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A Market Research on Introducing Drinking Straw Made of Dried Mango Leaves in the Province of Pampanga

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Abstract

Drinking straws have been almost a staple commodity and a hygiene tool to customers buying drinks and beverages from expensive iced coffee sold in coffee shops down to bottled soft drinks sold in retail stores. As for the continuous usage of plastic drinking straws, so is the continuous generation of solid waste. Furthermore, petroleum is needed for the production of plastic drinking straws, hence another cause of air pollution. The paper tackles the possibility of introducing in the market, a drinking straw made of dried mango leaves. Dried Mango leaves are another solid waste being discarded on a regular basis in many places in the Philippines. Thus, lessening the combustion of the said leaves would decrease the worsening greenhouse effect. To ensure the sustainability of the utilization of this innovative product, a market study is conducted. The different micro, small and medium enterprises where consumers buy drinking straws in the province of Pampanga were surveyed as target market. A demand-supply gap analysis is presented which in the end, leads to the conclusion of the projected number of unsatisfied customers from existing consumers of drinking straw made of plastic.

Index Terms - Solid waste management; Green Engineering; Innovative Drinking Straw; Market Research; Philippines.

Introduction

Plastic drinking straw is a common tool used in maintaining hygienic food presentation, thus preventing the spread of communicable diseases. However, as for the continuous usage of plastic drinking straws, so is the continuous generation of solid waste.

The Ocean Conservancy and McKinsey Center for Business and Environment reported that the Philippines ranked as the third (3rd) top

source of plastic leaking into oceans in a February 2015 study. The country generates 2.7 million metric tons of plastic garbage each year, 20% or 521,000 tons of which ends up in the ocean (McKinsey&Company, 2015). Moreover, petroleum is needed for the production of plastic drinking straws, hence another cause of air pollution.

Another solid waste being discarded on a regular basis both in residential and commercial areas are dried leaves. The Philippines has a tropical weather, which is highly favorable for growing trees both in rural and urban places. These trees, which naturally shed leaves that dry, are eventually considered as solid waste. Filipinos at home engaged in urban gardening would most likely use these dried leaves as a component of compost. On the negative side, others would just burn these leaves and contribute to the worsening greenhouse effect. On the other hand, others would just sweep and dispose them in garbage cans and would leave alone for decomposition.

For the reason that this problem could not be solved through the combustion of the dried leaves and that composting takes up a large portion of time, effort, and space, the researcher conducted this study to determine the marketability of developing a drinking straw made from dried leaves.

A common understanding is that paper is made generally from wood. Scholarly observations assume that wood makes up about 90% of the conventional raw material used for pulp and paper production in the world (Madakadze, Masamvu, Radiotis, Li, & Smith, 2010). However, due to the continuous depletion of trees in forests and its aggressive impact on the environment, several previous studies have compared the fibers of wood and non-wood materials to test if these non-wood materials could be potential alternatives in producing paper (Tran, 2006). Stenius et al. (2000) reported that the fiber composition of wood and non-wood materials from trees can be quite similar. This shows the potentiality of the idea of choosing non-wood materials such as dried leaves as alternative raw materials for papermaking.

With these facts come the ideas of making an innovative product of a paper drinking straw made of dried Mango leaves. A separate research was conducted in determining the materials used and the process of making the product. Appendix 1 shows the summary of the systematic procedures and the process descriptions in making the product. Appendix 2 shows a picture of what the finished product looks like.

This market research focuses on determining the marketability of this new product with the province of Pampanga as the target market location. This is necessary to ensure the sustainability of the product's utilization by the users. Previous studies on new market entry note that market size should be one of the most important factors to consider in

new market entry decisions, as market size reflects the market's post-entry profit potential for entrants (Min, Kim, & Zhan, 2017)

Conventional wisdom suggests that firms enter new markets with the expectation of making economic profits. Accordingly, new market entry has long been researched in relation to the focal market's size, usually referred to as market potential or market demand, as it is assumed to indicate, to a great extent, the post-entry profits to be expected from the new market (Fuentelsaz & Gomez, 2006).

Market potential is the limit approached by market demand as industry marketing effort goes to infinity, whereas market demand for a product or service is the total volume bought by customers in the market ((Kotler, 1984). But despite this difference, market size in terms of both is considered to be a crucial factor for success in a new market because both are related to expected post-entry profit (Rodríguez-Pinto, Gutiérrez-Cillán, & Rodríguez-Escudero, 2007). Potential entrants often speculate that a large market size may offer them a better chance to realize profits based on high unit sales, because unit sales, by definition, mean the firm's share of the market.

Filipinos are natural-born food lovers. Every established mall has its own outlets of various restaurants and fast food chains. However, budget wise people choose to eat and quench their thirst in cafeterias and *carinderias* whether inside work or educational institutions. According to the Census of Philippine Business and Industry (CPBI) released by the Philippine Statistics Authority (PSA) in 2016, there were 26,557 establishments engaged in Accommodation and Food Service Activities nationwide (e.g. cafeterias, hotels, motels, bars, and cocktail lounges). Among these, restaurants and mobile food service activities garnered the highest number of establishments at 74.8 percent or 19,853 establishments. The data provided by the Department of Trade and Industry (DTI) Pampanga Provincial Office, as well as the DTI Business Name Registration Helpdesk in its National Office, show that the province of Pampanga comprise 6.8% of the national statistics of business names registered under the same category in the same year. This means that in 2016, there were 1,351 establishments, which operated in this category in the province. Retail stores, also known as *sari-sari* stores are also scattered among b*arangays* across our country. These facts tell us that the drinking straw product still has a potential market in the country, and in the province of Pampanga. It is still considered a necessary commodity and a hygiene tool to customers buying drinks and beverages.

Will an entering firm that would offer the production and distribution of an innovative drinking straw has a potential in the market also? This paper is all about the search for the answer to this question. This paper tries to answer the following research questions:

- To ensure the sustainability of the utilization of an innovative drinking straw made of dried mango leaves, what are the yearly projected demands in the province of Pampanga to estimate its marketability?
- What is the relationship of the existing supply and demand of the product (i.e., supply of plastic drinking straw vs demand for drinking straw made of dried Mango leaves) that is present in the Pampanga market?
- What is the approximate percentage (%) of unsatisfied potential market?

Methodology

Considering the proposed product as a good alternative to the commonly used plastic drinking straw, this project aims to provide an environmental-friendly paper drinking straws to people of all lifestyles. The focus of the market are the micro, small and medium enterprises (MSMEs) such as *sari-sari* stores, mini marts, grocery stalls, convenience stores and the like, where people buy drinking straws and use drinking straws for beverage intake.

A quantitative approach of research was conducted. Appointments and surveys were administered to fifty (50) store owners. The participants were randomly and selected evenly from the different towns/cities of the four (4) political districts of the province. Appendix 3 shows a copy of the survey instrument used.

Moreover, a visit was conducted to the Department of Trade and Industry (DTI) – Pampanga Provincial Office and the necessary data were requested to and provided by Ms. Arlene P. Gomez, the designated Trade and Industry Development Specialist of the office. The provided information was further verified by Mr. Jedryck Empalmado of the DTI National Office's Business Names Registration Helpdesk. The data from the survey, as well as the statistics from PSA and DTI, were used to analyze and calculate the projected demand for the product for the next five (5) years.

Furthermore, interviews to known suppliers of plastic drinking straws in the province of Pampanga and searches on their archival records were done. For the years 2014 to 2017, annual supplies of each supplier to their customers (i.e., retails stores, mini-marts, grocery stalls, convenience stores and the like) within the bounds of the province were looked into. The data for the past five (5) years were tabulated. These were used to compute for the projected annual supplies for the next five (5) years. In conclusion, the percentage (%) of the projected unsatisfied market is derived from the demand-supply gap analysis. This is used to compute for a viable production volume for the succeeding year.

Results and Discussions

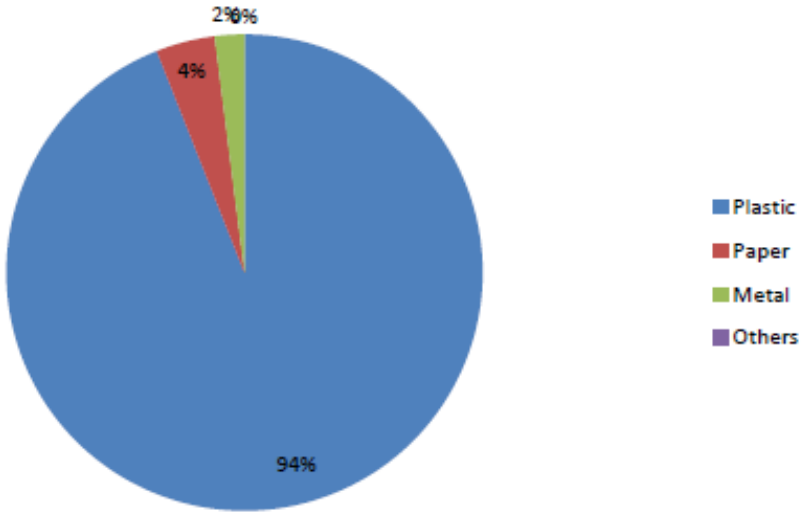
Survey Results

The first part focuses on the descriptive statistics of the conducted survey. The following discussions elaborate the findings from the six (6) questions of the survey instrument:

Question 1: What kind of drinking straw do you sell?

Fig. 1 shows that of the fifty (50) respondents, 47 (or 94%) are selling plastic straws, while 2 (or 4%) stores sell paper straws and only 1 (2%) store sells metal straws. This means that majority of the drinking straws sold by the respondents are made of plastic.

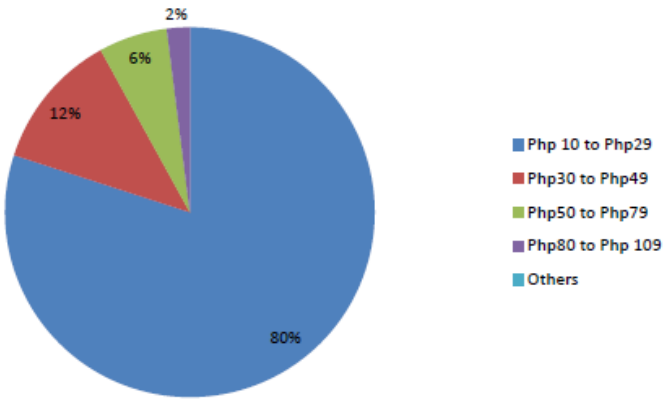
Figure 1 - Respondents' Answers to Question No.1



Question 2: What is the price range of the drinking straws that you are selling? (Per pack, approx. 100g)

According to the survey, the price range of per pack of drinking straws of 40 out of 50 stores is from Php10 to Php29, which is 80% of the total respondents. Six (6) store owners responded that the price of per pack of drinking straws ranges from Php30 to Php49, which comprises the 12%, while 3 store owners making up the 6% of the sample answered that the price of the drinking straws per pack is from Php50 to Php79. Lastly, the remaining 2% or only 1 store owner answered that the price of the drinking straws per pack is from Php80 to Php109. Fig. 2 below illustrates these findings.

Figure 2 - Respondents' Answer to Question No. 2

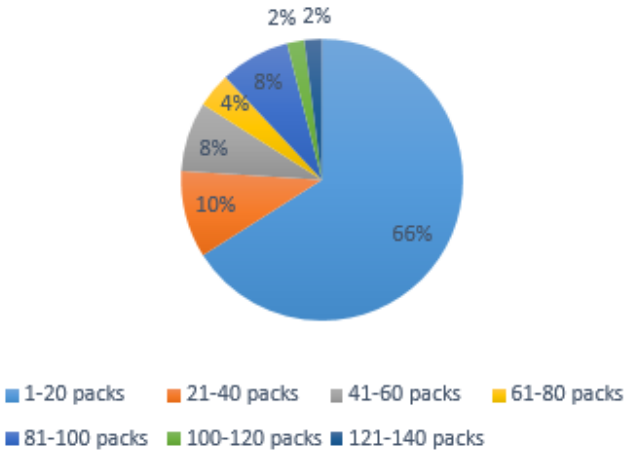


Question 3: How many packs of drinking straws are being supplied to your store every month (on average)?

Fig. 3 below illustrates the results from the survey on the monthly supply of drinking straws to the 50 stores. Thirty-three store owners answered that 1 to 20 packs of drinking straw are being supplied to them. These stores comprise the 66% of the sample population. Meanwhile, 10% or 5 of the stores responded that 21 to 40 packs were being supplied. However, 4 of them which make up the 8% are being supplied with 41 to 60 packs of drinking straw while 2 were being supplied with 61 to 80 packs which are 4% of the respondents. Four storeowners also responded that they are being supplied with 81 to 100 packs of drinking straw, which also constitute the 8%. The largest supplies of 101 to 120 packs, 121 to 140 packs and above are tied with 1 respondent each making up only 2% of the sample.

This exhibits that most of the respondents are being supplied with 1 to 20 packs of drinking straws every month.

Figure 3 - Respondents' Answers to Question No. 3

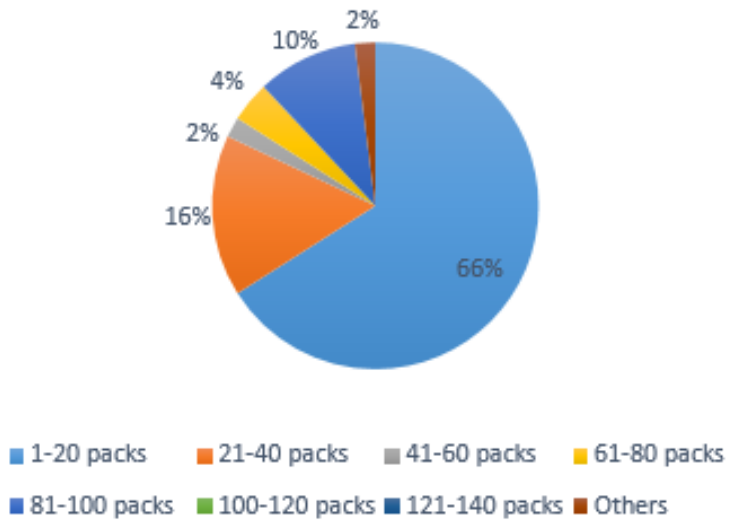


Question 4: How many packs of drinking straws are being sold every month (on average, approx. 100g)?

Fig. 4 exhibits the estimated number of packs of drinking straws being sold every month. Thirty-three respondents, also known as 66% were said to be able to sell 1 to 20 packs of drinking straw whereas 8 storeowners said that they were able to sell 21 to 40 packs which make up 16% of the respondents. Only 1 or 2% of the sellers responded that 41 to 60 packs were being sold and 2 storeowners which are the 4% answered that they can sell 61 to 80 packs of drinking straw. 81 to 100 packs were being sold to 5 stores or 10% while no one responded that they are able to sell 101 to 120 packs and 121 to 140 packs. The remaining 1 seller answered that more than 140 packs were being sold which is the remaining 2%.

This means that most of the respondents are able to sell the least amount, which is 1 to 20 packs of drinking straws with approximately 100 grams per pack.

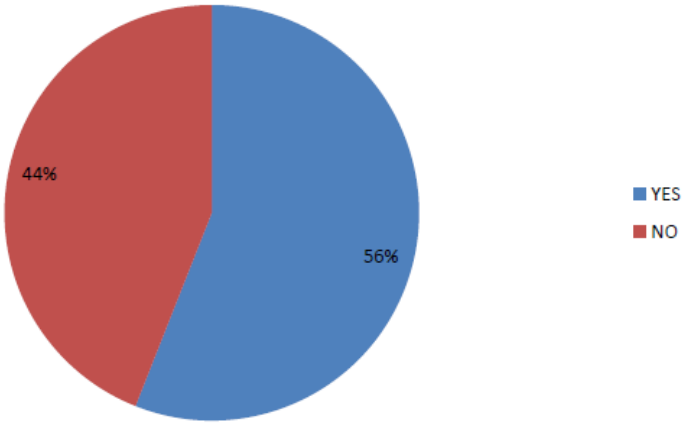
Figure 4 - Respondents' Answers to Question No. 4



Question 5: Have you heard about paper drinking straw?

The figure below shows that 28 (or 56%) of the respondents are aware of the existence of paper drinking straw while the remaining 22 (or 44%) are not. The gathered data show that most of the store owners are knowledgeable that paper drinking straws are existent in the market nowadays.

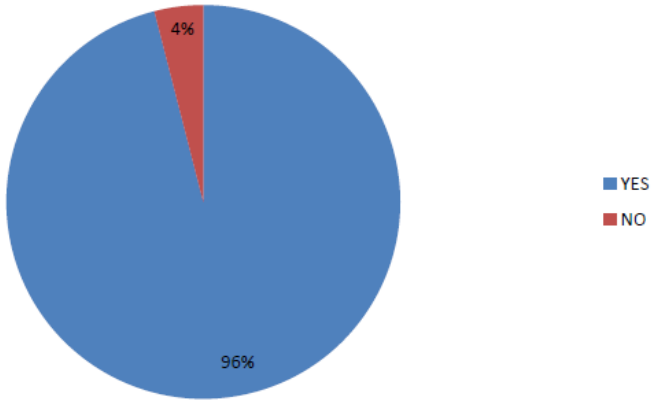
Figure 5 - Respondents' Answers to Question No. 5



Question 6: Given the chance that an innovated, environment-friendly paper drinking straw made from dried leaves would be available in the market, would you be willing to sell it?

According to the survey conducted, 48 (or 96%) of the stores are willing to sell the product given the chance that it will be marketed, while only 2 (or 4%) of them answered that they are not willing. This shows that majority of the SMEs are willing to sell the proposed product. Fig. 6 illustrates these findings.

Figure 6 - Respondents' Answers to Question No. 6



Demand Analysis

The information gathered from the Philippine Statistics Authority (PSA), the Department of Trade and Industry (DTI) - Pampanga Provincial Office, and DTI National Office's Business Names Registration Helpdesk were used to compute the target number of MSMEs used in demand analysis.

According to the Census of Philippine Business and Industry (CPBI) released by the Philippine Statistics Authority (PSA) in 2016, there were 26,557 establishments engaged in Accommodation and Food Service Activities nationwide (e.g. cafeterias, hotels, motels, bars, and cocktail lounges). Among these, restaurants and mobile food service activities garnered the highest number of establishments at 74.8 percent or 19,853 establishments. The data provided by the Department of Trade and Industry (DTI) Pampanga Provincial Office, as well as the DTI Business Name Registration Helpdesk in its National Office, show that the province of Pampanga comprise 6.8% of the national statistics of business names registered under the same category in the same year. This means that in 2016, there were 1,351 establishments, which operated in this category in the province.

a. Rate of Sales

All of the data are treated as 'once-a-month' since the questions in the survey asked for the supply and sales of the respondents on a monthly basis. The choices are ranged, so the average numbers are considered in the Number of Frequency (e.g. if the range is 1-20 packs, 10 is used as frequency). Then, the number of participants who answered the respective quantity ranges is counted.

Formulas used:

Monthly Rate of Sales, $MRS_{(in\ packs)}$ = No. of Participants x No. of Frequency

$MRS_{(in\ grams)} = MRS_{(in\ packs)}$ x 100 grams

$YRS_{(in\ grams)} = MRS_{(in\ grams)}$ x 12 months

Table 1 below summarizes the computed values based on the formulas given above.

Table 1 - Rate of Sales

Range of Sales	No. of Participant	No. of Frequency	MRS	MRS (Grams)	YRS (Grams)
1-20 packs	33	10	330	33,000	396,000
21-40 packs	8	30	240	24,000	288,000
41-60 packs	1	50	50	5,000	60,000
61-80 packs	2	70	140	14,000	168,000
81-100 packs	5	90	450	45,000	540,000
100-120 packs	0	110	-	0	0
121-140 packs	0	130	-	0	0
Others	1	150	150	15,000	180,000
TOTAL	50		1,360	136,000	1,632,000

To compute for the Average Monthly Sales:

Average Monthly Sales $_{(in\ grams,\ per\ store)} = MRS_{(in\ grams)}$ ÷ Total Participants

= 136,000 ÷ 50 participants = 2,720 grams

According to the Philippine Statistical Authority (PSA), the annual population growth rate of the province from 2010 to 2015 is at 1.95%. This is used to algebraically solve for the Target Number of Stores for the years 2014 to 2018. These historical data are used for the five-year projection of this market study. The summary of the computed Historical Annual Demands is shown in Table 2.

Formulas used:

Projected Target Market = Target market percentage x Target No. of stores

Demand per month = Projected Target Market x Ave. Monthly Sales (in grams)

Annual Demand = Demand per month x 12 months

Table 2 - Historical Demand Summary

Year	2014	2015	2016	2017	2018
Target No. of Stores	1,300	1,325	1,351	1,377	1,404
Target Market Percentage	96%	96%	96%	96%	96%
Projected Target Market	1,248	1,272	1,297	1,322	1,348
Ave. Monthly Sales (in grams)	2,720	2,720	2,720	2,720	2,720
Demand per month	3,394,072	3,460,256	3,527,731	3,596,522	3,666,654
No. of months per year	12	12	12	12	12
Annual Demand	40,728,862	41,523,074	42,332,774	43,158,264	43,999,850

b. Computation of the Projected Demands

Three (3) methods were used for the computation of the projected demands for the next five (5) years. These were:

- Arithmetic Straight Line Method
- Linear Regression Forecasting
- Parabolic Projection Method

For the Arithmetic Straight Line Method, the Projected Yearly Increment was first computed by the formula given below:

Projected Yearly Increment = (Actual Demand $_{\text{last year}}$ – Actual Demand $_{\text{first year}}$) ÷ No. of years

= (43,999,850 – 40,728,862) ÷ 5 years

= 654,198 grams

This means that starting 2019, there will be an increase of 654,198 grams in the projected demand per year. Table 3 summarizes the Projected Demand (in grams) using the Arithmetic Straight Line Method.

Table 3 - Projected Demands Using Arithmetic Straight Line Method

Year	Projected Demand (in grams)
2019	44,654,047
2020	45,308,245
2021	45,962,442
2022	46,616,640
2023	47,270,838

For the Linear Regression Forecasting, the Projected Demand is the dependent variable (Y) with the Year as the independent variable (X). The formula used is Y = *a* + *b*X, where:

$$a = \bar{y} - b\bar{x}$$

$$b = \frac{\sum (x-\bar{x})(y-\bar{y})}{\sum (x-\bar{x})^2}$$

and where $\bar{x}$ and $\bar{y}$ are the sample means: Average (known x's) and Average (known y's).

Table 4 summarizes the Projected Demand (in grams) using the Linear Regression Forecasting Method.

Table 4 - Projected Demands Using Linear Regression Forecasting

Year	Projected Demand (in grams)
2019	44,801,714
2020	45,619,431
2021	46,437,147
2022	47,254,864
2023	48,072,580

For the Parabolic Projection Method, the formula used is Y = **a** + **b**X + **c**X^2, where n = 5 and

$$\mathbf{a} = \frac{\Sigma x^4(\Sigma y) - \Sigma x^2(\Sigma x^2 y)}{n(\Sigma x^4) - (\Sigma x^2)^2}$$

$$\mathbf{b} = \frac{\Sigma xy}{\Sigma x^2}$$

$$\mathbf{c} = \frac{n(\Sigma x^2 y) - \Sigma x^2 (\Sigma y)}{n(\Sigma x^4) - (\Sigma x^2)^2}$$

Table 5 summarizes the Projected Demand (in grams) using the Parabolic Projection Method.

Table 5 - Projected Demands Using Parabolic Projection Method

Year	Projected Demand (in grams)
2019	44,856,982
2020	45,729,967
2021	46,618,742
2022	47,523,308
2023	48,443,665

After computing the Projected Demands for the next five (5) years using the three (3) different approaches, the Standard Deviation, SD, for each approach was computed. It is a measure of how widely values are dispersed from the average value (the mean). The formula used for computing the sample *SD* is

$$\sqrt{\frac{\sum(x-\bar{x})^2}{(n-1)}}$$

Table 6 - Summary of Standard Deviations for Demand Analysis

Method	Standard Deviation
Arithmetic Straight Line	1,034,377
Linear Regression Forecasting	1,292,923
Parabolic Projection	1,417,838

Table 6 summarizes the computed Standard Deviations for each method. Comparing the three (3) Standard Deviations, the Arithmetic Straight Line Method yielded the lowest *SD.* This means that it has the lowest measure of variation from the average value among the three methods. In this case, the projected demand data using the Arithmetic Straight Line Method shall be used in the succeeding computations.

Supply Analysis

a. Rate of Supplies

Based on the interviews and archival records of ten (10) known suppliers of plastic drinking straws in the province of Pampanga, their historical annual supplies were determined. For the years 2014 to 2018, annual supplies of each supplier to their customers (i.e., retails stores, mini-marts, grocery stalls, convenience stores and the like) within the bounds of the province were looked into. The data for the past five (5) years are tabulated and shown in Table 7.

Table 7 - Historical Summary of Annual Supplies of Known Suppliers in Pampanga

Supplier	2014	2015	2016	2017	2018
Lucky Plast Manufacturing Corp.	1,259,280	1,571,400	1,646,640	1,940,040	2,018,520
Happy Bee Paper Straws	1,202,040	1,435,320	1,602,360	1,886,400	1,931,040
Lucky Diamond	1,244,160	1,601,640	1,623,600	1,724,040	1,754,640
Plastic Consumer Corporation	1,260,000	1,566,720	1,618,200	1,585,800	1,967,760
Zedco	1,228,320	1,418,040	1,580,040	1,908,000	1,852,200
Stan Trading Corporation	1,241,640	1,447,560	1,619,640	1,596,600	1,794,240
Calypso Plastic Center Company	1,212,840	1,394,640	1,603,080	1,955,880	1,778,760
Philippine Plastic Industrial, Inc.	1,244,160	1,477,440	1,616,040	1,888,200	2,132,640
Popular Household Names, Inc.	1,192,320	1,414,440	1,620,000	1,692,000	1,872,360
B&B Straw Pack Corp.	1,231,560	1,512,360	1,612,800	1,602,000	1,744,200
Total	12,316,320	14,839,560	16,142,400	17,778,960	18,846,360

b. Computation of the Projected Supplies

The three (3) methods were also used for the computation of the projected supplies for the next five (5) years.

For the Arithmetic Straight Line Method, the Projected Yearly Increment was first computed by the formula given below:

Projected Yearly Increment = (Actual Supply $_{\text{last year}}$ – Actual Demand $_{\text{first year}}$) ÷ No. of years

= (18,846,360 – 12,316,320) ÷ 5 years

= 1,306,008 grams

This means that starting 2019, there will be an increase of 1,306,008 grams in the projected supply per year. Table 8 summarizes the Projected Supply (in grams) using the Arithmetic Straight Line Method.

Table 8 - Projected Supplies Using Arithmetic Straight Line Method

Year	Projected Supply (in grams)
2019	20,152,368
2020	21,458,376
2021	22,764,384
2022	24,070,392
2023	25,376,400

For the Linear Regression Forecasting, the Projected Supply is the dependent variable (Y) with the Year as the independent variable (X). The formula used is Y = a + bX, where:

$$a = \bar{y} - b\bar{x}$$

$$b = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sum(x-\bar{x})^2}$$

and where $\bar{x}$ and $\bar{y}$ are the sample means: Average (known x's) and Average (known y's).

Table 9 summarizes the Projected Supply (in grams) using the Linear Regression Forecasting Method.

Table 9 - Projected Supplies Using Linear Regression Forecasting

Year	Projected Supply (in grams)
2019	20,784,564
2020	22,384,512
2021	23,984,460
2022	25,584,408
2023	27,184,356

For the Parabolic Projection Method, the formula used is $Y = \mathbf{a} + \mathbf{b}X + \mathbf{c}X^2$, where n = 5 and

$$\mathbf{a} = \frac{\sum x^4(\sum y) - \sum x^2(\sum x^2 y)}{n(\sum x^4) - (\sum x^2)^2}$$

$$\mathbf{b} = \frac{\sum xy}{\sum x^2}$$

$$\mathbf{c} = \frac{n(\sum x^2 y) - \sum x^2 (\sum y)}{n(\sum x^4) - (\sum x^2)^2}$$

Table 10 summarizes the Projected Supply (in grams) using the Parabolic Projection Method.

Table 10 - Projected Supplies Using Parabolic Projection Method

Year	Projected Supply (in grams)
2019	19,495,584
2020	19,806,552
2021	19,749,240
2022	19,323,648
2023	18,529,776

After computing the Projected Supplies for the next five (5) years using the three (3) different approaches, the Standard Deviation, SD, for each approach was computed. Table 11 summarizes the computed Standard Deviations for each method. Comparing the three (3) Standard Deviations, the Parabolic Projection Method yielded the lowest *SD.* This means that it has the lowest measure of variation from the average value among the three methods. In this case, the projected supply data using the Parabolic Projection Method shall be used in the succeeding computations.

Table 11 - Summary of Standard Deviations for Supply

Method	Standard Deviation
Arithmetic Straight Line	2,064,980
Linear Regression Forecasting	2,529,740
Parabolic Projection	514,222

Conclusions and Recommendations

A Market Research plays a vital role in determining the potentiality of producing and selling an innovative product. In the case of this study, gathering the needed data required the use of a survey instrument, which was administered to fifty (50) MSMEs (retail sector) in the province of Pampanga. After gathering and interpreting the results, computations for the projected demands and supplies were conducted. For the next five (5) years, the Projected Demands were computed using Arithmetic Straight Line Method and Projected Supplies were computed using Parabolic Projection Method.

To determine the number of unsatisfied potential market, a Demand-Supply Gap Analysis is necessary. Demand-supply gap analysis is a significant indicator of the market feasibility of putting up a business because it will exhibit the relationship of the supply and demand that is currently present in the market.

The percentage of how much of the target market that is not being satisfied with the present supply of drinking straws is now computed. From this, a conclusion can be made on the quantity of the new product that can be produced and marketed.

Table 12 and 13 summarize the historical and projected (for the next five years) Demand-Supply Gap Analysis with a 5% margin of error. The percentage of unsatisfied market is computed by getting the percentage of the Gap from the Demand.

Table 12 - Historical Demand-Supply Gap Analysis

Year	Demand	Supply	Margin of Error (5%)	Gap	% Unsatisfied
2014	40,728,862	12,316,320	1,420,627	26,991,915	66.27
2015	41,523,074	14,839,560	1,334,176	25,349,339	61.05
2016	42,332,774	16,142,400	1,309,519	24,880,856	58.77
2017	43,158,264	17,778,960	1,268,965	24,110,338	55.86
2018	43,999,850	18,846,360	1,257,674	23,895,815	54.31

Table 13 - Projected Demand-Supply Gap Analysis

Year	Demand	Supply	Margin of Error (5%)	Gap	% Unsatisfied
2019	44,654,047	19,495,584	1,257,923	23,900,540	53.52
2020	45,308,245	19,806,552	1,275,085	24,226,608	53.47
2021	45,962,442	19,749,240	1,310,660	24,902,542	54.18
2022	46,616,640	19,323,648	1,364,650	25,928,342	55.62
2023	47,270,838	18,529,776	1,437,053	27,304,009	57.76

As shown in the tables above, there are still many unsatisfied market implied by the positive percentage (%) of unsatisfied market, all greater than 50% and with increasing trend for the succeeding years. It can be concluded that an entering firm that would produce the new product still has a slot in participating in the market and that it is feasible for marketability.

From here, the projected market share is assumed next. From Table 7, the competitors' market shares are computed (i.e., the percentage of the approximate Annual Supply per supplier from the Total Annual Supply). To set a conservative market share percentage, it can be decided to choose the lowest market share percentage among the 10 competitors for the year 2018, which is 9.25%.

Table 14 - Market Share Analysis

Supplier	2018 Supply	% Market Share
Lucky Plast Manufacturing Corp.	2,018,520	10.71
Happy Bee Paper Straws	1,931,040	10.25
Lucky Diamond	1,754,640	9.31
Plastic Consumer Corporation	1,967,760	10.44
Zedco	1,852,200	9.83
Stan Trading Corporation	1,794,240	9.52
Calypso Plastic Center Company	1,778,760	9.44
Philippine Plastic Industrial, Inc.	2,132,640	11.32
Popular Household Names, Inc.	1,872,360	9.93
B&B Straw Pack Corp.	1,744,200	9.25
Total	18,846,360	100.00

The Projected Annual Volume of Production is identified, initially for the year 2019. The projected production is based from the volume of the demand-supply gap of production for 2018 multiplied by the market share percentage (9.25%). 2,211,519 grams can be projected to be the minimum amount of production for the year 2019. From this, monthly production can be set at approximately 184,294 grams and daily production at 8,377 grams (or 84 packs for a 100g per pack). The production can be assumed to increase yearly based on the performance on actual operations and sales.

Table 15 - Computation of Production Volume

Year	D/S Gap	Market Share %	Volume of Production, 2019
2018	23,895,815	9.25	2,211,519

With these, it can be concluded that introducing an environment-friendly drinking straw made of dried Mango leaves has a potential market in the province of Pampanga. As a recommendation, other aspects of the 4Ps of Marketing Mix (i.e., product, place, price, and promotion) should be given attention as well. The product and place are already defined in this marketing research. For the price, it is

recommended that the unit cost (per 100g pack) would range from Php10 to Php29 (Php30 at the most) to make it affordable to most clients.

It should be realized that most people do not really give value to the drinking straw they use because it usually comes along with the drink or beverage that they buy. For the reason that the drinking straw will be made of dried leaves, the expected price is assumed cheaper than the usual plastic drinking straws available in the market. The environmental concern of recycling would be advantageous to attract more consumers and participate in reinforcing the environment.

A separate Technical and Financial Studies are recommended for a new entering manufacturer and distributor of this product. Furthermore, it is also suggested to conduct a study on the technology in coming up with a biodegradable straw, exploring the use of other raw materials. In all of these, the implementation of R.A. 9003 must always be considered. A product research can also be conducted in partnership and cooperation with the Department of Science and Technology (DOST).

Results from this Market Study could be utilized to lay down plans for a profitable and sustainable business. Marketing strategies for promoting the product should also be given careful attention. Marketing techniques are needed to further enhance the product's marketability and improve customer relationship. Different marketing channels could be used to communicate with the desired target market the availability of the product.

Lastly, if it is possible, the government could possibly give incentives and subsidies to companies in order to motivate them to pursue the production and distribution of the featured product in this research. This is aimed towards having a sustainable environment and sustainable lifestyles by its citizens.

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Appendix 1 – Process of Making the Product

Process Flow Chart

Process Descriptions

1. Preparation – Prepare the dried leaves, bleaching solution, starch, wooden frame, beeswax and equipment needed.
2. Cutting – Cut the dried leaves into small pieces.
3. Bleaching – bleach the dried leaves for 20 minutes to remove the chlorophyll.
4. Rinsing – rinse the dried leaves 3 times to remove the bleaching solution.
5. Boiling – boil the dried leaves for 20 minutes to remove the chemicals absorbed and to break the cell wall of the dried leaves. Mix the starch and water and boil it for 3 minutes.
6. Pulping – Blend the dried leaves and starch mixture in an electric blender until it forms an oatmeal-like mixture.
7. Paper Forming – pour the oatmeal-like mixture in the wooden frame to flatten it and form it like a paper.
8. Pressing – Press the paper to remove the excess water.
9. Straw Molding – the sheet of paper is manually rolled in a mold.
10. Boiling – boil the beeswax until it dissolves.
11. Testing – the drinking straw will be submerged in water and a pH tester will test the usability of the drinking straw or if there is still excess bleach content on the drinking straw.
12. Waterproofing – dip the paper straw into the boiled beeswax and let it dry for 3 minutes.
13. Packaging – put the straw into the packaging box for storage.

Appendix 2 – Finished Product

Appendix 3 – Market Survey Instrument

MARKET SURVEY QUESTIONNAIRE

Name of Business/Store: _____

No. of Years that the Business/Store is running: _____

Please put a check on the box beside your answer.

1. What kind of drinking straw do you sell?

☐ Plastic

☐ Paper

☐ Metal

☐ Others: _____

2. What is the price range of the drinking straws you are selling? (per pack)

☐ Php10 to Php29

☐ Php30 to Php49

☐ Php50 to Php79

☐ Php80 to Php109

☐ Other answer, please specify: _____

3. How many packs of drinking straws are being supplied every month (on average, approx. 100g)?

☐ 0 to 20 packs

☐ 21 to 40 packs

☐ 41 to 60 packs

☐ 61 to 80 packs

☐ 81 to 100 packs

☐ 101 to 120 packs

☐ 121 to 140 packs

☐ Other answer, please specify: _____

4. How many packs of drinking straws are being sold every month (on average, approx. 100g)?

- ☐ 0 to 20 packs
- ☐ 21 to 40 packs
- ☐ 41 to 60 packs
- ☐ 61 to 80 packs
- ☐ 81 to 100 packs
- ☐ 101 to 120 packs
- ☐ 121 to 140 packs
- ☐ Other answer, please specify: _____

5. Have you heard about a recycled paper drinking straw?

- ☐ YES
- ☐ NO

6. Given the chance that an innovated, environment-friendly paper drinking straw made from dried leaves would be produced, are you willing to sell it?

- ☐ YES
- ☐ NO