ALGO G E-POLYBAGS

INNOVATION & ENTREPRENEURSHIP (UTA012)

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Group: COE 2

Project Title: Algo G

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THAPAR INSTITUTE
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(Deemed to be University)

**THAPAR INSTITUTE OF ENGINEERING AND
TECHNOLOGY, PATIALA**

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CERTIFICATE

This is to certify that the project report on, "**Algo G E-Polybags**" being submitted by **Mr.Aditya Vashista, Mr. Abhishek Maira, Mr. Anshul Garg, Mr. Aditya Thakur, Mr. Aditya Sharma** to the Venture Lab, Thapar Institute of Engineering and Technology, Patiala for the fulfillment of the course requirement of **INNOVATION & ENTREPRENEURSHIP (UTA012)** is a bonafide record of work carried out by us in conformity with the rules and regulations of the institute. The results presented in this report have not been submitted, in part or full, to any other University or Institute for the award of any degree or diploma.

Dated: 25/06/2020

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<u>ACKNOWLEDGEMENT</u>

The success and the outcome of this project required a lot of guidance and assistance and we are extremely privileged to have got this all along with the completion of our project. Special gratitude to **Dr. Vinnet Srivastava** whose contribution to stimulating suggestions and encouragement, helped us to coordinate our project as well as writing this report.

Our project would have been impossible without the guidance and help from our teachers, our institution, lab assistants and all the other members of our department.

Last but not the least, we would like to thank our classmates who have made valuable comment suggestions which gave us the inspiration to improve our assignment. We thank all the people for their help directly and indirectly to complete our assignment.

Opportunity Analysis

1.1 Opportunity Identification

In the current market scenario, there are no price-competitive green poly bags that are going to be the need of the future considering the current nature crises. Hence a new venture in this sector of the market is profitable as it offers better eco-friendly services under strict quality standards in an understandable yet profitable manner. Using Porter's Five Force Model to Evaluate the Opportunity we have concluded that the threat to this kind of business is of 'medium' magnitude and is proved to have an ample opportunity to start a venture on this. Delving into the market we found out it to be a slightly missed opportunity that can be used to generate wealth, despite there being small ventures already present in this section of the market

1. **Increasing awareness against plastic usage**
   As time passes by more and more people are getting aware of the harmful effects of plastic products on our environment. These effects account from moderate to highly toxic results in our environment and hence causes a worldwide problem. Since the major plastic product used is plastic bags, thereby providing a cheap and eco-friendly option will not only help the environment but also our customers, as our alternative will result in saving of a great deal of money on bags (charges of plastic bags are rising and alternative cloth bags are relatively expensive)

2. **The tension of recycling/decomposing ever-increasing amount of waste**
   As the population of the world increases, it is been seen that the amount of waste produced daily is increasing day by day. Therefore the recycling of the waste is needed. As our product is made through organic material from such wastes, therefore it will help the society by decreasing the amount of waste to be decomposed and reducing the waste for further processing and dumping.

3. **Support From Government**
   As per the latest policies of the central government as well as many state governments, it is seen there has been a lot of encouragement for startups/ entrepreneurs having great ideas related to reducing plastic usage, compressing/decreasing the amount of waste, and those who are working towards environment conservation. Since our project satisfies all these criteria as well as it involves a great deal of technology (as promoted by digital India campaign), we are likely to get easy funding and promotion via the government itself.

1.2 Solution Proposed

With the help of technology we are offering the following solutions to society:

1. **Low-Cost Environment-friendly E-Poly Bags**
   AlgoE-poly bags provide the customers with a cheaper alternative to plastic and cloth bags available to the public. Since these are made from natural fibers and starch, they are easily decomposable and reusable, hence preventing various community levels as well as environmental hazards.

2. **Technology-based Filtration, Segregation, and Classification of Garbage**
   We will be applying advanced Machine Learning, Computer Vision as well as Deep Learning algorithms to filter out various types of waste depending upon their properties, and whether they are recyclable or not. The whole process will be supported by a conveyor belt system, hence making the entire process automated. Due to this, there will be minimum human contact, hence minimizing the spreading of diseases and infections.

3. **Recycling of Garbage as per Industries Requirement**
   As mentioned above, the AI-based automated conveyor belt system will automatically separate the waste that can be recycled by various industries or can be given as raw material to various factories. Metals/alloys for casting and manufacturing industries, plastic for plastic industry, organic by-product and waste for biogas plants, are such few examples. The material to be recycled will be given as input by the users/admin of the plant.

4. **Awareness Campaign to be Conducted With Promotion and Marketing**
   In order to make the public aware of the serious problem caused by the usage of plastic, we plan to launch an awareness campaign for the same through medium of social media, community campaigns, awareness drives in communities and other accessible means such as newspaper, advertisement holdings, etc.

1.3 Uniqueness of the Solution

- The Ability to receive the user to simply provide unfiltered garbage to our collection mediums is remarkable.

- Absence of any third party to serve for municipalities as an intermediate and domestic waste preprocessor.

- It's best out of a waste situation where we can rely on our algorithm so much that we know we will ultimately start yielding raw products for other industries from this garbage sorting, filtering, and processing activities.

- Our advertising strategies are both benefactory to brand awareness as well as user awareness on the good environmental factor of clean surroundings.

- In future we plan on coming up with more products like E-Polybags as our algorithm will train itself and yield better analysis on what all products can be made from the garbage we collect and sort

- We plan to process E-waste in a unique manner to retrieve smaller working components from it.

- Advertising 3rd party products on our famous and viable E-polybags is a great source for revenue

1.4 What problem of the market segment is solved by your solution

- **Reduces Disease transmission ->** Manual waste management can cause many diseases since our solution is automated hence it reduces human contact greatly which in turn reduces diseases

- **Prevents Environmental Degradation** -> AlgoG bags being Eco friendly reduces pollution to a great extent as compared to existing products by other companies

- **Solving a Future problem in advanced** -> Democracies all around the world are constantly trying to reduce the use of plastic (a necessary evil), environment-friendly products are the future, our products promote and help with this endeavor

1.5 Identification of users and customers

- **General Public ->** Increasing use of plastic bags & sacks as a low-cost marketing tool is anticipated to fuel the demand for the plastic bags & sacks market in the coming years, but they cause environmental harm that's where Algo-G E-poly bags come in eco-friendly, safe yet cost-efficient which will force the general public to adopt out product

- **Companies and Marketing agencies ->** Agency or brands are often looking for new ways to advertise what's better than E-poly bags and statistically speaking a polybag is

seen on average by 5-10 people on the road, creating an advertising - base and yet another source of revenue via the polybags solves many purposes.

- **Waste Management Corporation ->** Our automated waste segregation using Machine learning classification techniques provides as world-class service and inturn fuels our raw material needs and segregates waste based upon requirements of different industries

1.6 How will the target users be benefited by the solution

- **Environment Friendly ->** Replacing non-eco-friendly polythene bags with biodegradable AlgoG bags creates and promotes the 3 R's and is a sustainable alternative for the future of planet earth.

- **Cost-Efficient ->** With our proprietary biotechnology we are able to maintain the same distributor and seller profit margins if not more, despite the same market selling price hence satisfying both our customer agendas.

- **Alternative for waste management ->** Using Machine Learning algorithms, automated waste segregation, further processing, and reuse reduces human effort and even promotes healthier individuals.

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1.7 How will users discover and adopt their solution

In order to reach the people, we are planning to serve we plan to adopt a unique way of marketing strategy -:

a) **Targeting state municipalities ->** Domestic waste collection is an important task of any such municipal organization and quite a lot of resources and expenditure is made on this activity. Since we plan to collect waste on their behalf, sort and preprocess it and provide them at the appropriate dumping sites this will be a win-win situation for them and us.

b) **Targeting chemical industries->** Since our services of waste sorting and processing and extraction algorithms and methodologies are so efficient we will be serving raw material for other chemical industries as there will be chemical waste extraction from common garbage.

c) **Governmental policies ->** We believe after the COVID-19 pandemic goes away and normalcy sets in. We believe that the government at all levels will surely focus on boosting healthcare infrastructure. We optimistically hope to make use of the government's increased focus towards the waste collection and processing sector so as to reach the major audience.

d) User acquisition -> We reduce the hassle users have to face while sorting recyclable and other categories of waste themselves and rely on municipalities for its collection, in our use case the user will be advertised the prospect of simply dumping unsorted and unorganized garbage to one of our near garbage collection facilities or provide we collect it from a trash bin outside their homes with their due permission. We also plan to work with NGOs for brand awareness and user's awareness of proper waste management techniques.

1.8 How the market segment will get affected by their solution

a) Increase in Competitiveness -> We believe our services will increase competitiveness as all the services will compete on providing better services to the customers, also it would reduce the market size of the currently present services in the market and that would be attributed to the number of customers our company attracts.

b) Creation of a new market section-> As it becomes more and more obvious how we are just using the waste products to make a bag and redirect the production's waste material back to the municipal dumps, there will be a surge in production of other products that could be made this way, thus building a new paradigm and hence a new market section.

1.9 Opportunity Canvas

Opportunity Canvas — Title: Algo G E-Polybags — Date: 04-05-2020 — Iteration: 2

Users & Customers
What types of users and customers have the challenges your solution addresses?

Look for differences in user's goals or uses that would affect their use of the product. Separate users and customers into different types based on those differences that make a difference. It's a bad idea to target "everyone" with your product.

- Mass Distributors of polybags and plastic manufacturing companies will acts as consumers.
- General public will be a regular user of this product.
- A segment of customers will be that of the advertisers who may use this bag to advertise their products.

Problems
What problems do prospective users and customers have today that your solution addresses?

- No proper way to segregate 26,000 tons of plastic waste collected everyday.
- Disposal of plastic bags cause a threat to aquatic life and environment
- Costly pre existing solutions

Solutions Today
How do users address their problems today?

List competitive products or work-around approaches your users have for meeting their needs.
- Costy paper bags and cloth bags
- costly automatic waste segregation machines that uses various sorting methods but still requires manual input.

Solution ideas
List product, feature, or enhancement ideas that solve problems for your target audience.

- Eco-friendly yet cost efficient AlgoG E-polybags as alternatives
- Waste segregation and classification using machine and deep learning algorithm (classifiers)
- Segregation of waste based upon requirements by different industries
- Automated AI based conveyor system to reduce human effort and diseases
- Awareness program for community on effects of plastic consumption and advantages of its alternatives.

User Value
If your target audience has your solution, how can they do things differently as a consequence? And, how will that benefit them?

- Environment friendly
- Cost Efficient
- On demand efficient waste management
- Less intervention of human resource for segregation promotes healthy individuals

Adoption Strategy
How will customers and users discover and adopt your solution?
- Company Website
  - On demand garbage collections and segregation
- Digital Marketing
- Online & Television Advertisement
- General Stores
- E-commerce companies

User Metrics
What user behaviors can you measure that will indicate they adopt, use, and place value in your solution?

- Our aim is to target 62% users who are currently using single use plastic bags out of which 63% are ready to switch
- 70% user believe that government's implementational policies are not clear and strict
- 63% people of the total survey conducted agreed to pay extra for clean and sustainable environment
- 75% of users believe that banning/limiting plastic products results in improvements in environment and surroundings.

Business Problems
What problem for your business does building this product, feature, or enhancement solve for your business?

- This solution reduces the chance of diseases as it reduces the human contact greatly.
- Prevents environmental degradation to great extent as it reduces pollution as compared to existing products by other companies
- Government has imposed policies to ban the use of plastic bags, our business promotes and helps with this endeavour.

Budget
What's it worth to you?

How much money and/or development would you budget to discover, build, and refine this solution?
- Warehouse — Rs.2500000
- Marketing (Online + Awareness) — Rs. 100000
- Machines Cost — Rs. 5500000
- Production Expense — Rs. 500000
- TOTAL = — Rs. 8600000

Business Metrics
What business performance metrics will be affected by the success of this solution?

These usually change as a consequence of behavior metrics changing.
- As the business progresses the performance and accuracy of the garbage segregation increases and hence it poses a heavy competition to our counterparts like envigreen and sahaas.
- As the business grows and in accordance with govt laws we will reduce the dominance of plastic polybags in the market.

Customer Validation Survey

2.1 Sample form used for customer survey

In a survey conducted by our team, we asked the users following questions so as to obtain valuable insights which helped in following ways-:

1. Understanding of the present issues that aren't resolved by the present local goods carriage mediums like paper bags and plastic ones.

2. Help us in deciding the cost of the services that we want to offer.

Some thoughts while designing the questionnaire:

1. To Know about the various steps they take to segregate the waste generated in their households
2. Their views on services we are about to offer and whether they are willing to pay for it

3. Understand as to how they rate the implementation of the government's ban of plastic bags

2.1 Questionnaire

Section1-Basic Information

Alpha Green E - Polybags

Alpha Green is a small initiative taken towards the green revolution. We plan to completely replace the use of plastic polybags with E-polybags by manufacturing it from the segregated waste collected from various households and providing the bags to the vendors at a subsidised rate.

Name *

Short answer text

Profession *

Short answer text

Do you use Plastic Bags of any form? *

◯ Yes

◯ No

◯ Not Sure

How much a regular size plastic bag costs to you? *

◯ Rs 0 - Rs.0.25

How much a regular size plastic bag costs to you? *

○ Rs 0 - Rs.0.25

○ Rs 0.25 - Rs 0.65

○ Rs 0.65 - Rs 1

○ Rs 1- Rs 2

○ Rs 2 +

Are you willing to pay extra for more clean and sustainable environment? *

○ Yes

○ No

○ Maybe

How much extra are you willing to pay to prevent environmental degradation? *

○ 0%

○ 5%

○ 10%

○ 20%

○ Money isn't an issue

Section2- Knowledge about their cab service usage and problems they face

Rate the implementation of the government's ban of single use plastic bags by the vendors in your localities. *

	1	2	3	4	5	
Low	○	○	○	○	○	High

What steps do you take to segregate the waste generated in your household if any? *

Long answer text

Do you believe government is taking effective steps to ban plastic bags? *

○ Yes

○ No

○ Maybe

○ No idea

Do you believe that banning/limiting the usage of plastic products will result in improvement in our environment and surroundings? *

○ Yes

○ No

○ Maybe

Any suggestions for improvements?

Short answer text

2.2 Size of the customer survey and its documentary proof

Note: We have received a total of 111 responses out of which we have attached screenshots of a few below.

	A	B	C	D	E	F	G	H	I	
1	Timestamp	Name	Profession	Do you use Plastic Bags	How much a regular size	Are you willing to pay extr	How much extra are you	Rate the implementation	What steps do you take to	D
2	4/28/2020 20:49:48	Shouraya Goyal	Student	Yes	Rs 0 - Rs.0.25	Yes	Money isn't an issue	2	Put the garbage in paper	M
3	4/28/2020 20:50:30	Mansi	-	Yes	Rs 0.25 - Rs 0.65	Yes	20%	3	Wet waste and dry waste	M
4	4/28/2020 20:51:55	Yash kumar	Student	Yes	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	4	Different bins for garbage	Y
5	4/28/2020 20:53:18	Riddhi Sharma	Student	Yes	Rs 0.25 - Rs 0.65	Yes	5%	3	Separation of dry and wet	M
6	4/28/2020 20:54:12	Anmol Goel	Engineer	Yes	Rs 0 - Rs.0.25	Yes	5%	4	N/A	N
7	4/28/2020 20:54:19	Saumyaa	Student	Yes	Rs 1- Rs 2	Yes	Money isn't an issue	3	Different dustbins	M
8	4/28/2020 20:55:28	Vipasha	Student	No	Rs 1- Rs 2	Yes	20%	5	None	M
9	4/28/2020 20:58:25	Abhishek Maira	Student	Yes	Rs 0.65 - Rs 1	Yes	10%	3	Seperate wet waste and (	M
10	4/28/2020 20:59:36	Raghav Sharma	Student	Yes	Rs 0 - Rs.0.25	Yes	Money isn't an issue	2	No	N
11	4/28/2020 21:00:01	Aseem Goyal	Student	No	Rs 0.65 - Rs 1	Yes	Money isn't an issue	3	No	Y
12	4/28/2020 21:02:07	Muskan	Student	Yes	Rs 0.65 - Rs 1	Yes	10%	2	No steps	N
13	4/28/2020 21:04:03	Harsh Agarwal	Student	Yes	Rs 0.65 - Rs 1	Yes	10%	2	.	M
14	4/28/2020 21:05:14	Aditi	Student	Yes	Rs 0.25 - Rs 0.65	Yes	10%	4	Segregation of wet and dr	Y
15	4/28/2020 21:05:15	Anirudh	Student	Yes	Rs 0 - Rs.0.25	Maybe	5%	4	None yet	N
16	4/28/2020 21:07:24	adyaksh	engineering student	No	Rs 0.65 - Rs 1	Yes	5%	5	recycle	M
17	4/28/2020 21:09:33	Abhiraam	Student	No	Rs 0 - Rs.0.25	Maybe	5%	3	.	N
18	4/28/2020 21:09:43	Tejas Mehta	Student	Yes	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	4	Using separate dustbins	M
19	4/28/2020 21:14:35	Priyansh Garg	Student	Yes	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	3	Seprating wet and dry gar	M
20	4/28/2020 21:16:08	Sanskar	Student	No	Rs 0.65 - Rs 1	Yes	Money isn't an issue	3	By Use of Different dustbi	N
21	4/28/2020 21:18:57	Arushi Khulbe	College student	Yes	Rs 0 - Rs.0.25	Maybe	5%	3	Use different colour dustl	M
22	4/28/2020 21:19:06	Jonty	Student	Yes	Rs 0.65 - Rs 1	No	5%	2	Ban polybags	N
23	4/28/2020 21:19:24	Pranavi	Student	Yes	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	2	Separate kitchen waste fr	M
24	4/28/2020 21:22:10	We must reduce use of pl	Students	No	Rs 1- Rs 2	Yes	Money isn't an issue	5	Separation between plast	Y
25	4/28/2020 21:38:08	Ramandeep Singh	Student	Yes	Rs 1- Rs 2	Maybe	Money isn't an issue	3	Using different dustbins fc	N
26	4/28/2020 21:44:31	Pratyush Goyal	Student	No	Rs 0.65 - Rs 1	Yes	5%	3	Separate bins	M
27	4/28/2020 21:46:30	Deepika saha	Student	Yes	Rs 0.65 - Rs 1	Maybe	5%	3	None	M
28	4/28/2020 21:46:50	Ridhi chadha	Psychologist	Not Sure	Rs 1- Rs 2	Yes	10%	4	Segregation of waste at h	M
29	4/28/2020 21:48:57	Vanshika sharma	Undergraduate student	No	Rs 1- Rs 2	Yes	Money isn't an issue	2	Separate the wet and soli	M
30	4/28/2020 21:50:08	Arpit Arora	Student	No	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	3	We have separate bins at	M
31	4/28/2020 21:56:13	Abhishek Singh	Student	Yes	Rs 2 +	No	Money isn't an issue	5	Burn them.	N
32	4/28/2020 22:05:50	Pranjal	Student	No	Rs 0 - Rs.0.25	Yes	Money isn't an issue	3	Lend the waste to tha rag	M
33	4/28/2020 22:06:27	Akanksha Anand	Student	Yes	Rs 0 - Rs.0.25	Yes	5%	3	Not any really. Everything	M
34	4/28/2020 22:06:32	Naman	Student	Yes	Rs 1- Rs 2	Yes	10%	4	Separate dustbins for bio	M
35	4/28/2020 22:07:16	Souparna Saha	Student	No	Rs 0.65 - Rs 1	Maybe	Money isn't an issue	5	Kamehameha them all!	M
36	4/28/2020 22:10:46	Adarsh Kumar	Student	Yes	Rs 0 - Rs.0.25	Yes	Money isn't an issue	3	-	M
37	4/28/2020 22:12:27	Pragya	Student	Yes	Rs 0.65 - Rs 1	Yes	10%	4	Separate dustbins	M
38	4/28/2020 22:16:34	mehul mahajan	student	Yes	Rs 0 - Rs.0.25	Yes	Money isn't an issue	1	none	M

Alpha Green E - Polybags (Responses)

File Edit View Insert Format Data Tools Form Add-ons Help

fx | Use different colour dustbins for wet and dry waste

	Timestamp	Name	Profession	Do you use Plastic Bags	How much a regular size	Are you willing to pay extr	How much extra are you	Rate the implementation	What steps do you take t	Do you believe governme	Do you believe that banni	Any suggestions for impr
39	4/28/2020 23:06:03	Surbhi choudhary	Student	No	Rs 2 +	Maybe	0%	4	Mostly bury the organic w	Yes	Yes	
40	4/28/2020 23:13:39	Kaustubh Bhatt	Student	Yes	Rs 2 +	Yes	10%	2	We keep 2 seperate dustl	No	Yes	
41	4/28/2020 23:36:48	Dipti Lulla	Student	Yes	Rs 0.25 - Rs 0.65	Maybe	5%	5	Different dustbins	Maybe	Yes	Eco friendly substitute fo
42	4/28/2020 23:49:45	Dhawal Agarwal	Student	Yes	Rs 0 - Rs.0.25	Yes	5%	3	None	Maybe	Maybe	
43	4/29/2020 0:05:49	Abhishek Goyal	Student	Yes	Rs 0 - Rs.0.25	Maybe	Money isn't an issue	1	Noo	No idea	No	No
44	4/29/2020 0:33:31	Abhinav Jain	Student	Yes	Rs 1- Rs 2	Yes	20%	4	None	Maybe	Yes	None
45	4/29/2020 3:23:15	Gunit Anand	Student	Yes	Rs 1- Rs 2	Yes	10%	3	Separate bins for the kitcl	Maybe	Maybe	
46	4/29/2020 3:39:35	Adarsh	Student	Yes	Rs 1- Rs 2	Yes	Money isn't an issue	3	Recycle the waste	No	Yes	
47	4/29/2020 8:19:45	Harsh	Student	Yes	Rs 0.25 - Rs 0.65	Yes	5%	3	Separate dustbins	Yes	Yes	
48	4/29/2020 8:20:47	Shreyansh Rana	Student	No	Rs 0 - Rs.0.25	Yes	10%	5	None	Yes	Yes	
49	4/29/2020 9:24:51	Aditi Sharma	Teaching	Yes	Rs 0 - Rs.0.25	Maybe	5%	3	I segregate wet and dry w	No	Yes	Impose fine on using pla
50	4/29/2020 9:36:07	EktaThakur	Teacher	No	Rs 0.65 - Rs 1	Maybe	5%	5	Not sure	No	Yes	Ban production units of p
51	4/29/2020 9:58:17	Aditya	Student	Yes	Rs 1- Rs 2	Yes	Money isn't an issue	2	.	Maybe	Yes	
52	4/29/2020 9:59:20	Aditya Vashista	Student	Yes	Rs 1- Rs 2	Yes	20%	3	None.	No	Maybe	
53	4/29/2020 10:24:07	Utkarsh	Student	No	Rs 1- Rs 2	Yes	Money isn't an issue	5	We use two dustbins one	No idea	Yes	
54	4/29/2020 13:36:46	Chelsea	Student	Yes	Rs 0 - Rs.0.25	Yes	20%	4	None	Maybe	Yes	
55	4/29/2020 18:20:55	Mridul trivedi	Research scholar	Yes	Rs 0.25 - Rs 0.65	Yes	Money isn't an issue	1	Well I'm not the right pers	No	Yes	Plastic could not be igno
56	4/29/2020 18:33:04	Latika Sharma	Research Scholar	Yes	Rs 0.65 - Rs 1	Yes	10%	3	I use to wait for the Swacl	No	Yes	
57	4/29/2020 18:40:50	Himanshu Bagdi	Research Scholar	Yes	Rs 0.25 - Rs 0.65	Yes	5%	3	Limit the use of plastic ba	Maybe	Yes	
58	4/29/2020 18:44:19	Ayushi suwalka	Student	No	Rs 2 +	Yes	Money isn't an issue	3	Segregation of liquid and	Yes	Yes	Be more strict towards it
59	4/29/2020 22:24:35	Ramandeep singh	Study	Yes	Rs 1- Rs 2	Maybe	20%	1	We bring foods in own ba	No idea	Yes	Make strict rules and ma
60	4/30/2020 9:47:01	Anjali	Student	Not Sure	Rs 0.25 - Rs 0.65	Maybe	Money isn't an issue	4	By using it as manure	Yes	Yes	
61	5/1/2020 1:52:41	Yogen Aggarwal	Student	Yes	Rs 0.65 - Rs 1	Yes	10%	5	different dustbins for diffe	Maybe	Yes	
62	5/1/2020 22:19:23	Jeremy quadrio	ml engineer	Yes	Rs 0.65 - Rs 1	No	5%	2	seprate dustbins	No	Yes	
63	5/1/2020 22:25:07	Soumya Swaraj	student	Yes	Rs 0 - Rs.0.25	Yes	5%	3	nothing	Yes	Yes	
64	5/1/2020 22:30:24	Abhay goyal	student	No	Rs 0.65 - Rs 1	Yes	10%	4	nothing	Maybe	Maybe	
65	5/1/2020 22:30:45	Abhay goyal	student	No	Rs 0.65 - Rs 1	Yes	10%	4	nothing	Maybe	Maybe	
66	5/1/2020 22:33:07	Raghav Gupta	student	Yes	Rs 0.65 - Rs 1	Yes	5%	1	nothing	Maybe	Maybe	
67	5/1/2020 22:34:16	Hritvik naru	student	Not Sure	Rs 0.25 - Rs 0.65	Maybe	10%	2	seperate dustbins for wet	Maybe	No	
68	5/1/2020 22:35:05	Rudransh	student	No	Rs 0.25 - Rs 0.65	No	10%	2	nothing	Maybe	No	
69	5/1/2020 22:36:23	Arpit sharma	it professional	No	Rs 2 +	Yes	5%	3	nothing	No	No	
70	5/1/2020 22:37:12	Raghav sood	IT professional	Yes	Rs 2 +	Maybe	20%	4	nothing	Yes	No	
71	5/1/2020 22:39:08	Tushar Gool	student	No	Rs 1- Rs 2	No	10%	4	nothing	Maybe	Yes	
72	5/1/2020 22:39:57	Pushkar	student	No	Rs 0.25 - Rs 0.65	No	20%	5	nothing	Maybe	No	
73	5/1/2020 22:40:38	Aditya Maira	Service (Management)	Yes	Rs 1- Rs 2	Yes	10%	5	We segregate dry and we	Yes	Yes	
74	5/1/2020 22:41:29	Akansh aggarwal	student	No	Rs 0.65 - Rs 1	No	10%	5	nothing	No	No	

2.3 RESULTS OF THE SURVEY (QUESTION WISE)

a. Names of People. (Provided by users)

b. Profession of Surveyors
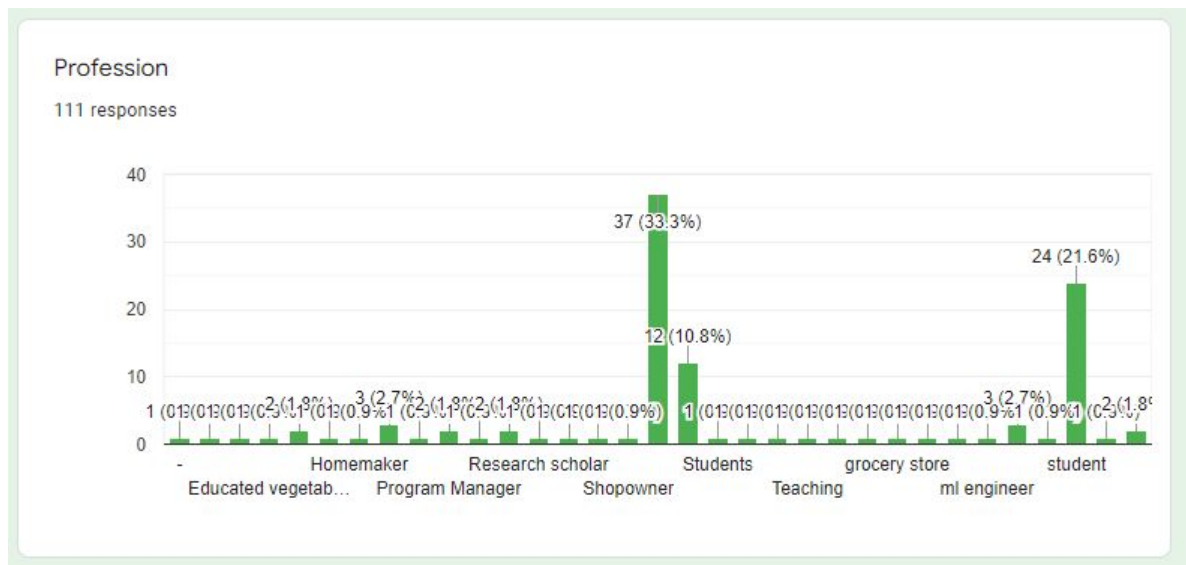
- Since the form was circulated mostly amongst students, 74 % of the responses came from students. The second-largest responses were from IT Professionals (4%)
- The form link was also sent to a lot of shop owners, teachers, engineers as well, but a low number of responses suggest their negligence towards environmental issues.
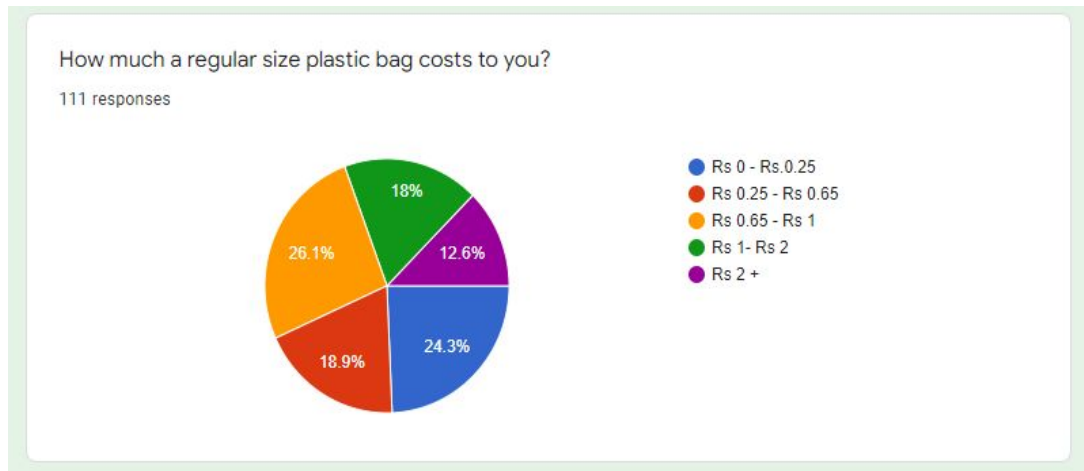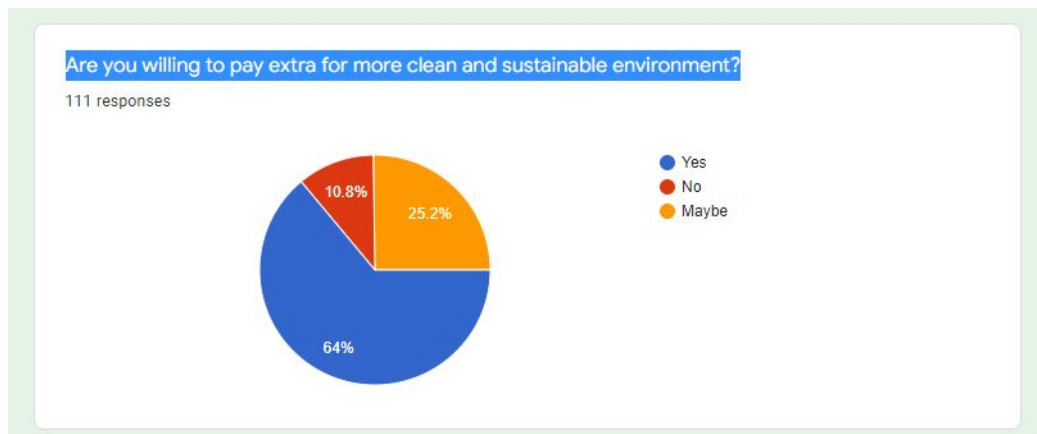
c. Consumption of Plastic Bags in any form.
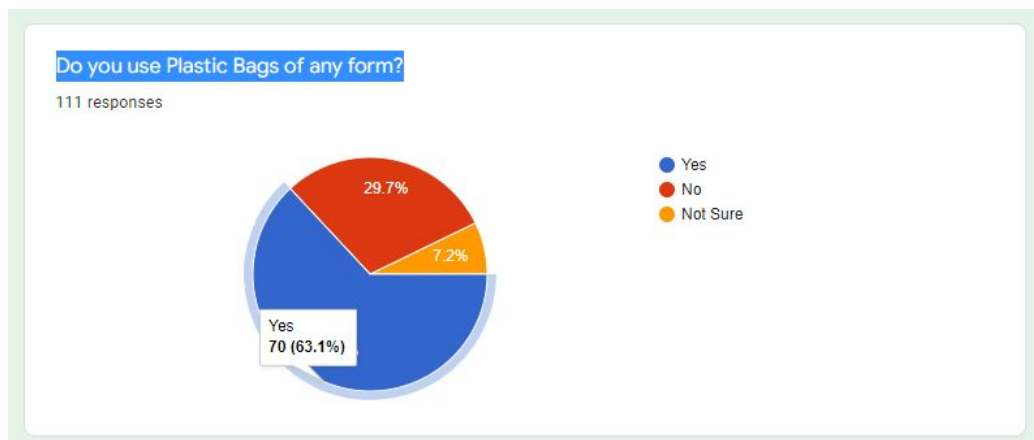
- Of all the people surveyed, ~63% of the surveyors still consume plastic bags. This explains the need for environmentally friendly carry bags.

d. Cost of a regular size plastic bag

How much a regular size plastic bag costs to you?

111 responses

Rs 0 - Rs.0.25
Rs 0.25 - Rs 0.65
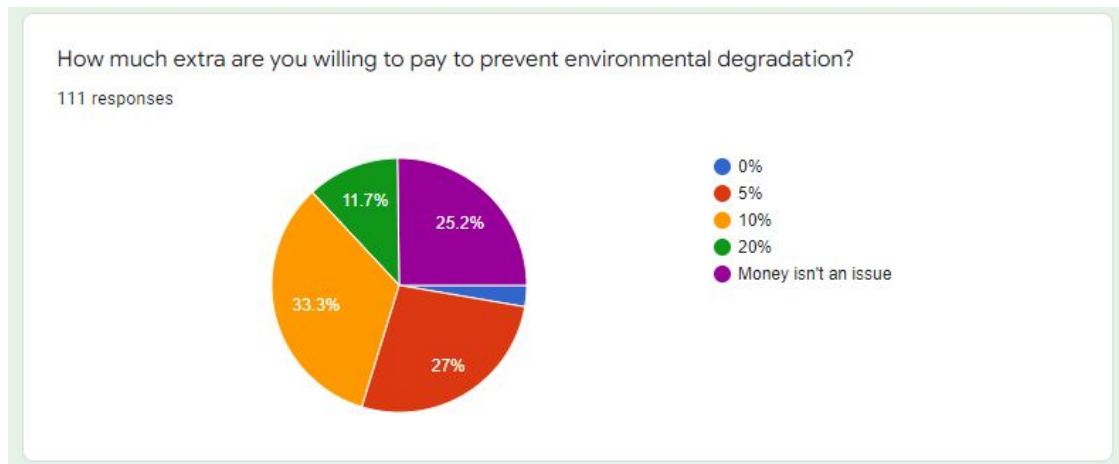Rs 0.65 - Rs 1
Rs 1- Rs 2
Rs 2 +

18%
26.1%
12.6%
18.9%
24.3%

- The above graph is created for 63% of surveyors who still use Plastic Bags
- From the above graph, we see that 30% of the people pay more than Rs 1 for a plastic bag which harms the environment.

e. Willingness of people to pay extra for the environment

Are you willing to pay extra for more clean and sustainable environment?
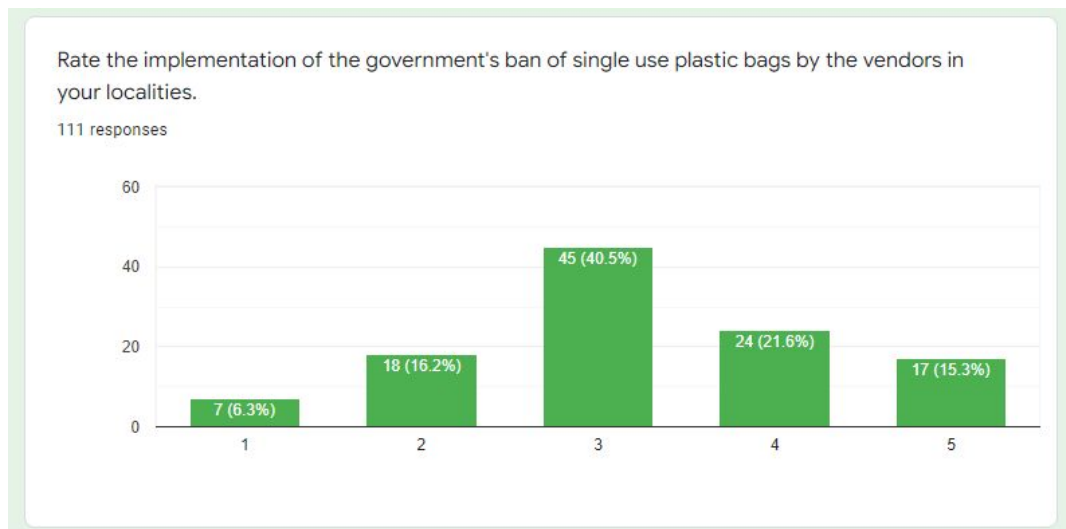
111 responses

Yes
No
Maybe

10.8%
25.2%
64%

- From the above graph, we see that ~64% of the people are willing to pay a little extra to avoid using plastic bags. We have covered the extent of cost people will pay in the next graph
- The reason for other customers to not pay extra may be because of how cheap a single use plastic bags can be (Around Rs 1)

f. Incremental Amount people will pay to prevent environmental degradation

How much extra are you willing to pay to prevent environmental degradation?

111 responses

- 0%
- 5%
- 10%
- 20%
- Money isn't an issue

11.7%
25.2%
33.3%
27%

- By this, we see that for 25% of the people that buy plastic bags, money isn't an issue
- Around 33% are willing to pay about 10% more than the price of a regular plastic bag

g. Rating the implementation of the ban of single-use plastics

Rate the implementation of the government's ban of single use plastic bags by the vendors in your localities.

111 responses

7 (6.3%) — 1
18 (16.2%) — 2
45 (40.5%) — 3
24 (21.6%) — 4
17 (15.3%) — 5

- This goes to show that 78% of the people agreed that despite the government's ban of plastic bags vendors still sell them to customers, which indicates that the policies were not stringent enough.

h. Steps taken by people to segregate waste

What steps do you take to segregate the waste generated in your household if any?

111 responses

Use different colour dustbins for wet and dry waste

Ban polybags

Separate kitchen waste from other waste.

Separation between plastic ,organic,other wastes

Using different dustbins for recycling and non recyclable waste

Separate bins

Segregation of waste at home
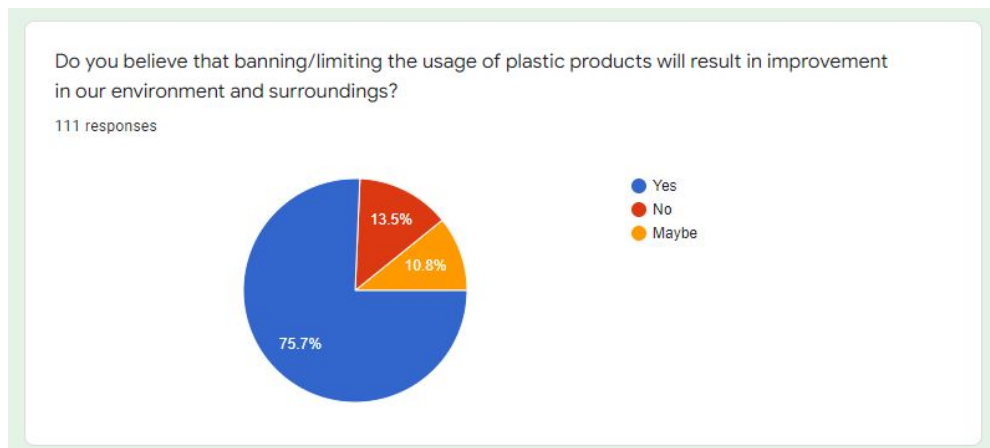
Separate the wet and solid waste.

We have separate bins at all the houses given by the gram panchayat for wet garbage and dry garbage, segregation is easy.

i. Perception of consumers regarding the government's ban on plastic bags

Do you believe government is taking effective steps to ban plastic bags?

111 responses
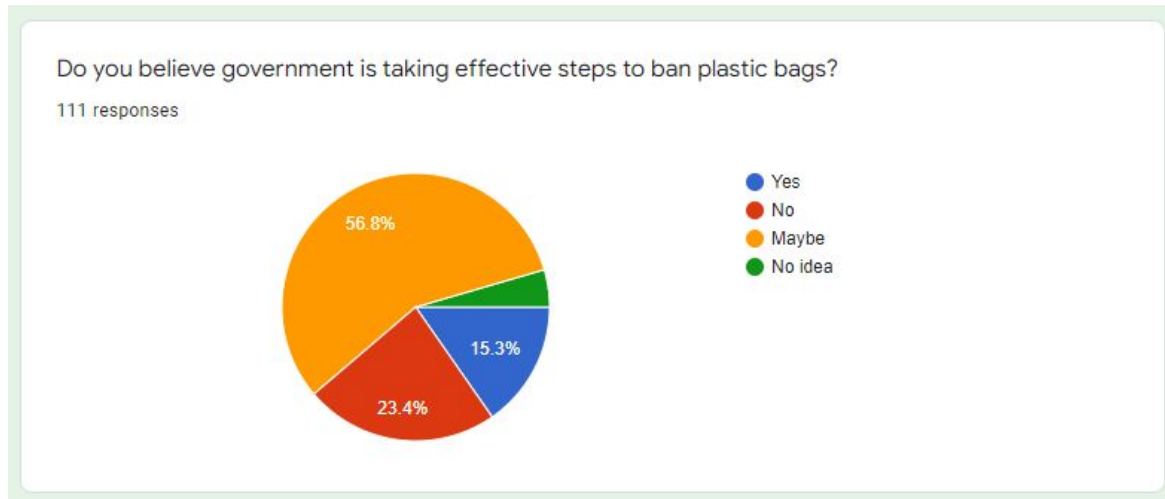
- 57% of the responders indicated that they were unsure while 24% of responders indicated that they were not satisfied with government's actions
- Hence, we observe that most of the consumers are unsure about the effectiveness of the policies pertaining to the ban of plastic bags.

j. Effect of Banning/Limiting the usage of plastic products

Do you believe that banning/limiting the usage of plastic products will result in improvement in our environment and surroundings?

111 responses

- 75% of responders think that better schemes in limiting the usage of plastic products will be beneficial to the surroundings.

k. Suggestions

Any suggestions for improvements?
Ban production units of plastic bags
Be more strict towards it
Doing great keep it up
Eco friendly substitute for plastic should be introduced
Government should ban plastic strictly like they did for lockdown. for
Impose fine on using plastic either by buyer or seller
Just proper ban on manufacturing and sales of plastic bags
Make strict rules and make sure implementations of those.
planting trees should be made a job
Plastic could not be ignored or a vanishble stuff but vendors should use wooden spoons over plastic spoons, paper bags need to be promoted to use and obviously we need to change ourselves first.
Polybags are cheaper than biodegradable bags. That makes it difficult for vendors to get thier margin, bio-bags should be subsidised
Recycle dry waste
Stop using your mobile cover
We should say no to plastic and yes to environment
Ya we need to replace plastic but at the same time better quality of anything can be used

2.4 Detailed Analysis of the survey

1. Total Responses recorded - 111

2. Top three most common professions
   - Student (67%)
   - IT Professional (4%)
   - Engineer (2%)

3. A staggering 60% of people still use plastic bags for carrying their products.

4. Around 70% of the people pay less than Rs 1 for a plastic bag which indicates that plastic bags are extremely cheap and so are widely still in use.

5. Despite this, around 64% are willing to pay a little extra for the betterment of the environment. Out of these responders, 33% are willing to pay up to 10% extra and for 25% of the people money is not a bigger issue than the environment.

6. Although the Modi government had imposed a nationwide ban on plastic bags, these steps were not implemented properly and many vendors still use plastic bags, cups, straws etc.

7. Many people suggested the use of two different dustbins for wet and dry waste to segregate the waste properly.

8. The majority of the people are unsure as to if the government is taking effective steps to prevent environmental degradation.

2.5 Conclusion of the survey

In conclusion, the survey suggests that the government needs to review the policies to apply more stringent methods to limiting the use of plastic products.We also come to know from our analysis that people are willing to put in the money as long as there are better quality and cheaper alternatives to plastic bags. Also there needs to be a better way for the segregation of the waste materials.

So we at Algo G aim to build a system to manufacture environmental friendly E-poly bags made out of biodegradable waste by improving the process of waste segregation by using the power of machine learning techniques.

Financial Model

3.1 Cost Structure

This building block describes the most important costs incurred while operating under a particular business model. Creating and delivering value, maintaining customer relationships, and generating revenue all incur costs. Naturally enough, costs should be minimized in every business model. Therefore, it is important to distinguish between two broad classes of business model Cost Structures: cost-driven and Value-driven:
Cost Driven: cost-driven business models focus on minimizing costs wherever possible. This approach aims at creating and maintaining the leanest possible Cost Structure, using low price Value Propositions, maximum automation, and extensive outsourcing.
Value-Driven: Some companies are less concerned with the cost implications of a particular business model design, and instead focus on value creation. Premium Value Propositions and a high degree of personalized service usually characterize value-driven business models.
Other attribute(s) to determine the cost structure of a business model is/are the category in which the costs fall, they could be distinguished as variable and fixed costs

Note:- All the variable costs have been calculated on per month basis

Fixed Costs	Variable Costs
Factory land cost- Rs. 25,00,000	Marketing Expense- Rs. 20,000 (Online + Offline)
Machines Cost- Rs. 30,00,000	Wages- Rs. 2,00,000
Computers cost- Rs. 5,00,000	Machine maintenance cost- Rs. 30,000
Hardwares cost- Rs. 10,00,000	Oil and Ink cost- Rs. 40,000 Chemicals cost- Rs. 1,00,000 Miscellaneous Costs- Rs. 10,000
Total fixed cost- Rs. 70,00,000	**Total variable costs- Rs. 4,00,000**

Total Costs estimated for a month are - Rs. 4,00,000

Note-:

1) The above-mentioned costs can also be broken down by other factors like cost/value-driven and their importance, which resources are most expensive and why.

2) All these costs have been accrued according to their period of use.

3) All the above-mentioned costs are a mere assumption and can change over time due to various factors such as inflation, funds available with the firm etc.

4) Equipment includes the purchase of customized cabs and bikes

3.2 Revenue Structure

A revenue model here is seen as an operational description, indicating how a firm collects revenue from its customers. In other words, it relates to the various options that a firm may offer to customers who might wish to use their provided services.

Our Products list:

| For Distributors	Price
Grocery Bag Roll(100pcs) (10x13 inches)	Rs. 300 per Kg
Small garbage polybag(24x32 inches)	Rs. 370 per Kg
Large garbage polybag(30x37 inches)	Rs. 450 per Kg
Low quality small polybag(10x14 inches)	Rs. 100 per Kg
Small Polybag(10x14 inches)	Rs. 180 per Kg
Medium Polybag(13x16 inches)	Rs. 270 per 100 pieces
Large Polybag(16x20 inches)	Rs. 410 per 100 pieces
Extra Large Polybag(20x26 inches)	Rs. 600 per 100 pieces

For Factories	Price
High quality recycled plastic	Rs. 650 per 10 kg
Low quality recycled plastic	Rs. 500 per 10 kg

Products	No. of units sold (price x quantity)	Total
Grocery bags	300x200kg	Rs. 60,000
Garbage bags	350x220kg 450x190kg	Rs. 1,62,500
Low density bags for street retailers	120x400kg	Rs. 48,000
Retail Shops	180x250 kg 300x180 packs 400x150 packs 600x100 packs	Rs. 2,19,000
Factories	65x4000 kg 50x5010 kg	Rs. 5,10,500
		Rs. 10,00,000

Above table shows the revenue for the first month

- The Revenue will keep on increasing with increasing popularity of our products in the market and advertising and also with customer reviews.
- The Revenue will increase at the time of festivals as the demand for packaging poly bags will increase at that time with people purchasing more from the markets.
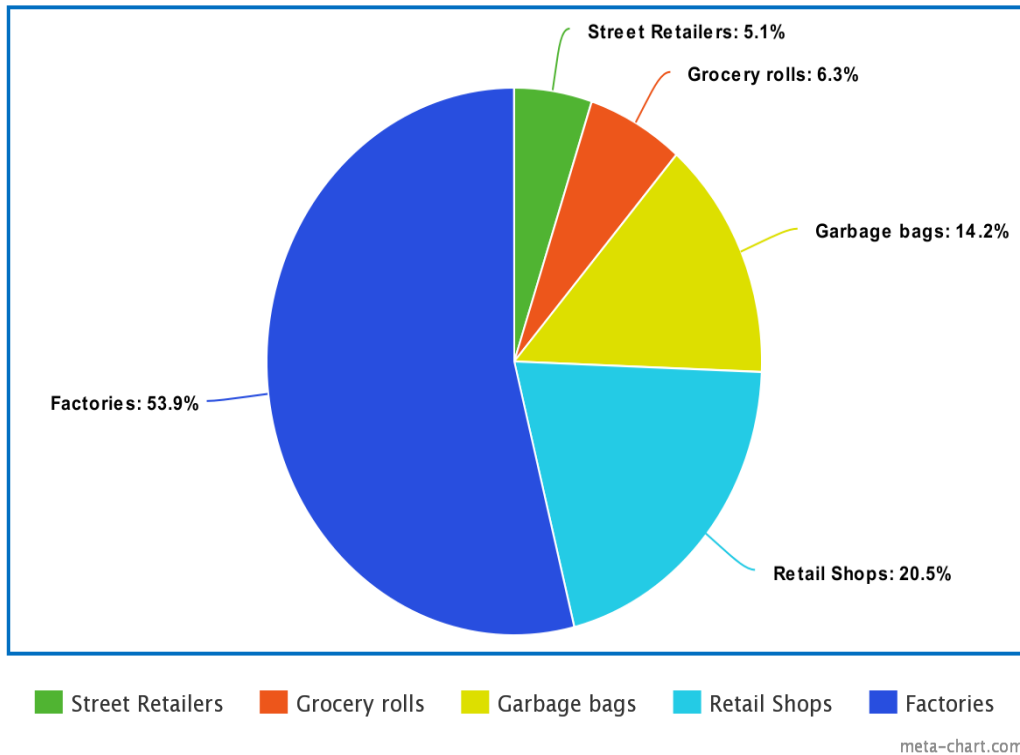
% of revenue generated from different products

3.3 Balance Sheet

Assets	INR(in lakhs)
Current assets	
Cash	100.5
Accounts receivable	0
Inventories	0
Other current assets	0
Total current assets	**100.5**
Long term assets	
Land	10
Building	15
Equipment	45
Less accumulated depreciation	-6
Goodwill and Intangible assets	0
Other long term assets	0
Total Long Term Assets	**64**
Total Assets	**164.5**

Liabilities and Stockholder's Equity	INR (in lakhs)
Current Liablities	
Accounts payable	24.04
Short term Debt	0
Wages Payable	2.5
Other current liabilities	0
Total current liabilities	**2.5**
Capital stock	75
Retained Earnings	62.96
Total Liabilities & Stock holders equity	**164.5**

Additional Data:
- All operating activities are cash positive. All the cash is taken in advance and hence accounts payable and accounts receivable from any supplier is 0.
- Equipment life is taken to be 10 years. Total value of equipment is 60 lakhs. Hence 6 lac depreciation each year is calculated for equipment.
- Wages payable are for the month of Dec to be paid in Jan next year.
- The company pays dividends (20%).

3.4 Profit and loss statement

MONTH	Jan (INR in lakhs)	Feb (INR in lakhs)	Mar (INR in lakhs)	April (INR in lakhs)	May (INR in lakhs)	June(INR in lakhs)
Revenue	10	11	12	11	11	11
Cost of goods and services	-1.5	-1.8	-2	-1.8	-1.8	-1.8
Gross Profit	**8.5**	**9.2**	**10**	**9.2**	**9.2**	**9.2**
Wages	0	-2	-2	-2	-2	-2
Marketing expenses	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2
Machine maintainance cost	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Total Operating Expenses	**-0.5**	**-2.6**	**-2.5**	**-2.5**	**-2.5**	**-2.5**
EBITDA	**8**	**6.6**	**7.5**	**6.7**	**6.7**	**6.7**
Depreciation and Amortization	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
EBIT	**7.5**	**6.1**	**7**	**6.2**	**6.2**	**6.2**
Interest Income(expense)	0	0	0	0	0	0
EBT	**7.5**	**6.1**	**7**	**6.2**	**6.2**	**6.2**
Taxes	0	0	0	0	0	0
Net Income	**7.5**	**6.1**	**7**	**6.2**	**6.2**	**6.2**

July (INR in lakhs)	Aug(INR in lakhs)	Sept(INR in lakhs)	Oct(INR in lakhs)	Nov(INR in lakhs)	Dec(INR in lakhs)
12	12	13	14	12	12
-2	-2	-2.5	-2.5	-2	-2
10	**10**	**10.5**	**11.5**	**10**	**10**
-2.5	-2.5	-2.5	-3	-2.5	-2.5
-0.4	-0.4	-0.4	-0.4	-0.3	-0.3
-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
-3.2	**-3.2**	**-3.2**	**-3.7**	**-3.1**	**-3.1**
6.8	**6.8**	**7.3**	**7.8**	**6.9**	**6.9**
-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
6.3	**6.3**	**6.8**	**7.3**	**6.4**	**6.4**
0	0	0	0	0	0
6.3	**6.3**	**6.8**	**7.3**	**6.4**	**6.4**
0	0	0	0	0	0
6.3	**6.3**	**6.8**	**7.3**	**6.4**	**6.4**

Additional Data:
- Taxes (for startups) is 0%.
- Total Net Income is 38.008.
- Assuming 10% growth each month and 20-30% at the time of festivals.

3.5 Cash Flow Statement

Statementof Cash flows	INR in lakhs
Operating activities	
Net Income	78.7
Depreciation and Amortization	6
Change in accounts receivable	0
Change in Inventory	23.7
Change in Payables	2.5
Cash from Operating activities	**110.9**
Investment activities	
Capital expenditures	-70
Acquisitions and other investing activities	0
Cash from Investing activities	**-70**
Financing activities	
Dividends paid	-15.74
Sale of stock	75
Increase in borrowing	0
Cash from financing activities	**59.26**
Change in cash and cash equivalents	**100.5**

Note: The net cash flow at year's end is positive which gives the firm enough money to make an investment decision for the next year

Additional Data:
- The company pays dividends to owners equal to Rs. 15,74,000/- (20%).
- Change in payables is positive since the company will pay Dec salary in Jan next year.
- The cash in hand for the year 2020 is 10,050,000/-
- All the financing has been done by owners by bootstrapping with their personal investment (75 lacs)

<u>Reflections</u>

During the course of the project, we discovered that there is an advantage of working as a group. Group work allows us to develop skills such as communication, leadership, and coordination. We learned that good teamwork is the key to success in design activities when time and resources are limited and that the capability of a team is greater than the collective abilities of the individuals within it.

We discovered that our simplest idea was turned into something amazing after putting enough creativity and effort while working on it. Everyone had their own point of view; many different ideas came up and which led to disagreement among the group members. All the disagreements were resolved, and we worked together harmoniously. Our team faced some problems such as lack of knowledge in certain domains, no availability of certain data, less published research.

It opened our minds to consider entrepreneurship as a viable career in future and at the same time through the theme of our project forced us to see environmental impacts of the current lifestyles of mankind. This helped us come up with innovative solutions.

Working on this project was a great experience as it was different from rest of the projects.it helped in the development in knowledge for pursuing an entrepreneurial career, its downsides, confrontations, management, concerns and finance it gave the experience of running a business and decision-making task that could lead to its success or failure. This project offered a great insight into our strengths and weaknesses when it comes to running a business and working in a team.