moderate Level				

**Source:** Prepared by the authors

In relation to the external customer dimension, the arithmetic mean was 2.97 (interval 2.61–3.40 of Rank 3), which falls in the moderate level category, with a median and mode of 3. Thus, the plastic recycling companies in La Guajira sometimes seek to satisfy external customers in terms of their needs, wants, expectations, and perceptions. Regarding needs, Table 5 shows that 35% of the respondents stated that recycling companies sometimes meet the needs of their external customers, for which they must provide recyclable products with the attributes and characteristics required by them, with 22.0% choosing the option almost always, 18.0% selecting almost never, 15% responding always, and 10% stating never. These results

point out that these business units are not concerned with meeting the priority needs of the Colombian Caribbean plastic buying companies. In terms of wants, 32% of the surveyed sample stated that the recycling companies sometimes seek to meet the wants of companies that buy their recycled products, 22% chose never, 18% selected almost never, 17% chose almost always, and 11% stated always. In terms of expectations, the most selected alternative was sometimes (42%), which shows that the recycling companies do not fulfill their promises in terms of recycled product quality: 20% chose almost never, 15% selected almost always, 14% stated never, and 9% chose always. Thus, external customers moderately cover their requirements with the products provided by the recycling companies.

Finally, the perception indicator shows that 30% of the plastic buying companies recognize that the products provided by the recycling companies stimulate them sometimes because they have characteristics and attributes of good quality required to cover their priority needs: 20% stated that these products almost always have the conditions that guarantee an optimal plastic recycling process, 20% believed that this is almost never the case, 18% chose the alternative always, and 12% stated never. In summary, these results fall in the moderate level category shown in Table 5.

**Table 5.** External Customer

Indicators	Alternatives (%)				
	Always	Almost Always	Sometimes	Almost Never	Never
Needs	15	22	35	18	10
Wants	11	17	32	18	22
Expectations	9	15	42	20	14
Perceptions	18	20	30	20	12
Trend	13.25	18.5	34.75	19.0	14.5
Mean	2.97				
Median	3				
Mode	3				
Category	Moderate Level				

**Source:** Prepared by the authors

## Conclusions

After achieving the results and confronting the theoretical foundations of this research, we determined its conclusions to analyze productivity efficiency from the perspectives of internal and external customers in the plastic recycling companies in La Guajira, Colombia, as follows:

Regarding the internal customer dimension, the results in terms of resources and logistics fall in the low-level categories, showing a lack of resources and logistics necessary to develop productivity processes with high efficiency

levels; consequently, the significant generation of recyclable plastic in this border area is wasted. In this regard, Harrison et al. [13] pointed out that the amount of available resources and logistics is constantly assessed depending on the rarity, changes in use, and possibilities of resources, i.e., of the material means available in a company for a given production and process. However, the means used by the plastic recycling companies of La Guajira have many limitations in productivity.

Consequently, it can be concluded that the plastic recycling companies in La Guajira Department, Colombia, almost never have proper infrastructure, which allows the physical coordination necessary to carry out efficient production processes and that ensures optimal commercial exchanges. In fact, infrastructure can lead a customer to carry out the first commercial operation with the organization. However, recycling companies show no such business capability to achieve business growth, please customers, or outperform rivals; they do not respond to changing market conditions, and they do not manage each functional part of the business to develop the organizational capabilities necessary to achieve strategic and financial goals.

In these recycling companies, HR department seeks to improve personnel performance only to a very limited extent. Thus, these organizations must manage human resources efficiently and take advantage of each employee's potential. In terms of raw material, the plastic recycling companies in La Guajira are able to access a sufficient amount of recyclable plastic since they generate 360 tons per day, of which 85% is dumped into sanitary landfills. This calls for better use to transform the recycled products produced by these business units.

In terms of input, plastic recycling companies do not regularly make optimum use of the input characteristics in their production processes, due to lack of knowledge of certain quality properties, and always seek low prices, since they lack the necessary resources. The equipment, as well as the machinery indicator, shows that they lack the most necessary resources to consolidate production processes with high efficiency levels. The company must design adequate and preventive management policies to avoid occupational hazards, an aspect that is poorly met by plastic recycling companies in La Guajira, Colombia.

Regarding the personal condition, the results in the moderate level category show that these companies are somewhat concerned about the human resources that interact in the productivity processes, and personnel achieve competence in terms of efficiency.

In terms of training, we must first consider what Llanos states, i.e., training involves sharing knowledge, skills, and attitudes with employees and workers for good performance in tasks and complete compliance with daily duties to dignify and enhance human work in organizations. The results achieved in terms of training show that the plastic recycling companies



studied almost never train their personnel to improve performance in the tasks to be carried out.

Furthermore, the recycling companies' employees present high levels of motivation, in spite of not having the minimum conditions to maintain their job satisfaction. These results agree with the concepts proposed by Fernández [16], who defines motivation as an intrinsic process that leads a person to act in a particular way to achieve a result that satisfies their job expectations or needs. These companies' employees carry out their duties with commitment and dedication, despite the lack of optimal work conditions, to achieve efficiency in productivity processes. In this regard, Lepeley [17] argues that it is difficult to achieve a balanced, dynamic work environment with no turbulence.

In terms of the external customer dimension that should frame productivity efficiency in these plastic recycling companies in La Guajira, Colombia, it is concluded that they are in the moderate level category and evidence that the recycled plastic buying companies' needs, wants, expectations, and perceptions are not fully satisfied with the products provided by the recycling companies. This predefines the applicability of the external customer concept, a category wherein Kotler [4] includes the end consumer or service user who ultimately validates the product and the service. For instance, these companies sometimes satisfy the needs of customers; therefore, they must seek the satisfaction of internal customers such that the products meet the characteristics and attributes required by their external customers. At the same time, recycled plastic buying companies are dissatisfied because products do not meet the priority wants required to ensure an optimal plastic recycling process.

With regard to the expectations of the Colombian Caribbean recycled plastic buying companies, they hardly believe in the promises made by recyclers due to the conditions in which they carry out their production processes. Zeithaml and Bitner point out that customer expectations are beliefs about productivity and service delivery that serve as standards or benchmarks to judge performance. All the above conclusions are a key foundation for the plastic buying companies to perceive the product provided by the recycling companies. These results are in line with Davis [14], according to whom perception is a process by which consumers select, organize, and interpret stimuli, reducing them to a meaningful and coherent image and people perceive things and events through all the senses.

Finally, strategic guidelines were generated to enhance productivity efficiency from the internal and external customer's perspective in plastic recycling companies in La Guajira, Colombia, based on the results of the specific objectives and on several bibliographic contributions [3, 12, 13, 18]. These guidelines are presented below:

The companies engaged in plastic recycling in La Guajira Department must recognize the needs and wants of current and potential customers to ensure their satisfaction by providing products according to the demands of their customers and thus achieve strategic capability.

To achieve productive efficiency, plastic recycling organizations in La Guajira must also meet the following requirements: possess adequate infrastructure to guarantee their productivity; determine sources of income that provide the economic resources necessary for the recycling activity; have the necessary logistics and suitable and trained personnel for the production and marketing of recycled products; and finally, to acquire the relevant machinery and equipment of last technology that facilitate the production and marketing process of recycled products.

In sum, the plastic recycling companies in La Guajira Department must identify and clearly define their customers' needs, wants, expectations, and perceptions to design a marketing strategy aimed precisely at them. Only then can they meet the requirements of recycled plastic buyers.

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