



# Impact of no-plastic policy on business operations: A business-centric perspective

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## Abstract

This research examined how Municipal Ordinance No. 337 influences business strategies, sales, and customer retention. While existing literature primarily focuses on environmental benefits and consumer preferences, this study uniquely investigates the policy's impact on business operations. A quantitative study involving 42 registered micro-businesses in Labo's financial center was conducted. Data were collected using a structured survey questionnaire and analyzed through statistical tools such as frequency, percentage distribution, weighted mean, and Spearman's Rank Correlation Coefficient. Micro-business compliance with and perceptions of Municipal Ordinance No. 337 were measured using a 4-point Likert scale. The results indicated high micro-business compliance with the ordinance's three categorized sections ( $M = 3.44$ ) and a strong perceived impact on business operations, particularly in terms of pricing ( $\bar{x} = 3.15$ ), packaging ( $\bar{x} = 3.56$ ), sales ( $\bar{x} = 3.9$ ), and customer retention ( $\bar{x} = 2.92$ ). A significant positive correlation was found between compliance with Sections 8 and 9.3 (encouraging alternative and eco-friendly packaging) and the impact on packaging strategies ( $r_s = 0.457$ ,  $p < 0.002$ ). Although limited to a single municipal geographic area, this study provides valuable insights into the impact of plastic waste reduction ordinances on micro-business operations.

**Keywords:** *plastic policy, business perspective, business strategy, sales, customer retention*

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## 1. Introduction

Environmental sustainability has become a global priority due to growing concerns over plastic pollution (Idumah & Nwuzor, 2019), with over 460 million metric tons of plastic produced annually and 20 million metric tons polluting the environment each year (International Union for Conservation of Nature, 2024). To address this issue, international, national, and regional policies are emerging to manage plastic waste and promote sustainable practices (Pilapitiya & Ratnayake, 2024). The European Commission, aiming for all plastic packaging to be recyclable by 2030, has spurred business sectors across the EU to adopt no-plastic policies (Kaszniak & Łapniewska, 2023; Matthews et al., 2021).

At the national level, the Ecological Solid Waste Management Act (RA 9003) was passed in 2001 in the Philippines to promote integrated waste management, including plastic waste (Environmental Management Bureau, 2019). Local governments, under RA 7160, share responsibility for ecological waste management with the national government. In Camarines Norte, Labo was the first municipality to institute a moratorium on plastic. It transitioned from a policy encouraging the use of biodegradable materials to a comprehensive Anti-Plastic Ordinance. Labo pioneered the Anti-Plastic Ordinance, banning plastic bags and similar materials (Municipal Ordinance No. 337, 2019), inspiring other municipalities like Talisay and Vinzons to adopt similar policies.

Talisay, Camarines Norte, introduced Municipal Ordinance No. 004-2017, enforcing a complete ban on plastic bags and promoting sustainable alternatives. Similarly, Vinzons adopted the "Plastic and Styrofoam Free Vinzons Ordinance of 2020" (Municipal Ordinance No. 132-2020), banning the use of styrofoam and certain plastics, with some exceptions. Both ordinances included penalties to ensure compliance and aimed to reduce plastic waste, align with sustainability goals, and promote a cleaner environment. However, several studies state that businesses, especially those selling food, large items, and wet or dairy products, face challenges complying due to the inconvenience of using fragile paper bags (Calzada, 2021; Bharadwaj et al., 2023). Dijkstra et al. (2020) state that the main barriers to sustainable plastic management are higher costs and the reliance of many industries on plastic across the supply chain, often due to low demand for more expensive sustainable alternatives.

Despite the widespread implementation of plastic ban policies, there is a lack of studies that explore the perceptions of micro-business owners regarding such policies and their effects on business operations. Understanding how businesses react to these plastic bans

is beneficial for improving these policies. For instance, a study in Macao showed that examining business perspectives and behaviors can reveal whether consumers are truly changing their habits in response to these bans (Xu et al., 2022).

It is evident that No Plastic Policy initiatives aimed at combating plastic waste globally have an impact on business operations. However, no quantitative research has determined the positive or negative effects of these initiatives on business operations, despite the fact that enterprises have long used plastic as their primary packaging material. In Labo, despite nearly nine years of implementing Municipal Ordinance No. 337, there has been no quantitative study focusing on understanding the impact of these policies on business operations. Therefore, this study examines the impact of the plastic ban on micro-businesses in Labo, Camarines Norte, focusing on the effects of Municipal Ordinance No. 337 (Anti-Plastic Ordinance). This research aims to evaluate business perceptions of the plastic ban and its implications. The topic is significant, as the United Nations Environment Programme (2023) reports that 36% of all plastic produced is for packaging, and 85% of single-use food containers end up in landfills or are improperly disposed of.

The objective of this study is to conduct an in-depth analysis of the impact of Municipal Ordinance No. 337, or the Anti-Plastic Ordinance, on the business operations of micro-enterprises in the financial center of Labo, Camarines Norte. Specifically, the study aims to assess the level of compliance of micro-business enterprises with the implementation of Labo Municipal Ordinance No. 337, evaluate compliance with Sections 7 and 9.2 of the ordinance, assess compliance with Sections 8 and 9.3 of the ordinance, and analyze the overall impact of the ordinance on business operations.

## **2. Literature Review**

### ***2.1. No Plastic Policy***

Single-use plastics significantly contribute to pollution and climate change. According to Lindwall (2020), many countries, including India, have implemented bans on plastic bags, straws, and containers to protect oceans, wildlife, and human health. Studies by Glanowski et al. (2020) and Clayton et al. (2021) emphasize the importance of stakeholder collaboration and investment in alternatives, while Bharadwaj et al. (2019) highlight the need for strict enforcement to ensure the effectiveness of plastic bans. However, Herberz et al. (2020) argue that although plastic bans reduce marine pollution, they may also increase

emissions from alternative materials, suggesting the need for broader strategies such as waste reduction and improved waste management.

In the national context, Lau et al. (2020) stressed the need for global coordination and innovation in waste management to address plastic pollution. In Quezon City, Philippines, City Ordinance 2868-2019 reinstated a plastic bag ban post-pandemic, requiring retailers such as malls, supermarkets, and fast-food chains to cease distributing single-use plastics, with fines for non-compliance (Quezoncity.gov.ph, 2021). Abueg (2019) emphasized the importance of a comprehensive approach to ocean cleanup, considering both economic and ecological impacts while Martinez et al. (2023) examined Bacoor City's zero-waste program, identifying challenges related to public awareness and the allocation of resources for effective waste management.

## ***2.2. Business Perspective on the No-Plastic Policy***

Research indicates that the no-plastic policy has both economic and operational implications for businesses. Studies highlight the financial strain caused by rising plastic costs, unpredictable pricing, and the need for sustainable packaging alternatives, which can be more expensive and less convenient for both businesses and consumers (Vanaerschot & Plaisier, 2021). Feber et al. (2020) found that while customers prioritize cost and convenience, they are also willing to pay more for eco-friendly packaging if it is clearly labeled and readily accessible.

In the Philippines, cities such as Metro Manila face compliance challenges with plastic bans, particularly for low-profit businesses that rely on affordable plastic materials (Limos, 2020; Sai, 2020). Calzada (2021) reported that business owners in Ormoc City faced customer complaints regarding the durability of paper alternatives, yet complied with the ordinance to avoid penalties. Some local governments, such as Toledo City, provide incentives, such as exemptions from certification fees, for businesses that comply with the ban (Genon et al., 2022). Bell (2023) found that engaging customers in sustainability efforts can enhance brand loyalty through educational campaigns and eco-friendly incentives. Xu et al. (2022) highlighted the importance of government guidance in effectively implementing plastic bans. Eco-innovation, as noted by Yurdakul and Kazan (2020) and Walker et al. (2021), can also improve business performance by reducing waste, advancing technology, and lowering operational costs.

Several studies are linked to the circular economy (CE), a promising approach for addressing environmental challenges and promoting sustainability. For instance, Taghipour et al. (2022) emphasized the economic and environmental benefits of CE, highlighting its potential to create business opportunities and reduce waste. On the other hand, Trivellas et al. (2020) noted that sustainable practices enhance brand loyalty and customer retention. In addition, Cuevas et al. (2020) found that restaurants in Sta. Rosa, Laguna, adopted green practices such as eco-friendly packaging to reduce environmental impact and boost their brand image. However, Vicente et al. (2022) warned that no-single-use plastic policies can pose challenges for businesses, leading to increased costs and customer dissatisfaction, thereby necessitating investments in innovation and cost-effective solutions.

The literature shares both similarities and differences with this study's focus on the impact of Labo's Anti-Plastic Ordinance on micro-businesses. Many studies align with the environmental objectives of this research, such as reducing plastic waste and protecting ecosystems. Lindwall (2020) and Clayton et al. (2021) discuss plastic bans in various regions, emphasizing the role of legislation in environmental protection. Similarly, Calzada (2021) highlights the challenges businesses face in adjusting to plastic restrictions, which parallels this study's investigation into how micro-businesses in Labo adapt operationally and financially to comply with Municipal Ordinance No. 337, particularly in relation to sustainable packaging. Additionally, studies by Vanaerschot and Plaisier (2021) and Bell (2023) focus on the effects of compliance on sales and customer retention, emphasizing the cost implications of eco-friendly policies and the importance of customer engagement in building brand loyalty. Research by Cuevas et al. (2020) and Taghipour et al. (2022) further supports sustainability initiatives that can enhance business reputation and customer support, which aligns with the ordinance's goal of encouraging sustainable practices. However, this study differentiates itself by focusing specifically on micro-business categories in Labo, Camarines Norte, offering a narrower scope compared to broader regional or national studies. While existing research predominantly uses qualitative methods and focuses on consumer perceptions, this study provides a quantitative analysis of compliance and its impact on business operations, sales, and customer retention. Moreover, it addresses specific sections of the ordinance relevant to Labo, an approach not commonly explored in other literature. By employing a quantitative method, this research aims to fill the gap in understanding the

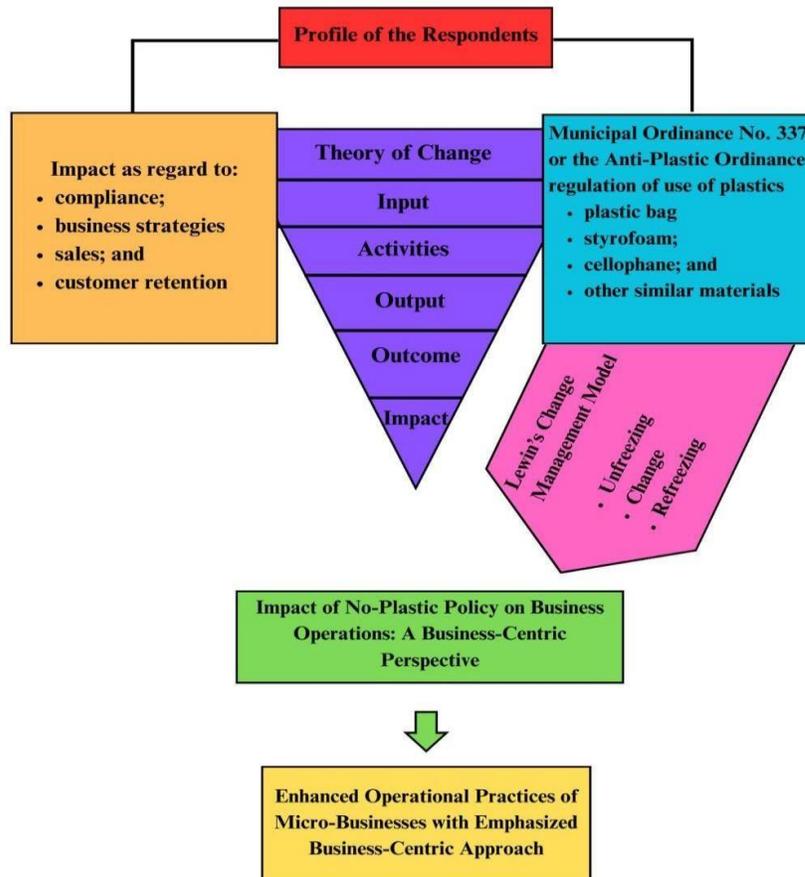
impacts of the No-Plastic Policy on micro-business operations, offering insights into the unique challenges and adaptations faced by micro-businesses in Labo.

### 2.3. Theoretical Framework

This study applies Weiss's Theory of Change (1995) and Lewin's Change Management Model (1940) to evaluate the impact of Labo's Anti-Plastic Ordinance (Ordinance No. 337) on micro-businesses. The Theory of Change views the ordinance as an input, adaptation efforts as activities, compliance systems as outputs, and acceptance as the outcome, framing its operational effects. Lewin's model, with its Unfreezing, Changing, and Refreezing stages, tracks businesses' adaptation: recognizing the need for change, strategically complying, and integrating these changes into daily practices. Visual cues are used to highlight significance—red for respondent profiles, green for sustainability, and purple and pink for theory connections.

**Figure 1**

*Theoretical paradigm of the study*



### **3. Methodology**

#### ***3.1. Research Design***

The study employed a descriptive-quantitative research design to examine the impact of the no-plastic policy on micro-businesses in Labo, Camarines Norte. This approach was chosen to address the gap in the existing literature, as few studies have quantitatively explored this topic. The study focused on determining the level of compliance with Municipal Ordinance No. 337 and assessed its impact on packaging, pricing strategies, sales, and customer retention. This design allowed for an objective analysis of the ordinance's effects on business operations.

#### ***3.2. Population of the Study, Sampling Procedures, and Techniques***

The study focused on enterprises, particularly 48 micro-businesses. Of these, five had closed, and one respondent declined participation, resulting in 42 micro-businesses actively participating in the survey. These businesses were defined based on the criteria of having fewer than 10 employees and assets not exceeding PHP 3 million (Department of Trade and Industry, 2022).

Located in Barangays Anahaw, San Francisco, Gumamela, Kalamunding, and Pinya, the participating businesses were identified with the assistance of the Mayor's Office and the Licensing Section. The sample included four business categories: Dry Goods, Frozen/Wet Products, Fruits & Vegetables, and Food & Beverages, providing a representative view of the area's micro-business landscape. Of the 1,105,143 micro, small, and medium enterprises (MSMEs) in the Philippines, micro-enterprises account for 90.49% (1,004,195) of the total (Department of Trade and Industry, 2022), making them ideal respondents for this study.

To be eligible for inclusion, a micro-business had to meet three criteria: it must be a registered micro-business; it must be located in one of the five selected barangays (San Francisco, Pinya, Gumamela, Anahaw, or Kalamunding); and it must be engaged in selling products in one of the following categories: dry goods, frozen/wet goods, fruits/vegetables, or food/beverages.

The study used total enumeration sampling due to the small number of micro-businesses present in the area. This method ensured comprehensive representation and reduced sampling bias, thereby enhancing the study's accuracy and validity.

### 3.3. Data Collection

Data were collected using a structured survey questionnaire consisting of closed-ended and multiple-choice questions. These were designed to gather information on the respondents' profiles and determine their level of compliance with the ordinance, as well as its impact on business operations, measured using a 4-point Likert scale. To enrich the data, a brief follow-up interview was conducted to add depth to some responses.

The questionnaire was reviewed by academic advisors and pilot-tested with 10 micro-businesses in Vinzons, Camarines Norte, chosen for its similarities to the study area and its existing regulations on single-use plastics. Informed consent was obtained from all participants, and confidentiality was strictly maintained. The collected data were then tallied, organized, and prepared for analysis.

### 3.4. Tools for Data Analysis

The study utilized several statistical tools, as recommended by a statistician, to analyze the data. These included the percentage technique, frequency analysis, mean, and Spearman Rank Correlation. The analysis was conducted using Statistical Product and Service Solutions (SPSS) Version 21.

## 4. Results and Discussion

Table 1 examines the operational duration of micro-businesses according to the findings. It implies that 35 micro-businesses, representing 83.3 percent, have been in operation for a period of 1 month to 8 years. In contrast, merely 1 micro-business, or 2.4 percent, has been operational for almost 17 years.

**Table 1**

*Years of operation*

Category	Frequency	Percentage
1 month - 8 years	35	83.33
9-16 years	6	14.29
17-24 years	1	2.38
<b>Total</b>	<b>42</b>	<b>100</b>

Many businesses in their early stages struggle to adjust to Municipal Ordinance No. 337, facing challenges that affect their sustainability. Research by Ankita and Saikia (2023) shows that businesses often encounter difficulties within their first five years, requiring resilience to adapt to government policies. For this, Iborra et al. (2019) advise small businesses to remain flexible in order to survive such regulations. Businesses established before the ordinance are more likely to endure, benefiting from prior experience and requiring only minimal adjustments to comply. As noted by Kücher et al. (2022), businesses with more experience adapt more easily to the plastic ban ordinance. Despite initial difficulties, adapting to the ordinance is essential for long-term success.

Table 2 shows that 50 percent of micro-businesses (21 respondents) sell food and beverages, 35.7 percent (15 respondents) sell dry goods, and 7.1 percent (6 respondents) sell frozen and wet goods or fruits and vegetables.

**Table 2**

*Types of products micro business offers*

Category	Frequency	Percent
Dry goods	15	35.7
Frozen and wet goods	3	7.14
Fruits and vegetables	3	7.14
Food and beverages	21	50.00
<b>Total</b>	<b>42</b>	<b>100</b>

Micro-businesses in the area are categorized into four types based on their offerings, with food and beverage businesses being the most common. These businesses contribute significantly to plastic waste due to the high usage of single-use packaging, especially from on-the-go consumption (Mishra et al., 2020). Plastic bans notably impact food and beverage businesses, where owners are concerned about the cost and durability of alternatives. The law also affects frozen, perishable, and produce businesses due to the challenges of using plastic substitutes for moisture-resistant packaging, which, according to White and Lockyer (2020), affects quality control and reduces shelf life when using eco-friendly packaging alternatives.

Tables 3 to 5 highlight business compliance with key sections of Municipal Ordinance No. 337, organized for clarity. Sections 4.1 and 6 prohibit plastic use, urging reduced reliance on plastic packaging. Sections 7 and 9.2 promote eco-friendly materials,

while Sections 8 and 9.3 encourage local entrepreneurs to produce affordable alternatives, supporting sustainability in Labo, Camarines Norte.

Table 3 shows that all businesses consistently comply with the regulations, with Indicator 4 having the highest mean (3.60), indicating adherence to prohibitions even without supervision. Indicator 3, with the lowest mean (3.43), reflects restrictions on single-use plastic packaging. Micro-businesses show high overall compliance, with an average mean of 3.52.

**Table 3**

*Labo Municipal Ordinance No. 337 Sections 4.1 and 6*

Indicators	Weighted Mean	Interpretation
1. The business does not sell, provide, or dispense any kind of plastic bags, styrofoam, cellophane, or other similar materials as tertiary packaging for products.	3.50	AC
2. The business ceased to use banned materials for packaging and bagging of customer-purchased items.	3.52	AC
3. The business prohibits the use of any kind of single-use plastic or receptacles for packaging and bagging of products.	3.43	AC
4. The business complies with the prohibition both with and without the supervision of governing authorities.	3.60	AC
5. The business does not tolerate customer demand for any kind of plastic and other banned materials to use as packaging and packing materials.	3.57	AC
<b>Average Weighted Mean</b>	<b>3.52</b>	<b>AC</b>

**Legend:** 3.25 – 4.00 Always Complied; 1.75 – 2.49 Sometimes Complied; 2.50 – 3.24 Often Complied; 1.00–1.74 Never Complied

The micro-businesses demonstrate a significant degree of adherence to the ordinance, as evidenced by the average weighted mean. This suggests that the rigorous enforcement by Labo's governing authority compels firms in the five barangays to comply strictly with the legislation. Fines and penalties effectively promote compliance, as respondents prefer adherence over incurring penalties. Similarly, Nyathi and Togo (2020) determined that a prohibition on plastic bags is futile without stringent enforcement, which aligns with this study's findings regarding Labo's strict implementation of the ordinance. Moreover, a local study by Velasco et al. (2020) contends that enterprises in Labo diligently comply with the Anti-Plastic Ordinance due to rigorous enforcement and penalties.

Table 4 shows that Labo micro-businesses generally comply with Municipal Ordinance No. 337, particularly Sections 7 and 9.2 on environmental practices. They prioritize sustainable packaging, eco-friendly materials, and educating customers on plastic alternatives, with a high mean score of 3.57. However, the direct provision of plastic alternatives and consistent daily use scored slightly lower at 3.55, indicating some areas for improvement. The overall mean of 3.56 reflects a strong commitment to the ordinance and sustainability.

**Table 4**

*Labo Municipal Ordinance No. 337 Sections 7 and 9.2*

Indicators	Weighted Mean	Interpretation
1. The business offers plastic alternatives or eco-friendly bags to the customer for packaging and bagging.	3.55	AC
2. The business adopts the use of recommended plastic alternatives and eco-friendly bags in their day-to-day operations.	3.55	AC
3. The business reduces plastic's environmental impact by using eco-friendly alternatives in packaging and bagging.	3.57	AC
4. The business promotes eco-friendly materials and plastic alternatives for tertiary product packaging, bagging, and wrapping.	3.57	AC
5. The business raises customer awareness about the benefits of using plastic alternatives and eco-friendly materials for packaging and bagging.	3.57	AC
<b>Average Weighted Mean</b>	<b>3.56</b>	<b>AC</b>

**Legend:** 3.25 – 4.00 Always Complied; 1.75 – 2.49 Sometimes Complied; 2.50 – 3.24 Often Complied; 1.00–1.74 Never Complied

The results indicate strong compliance among micro-businesses in the financial district, demonstrating active cooperation and discipline in adopting eco-friendly packaging. This underscores the importance of government-business collaboration for effective ordinance implementation. Dijkstra (2023) emphasizes that sustainable plastic use requires systemic change involving regulations, shifts in consumer behavior, and business innovation. Similarly, studies highlight the crucial role of society, government, and public awareness in effectively managing plastic usage, underscoring the interconnected effort needed to promote responsible consumption (Sumanik et al., 2021; Killip & Dadulla, 2023).

Business compliance with Sections 8 and 9.3 of Labo Municipal Ordinance No. 337 is evident, with Table 5 showing frequent adherence. Indicator 5, which involves sourcing

eco-friendly packaging from recognized suppliers, has the highest weighted mean of 3.60. Indicator 1, which pertains to the local production of eco-friendly packaging, has the lowest weighted mean of 2.95. The average weighted mean of 3.25 indicates consistent adherence overall.

**Table 5**

*Labo Municipal Ordinance No. 337 Sections 8 and 9.3*

<b>Indicators</b>	<b>Weighted Mean</b>	<b>Interpretation</b>
1. The business locally produces recommended alternative and eco-friendly materials for packaging and bagging, applicable to the kind of goods or merchandise.	2.95	OC
2. The business sources its packaging from locally produced raw materials.	3.29	AC
3. The business locally manufactures eco-friendly packaging and bagging receptacles offered at reasonable prices.	3.26	AC
4. The business innovates a new line of packaging and bagging materials crafted exclusively from eco-friendly sources.	3.14	OC
5. The business ensures that the source of packaging materials is from approved suppliers who provide eco-friendly options.	3.60	AC
<b>Average Weighted Mean</b>	<b>3.25</b>	<b>AC</b>

The table results reveal strong compliance by micro-businesses with Ordinance Sections 8 and 9.3, demonstrating their awareness and willingness to use eco-friendly packaging from approved suppliers, which reflects sustainable purchasing practices. Suherlan and Widiyanti (2021) note a shortage of eco-friendly packaging producers, causing some micro-businesses to purchase packaging rather than produce it locally. However, the majority of businesses in Labo, Camarines Norte, struggle to use locally produced packaging due to high costs and limited local suppliers. These findings highlight both the commitment to and the practical challenges of adopting sustainable packaging solutions. As noted by Boz et al. (2020), decision-makers face cost and logistical challenges in adopting sustainable packaging, especially in the absence of clear sales or cost benefits.

Table 6 shows that Indicator 5 has the highest mean (3.40), suggesting that businesses adjust pricing to recover the cost of alternative packaging. Indicator 3 has the lowest mean (3.02), indicating that the availability of plastic alternatives influences competitive pricing. The average mean score of 3.15 reflects a shared view among micro-businesses regarding the ordinance's impact on pricing strategies.

Most businesses are concerned about how the ordinance affects pricing, as compliance increases operational costs. To cover these expenses, business owners adjust their pricing strategies. Research by Sai (2020) found that financial pressures from alternative packaging materials led businesses to employ captive product pricing to recoup costs. This aligns with the survey results, where businesses expressed concern about pricing adjustments necessary to offset these expenses.

**Table 6***Pricing strategies*

Indicators	Weighted Mean	Interpretation
1. The prohibition of selling, providing, and dispensing any kind of plastic bags, styrofoam, cellophane, and other similar packaging materials causes businesses to adjust their pricing decisions.	3.10	A
2. The locally produced and innovative offering of plastic alternatives and eco-friendly bags to customers leads businesses to employ a cost-plus pricing strategy to recoup their expenses.	3.10	A
3. The availability of various plastic alternatives in the market as tertiary packaging and bagging materials for purchased items prompts businesses to competitively price their products.	3.02	A
4. Compliance with the ordinance leads businesses to segment markets and products, tailoring pricing strategies to meet the specific needs and willingness to pay for each segment.	3.12	A
5. Customer packaging needs prompt businesses to employ captive product pricing strategy to recover the cost of alternative packaging materials.	3.40	SA
<b>Average Weighted Mean</b>	<b>3.15</b>	<b>A</b>

**Legend:** 3.25 – 4.00 Strongly Agree; 2.50 – 3.24 Agree; 1.75 – 2.49 Disagree; 1.00 – 1.74 Strongly Disagree

Wandosell (2021) found that pricing plays a key role in shaping purchase intentions among consumers of green products, supporting concerns over adjusting prices to compensate for added costs. Additionally, Sana (2020) finds that competition in pricing among green product businesses, driven by the use of plastic alternatives, leads to competitive pricing of tertiary packaging. This aligns with the study's finding that businesses price green products strategically to gain a market advantage.

Table 7 shows that businesses prioritize simplicity ( $\bar{x} = 3.62$ , Indicator 2), with an average weighted mean of 3.56, as eco-friendly practices encourage reducing excess packaging and conserving materials.

**Table 7**

*Packaging strategies*

Indicators	Weighted Mean	Interpretation
1. The plastic bag, styrofoam, cellophane, and other similar materials ban prompts businesses to create alternative packaging materials.	3.55	SA
2. Business compliance with the use of plastic alternatives and eco-friendly packaging and bagging materials causes businesses to focus on reducing excess packaging, emphasizing simplicity.	3.62	SA
3. The adoption of eco-friendly options in daily business operations reduces business packaging size to save materials.	3.52	SA
4. Offering plastic alternatives or eco-friendly bags to customers led the business to use reusable packaging materials rather than recyclable materials for extended customer use.	3.55	SA
5. Compliance with the ordinance guidelines and requirements induces businesses to custom-build packaging for their products to prioritize ease of use and convenience.	3.55	SA
<b>Average Weighted Mean</b>	<b>3.56</b>	<b>SA</b>

*Legend:* 3.25 – 4.00 Strongly Agree; 2.50 – 3.24 Agree; 1.75 – 2.49 Disagree; 1.00 – 1.74 Strongly Disagree

The table shows that most micro-businesses strongly agree on the extent to which the ordinance impacts their packaging strategies. Municipal Ordinance No. 337 requires businesses to switch to eco-friendly materials, significantly affecting how they present their products. Environmental concerns and customer demand drive businesses to adopt eco-friendly packaging, as highlighted by Wandosell et al. (2021) and Calzada (2021), who note that businesses adopt sustainable packaging due to societal pressure, customer attitudes, and regulatory requirements. These findings align with the present study, showing that micro-businesses comply with the ordinance by transitioning to plastic alternatives.

Table 8 shows that all respondents agree that compliance with plastic replacements and eco-friendly packaging affects sales stability. Indicator 1 has the highest mean at 3.14, while Indicator 5, measuring the difficulty in meeting revenue goals, follows with a mean of 3.05. Overall, micro-businesses perceive the ordinance's impact on sales, reflected in an average mean of 3.09.

Respondents typically agree that the ordinance affects sales. They confirm that the unfavorable impact of the ordinance on customer prospects and the cost of adapting to it affect sales stability. According to Pacatang (2020), grocers and shops near cities with plastic bans experienced lower sales. Xu et al. (2022) further found that the Plastic Bag Reduction Law affected grocery store and supermarket sales. These studies support the respondents' view that their sales have been influenced by the government's plastic reduction policy. Although the ordinance attracts environmentally conscious consumers, most respondents do not perceive the impact to be severe enough to strongly agree with its negative effects (Choi & Lee, 2020).

**Table 8***Sales*

Indicators	Weighted Mean	Interpretation
1. Business compliance with recommended plastic alternatives and eco-friendly packaging affects sales stability.	3.14	A
2. The business's total sales revenue has decreased since the compliance with Municipal Ordinance No. 337.	3.07	A
3. The Anti-Plastic Ordinance has altered the business's ability to retain revenue from existing customers over a specific period of time.	3.07	A
4. The Municipal Ordinance No. 337 affects the business's expense-to-sales ratio.	3.10	A
5. With the implementation of Ordinance No. 337, the business has faced difficulty in reaching its target revenue within a specific period.	3.05	A
<b>Average Weighted Mean</b>	<b>3.09</b>	<b>A</b>

**Legend:** 3.25 – 4.00 Strongly Agree; 2.50 – 3.24 Agree; 1.75 – 2.49 Disagree; 1.00 – 1.74 Strongly Disagree

Indicator 1 shows that business compliance with the ordinance results in negative customer feedback, with the highest weighted mean of 3.24, while Indicator 5 indicates that businesses lose frequent customers, with the lowest mean of 2.74. Overall, micro-businesses report a significant impact of the ordinance on client retention.

Micro-businesses in Labo, Camarines Norte agree that Municipal Ordinance No. 337 impacts customer retention. The study highlights complaints regarding the durability and convenience of eco-friendly packaging, especially paper bags, for businesses selling bulky, frozen, and food products. Vicente et al. (2022) found similar customer frustrations in food businesses, supporting the finding that poor packaging affects customer retention. Chen and

Chen (2020) noted that green marketing can make products appear expensive, further reducing customer retention.

**Table 9**

*Customer relation*

Indicators	Weighted Mean	Interpretation
1. Business compliance with the ordinance results in negative customer feedback.	3.24	A
2. Customer loyalty to the business decreases as a result of compliance with the regulations and requirements of Ordinance No. 337.	2.88	A
3. Customer referrals decrease due to the business's compliance with the Anti-Plastic Ordinance.	2.90	A
4. The implementation of Municipal Ordinance No. 337 affects the business's ability to keep customers engaged with their business.	2.86	A
5. Municipal Ordinance No. 337 causes the business to lose frequent customers.	2.74	A
<b>Average Weighted Mean</b>	<b>2.92</b>	<b>A</b>

**Legend:** 3.25 – 4.00 Strongly Agree; 2.50 – 3.24 Agree; 1.75 – 2.49 Disagree; 1.00 – 1.74 Strongly Disagree

Table 10 presents the Spearman Rank Correlation ( $r_s$ ) between compliance levels and micro-business operations in Labo's financial district at a 5% significance level.

**Table 10**

*Relationship between the level of compliance and its impact on business operations*

Compliance to Municipal Ordinance No. 337	Impact on Business Operation			
	Pricing	Packaging	Sales	Customer Retention
Compliance level to section 4.1 and 6	$r_s = 0.057$	$r_s = 0.229$	$r_s = -0.212$	$r_s = -0.082$
	$p = 0.720$	$p = 0.145$	$p = 0.178$	$p = 0.604$
Compliance level to section 7 and 9.2	$r_s = 0.181$	$r_s = 0.053$	$r_s = 0.106$	$r_s = 0.071$
	$p = 0.251$	$p = 0.739$	$p = 0.504$	$p = 0.653$
Compliance level to section 8 and 9.3	$r_s = 0.230$	$r_s = 0.457^{**}$	$r_s = 0.024$	$r_s = 0.200$
	$p = 0.143$	$p = 0.002$	$p = 0.882$	$p = 0.205$

**Legend:** \*Significant at 0.05; \*\* Highly Significant at 0.05 below

Municipal Ordinance No. 337: Section 6 and Section 4.1 (2019 amendment) ban the use of cellophane, Styrofoam, and plastic bags. Sections 8 and 9.3 encourage local manufacturing of eco-friendly packaging, while Sections 7 and 9.2 mandate the use of cloth

and paper bags as plastic alternatives. Sections 8 and 9.3 show a significant impact on packaging, as indicated by a positive correlation between businesses' packaging strategies and compliance ( $r_s = 0.4587$ ,  $p = 0.002$ ). No significant correlation was found between Sections 4.1, 6, 7, and 9.2 and micro-business operations, including pricing, sales, and customer relations.

Correlation tests indicate a significant relationship between compliance levels and the impact on business operations related to packaging. Micro-businesses in Labo's financial district prefer sourcing eco-friendly packaging from approved suppliers rather than self-manufacturing. Siuda and Grębosz-Krawczyk (2025) highlight that packaging serves a dual role in product protection and marketing. However, businesses in Labo prioritize simplicity due to the ordinance, aiming to minimize excess packaging that imposes additional costs. Bandara (2022) supports this, showing consumer preference for minimal, reusable, and biodegradable packaging, reinforcing the impact of sustainable packaging on purchase choices.

Compliance levels and their impact on micro-business pricing, sales, and customer retention show no significant correlation. Pricing is less affected, as retail prices are governed by regulations, including franchise rules and the Price Act. While businesses offer eco-friendly packaging, the decision to purchase lies with the customers. Sales show minimal changes, indicating that consumers prioritize sustainable packaging even with additional charges. Customer retention is not greatly impacted, as it is primarily influenced by customers' willingness to pay, alongside perceived value, environmental concern, and sustainability attitudes (Gano-an, 2017; Xu et al., 2022).

## **5. Conclusion**

The study finds that food and beverage micro-businesses in Labo, Camarines Norte, are key contributors to single-use plastic waste and are most affected by Municipal Ordinance No. 337. While compliance is high and businesses show commitment to eco-friendly packaging, they face challenges with the durability and cost of alternatives—especially for items like frozen and wet produce. The ordinance has impacted pricing strategies, as businesses adjust prices to cover the costs of eco-friendly packaging. Despite concerns over product quality and sales stability, businesses comply to avoid penalties and maintain a positive community image.

The study found a moderate positive relationship between compliance with Sections 8 and 9.3 of the ordinance and its impact on packaging practices ( $r_s = 0.4587$ ,  $p = 0.002$ ), leading to the rejection of the null hypothesis. Micro-businesses in Labo's financial district preferred eco-friendly packaging from approved suppliers. Although the overall compliance correlation with business operations was weak, Sections 8 and 9.3 significantly impacted packaging practices. However, no significant relationship was found between compliance with Sections 4.1, 6, 7, and 9.2, suggesting that business decisions are more market-driven than influenced by regulatory compliance.

To enhance sustainability, micro-businesses should minimize plastic use, maintain consistent packaging practices, and explore cost-effective alternatives. New business owners are encouraged to familiarize themselves with the ordinance to avoid violations. Future studies may explore other aspects of the ordinance not covered in this research. Due to the limited geographic scope, the findings may not be generalizable to micro-businesses outside Labo or to other sectors not covered by the study. Additionally, businesses operating without registration were not included, potentially missing insights from unregistered entities. As the study period was short, any seasonal fluctuations or external events occurring outside this timeframe were not accounted for, which may affect the study's insights into the long-term effects of the ordinance.

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**Institutional Review Board Statement**

This study was conducted in accordance with the ethical guidelines set by Camarines Norte State College. The conduct of this study has been approved and given relative clearance by Camarines Norte State College Office of the President as endorsed by Office of the Vice President for Research and Extension and Research Services Division.

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