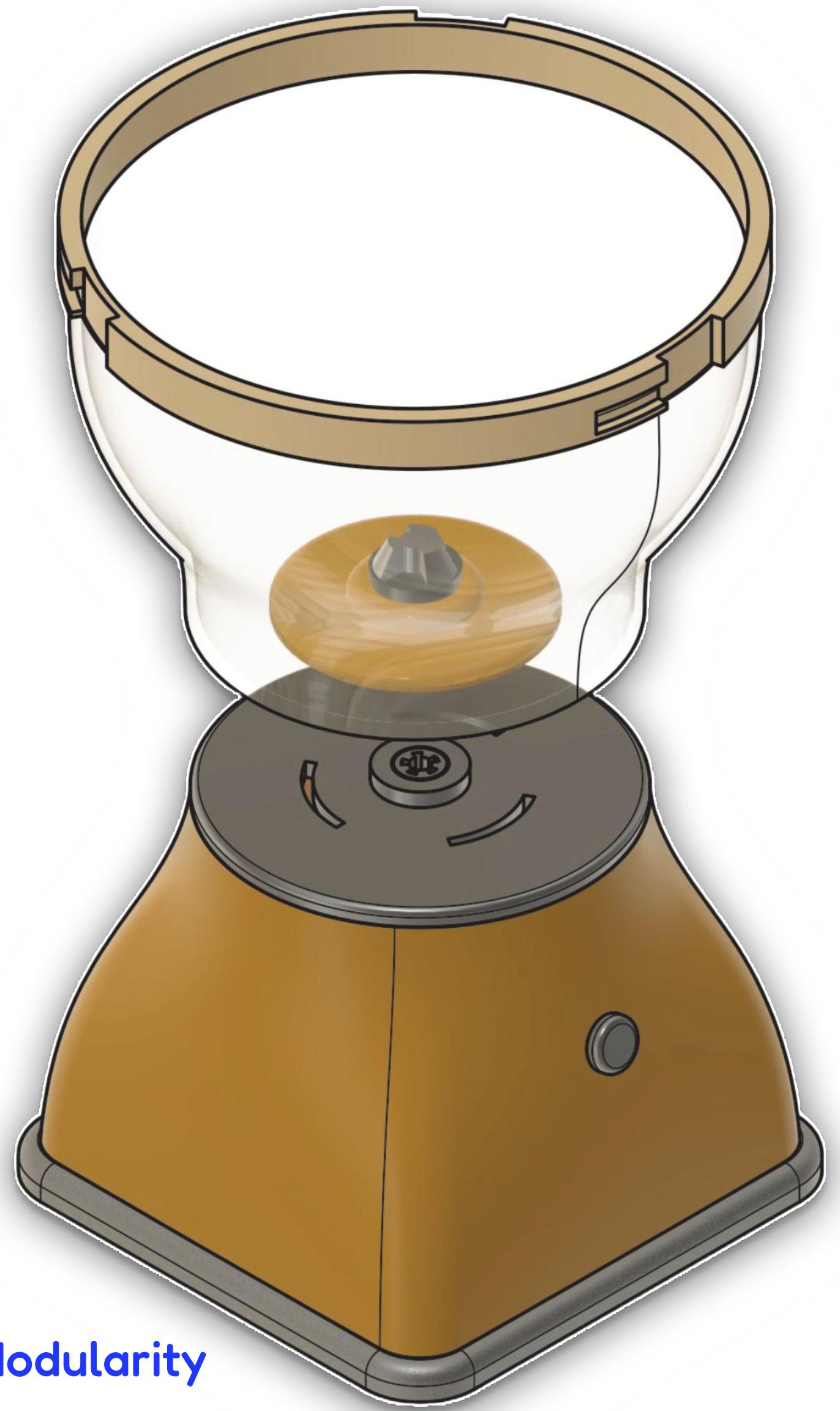


E

CHOP



New Product Development | Product Breakdown | Business Model | Circular Economy | Modularity

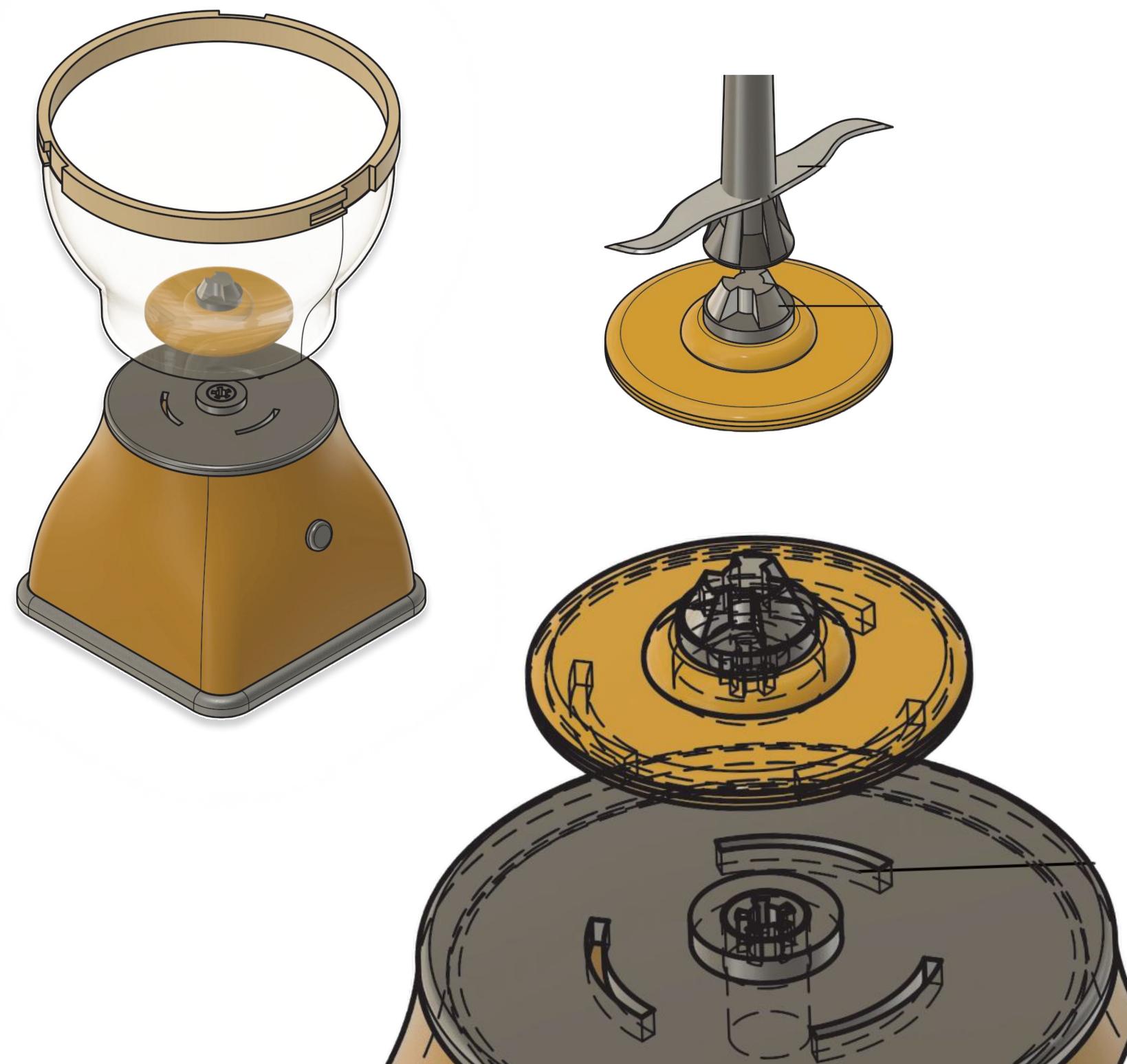
A Design Research paper to be presented on ICoRD25



10th International Conference on Research Into Design

8th - 10th Jan 2025

Department of Design
Indian Institute of Technology Hyderabad



Redesigning Electric Chopper for Indian Households: A Circular and User-Centric Approach

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¹ Indian Institute of Science, Bangalore 560 012, India

Abstract. The motivation driving this paper stems from the pervasive presence of the linear design model, which prioritizes continuous production and sales without considering the lifecycle of products, leading to issues once they reach the end of their usefulness or encounter breakdowns. In response, the paper aims to redesign the electric chopper, tailored for Indian households, with a strong emphasis on eco-design and sustainable principles, prioritizing an enhanced cooking experience while minimizing environmental footprint to contribute to the development of kitchen appliances that promote both efficiency and environmental responsibility.

Detailed user research involving 16 regular electric chopper users uncovered several significant issues with the current products available in the market. These issues include inconsistent chopping results, difficulty in cleaning due to complex designs requiring dedicated tools and extended drying times, lack of modularity leading to product wastage even for minor damages, absence of safety features like locking mechanisms, and the use of materials that are difficult to recycle.

Our methodology focuses on enhancing product modularity to empower users with easily replaced or repaired components, thereby extending product lifespan and reducing waste. Beginning with the identification of key problems, we developed concepts and prototypes aimed at addressing these issues. Through iterative testing with real users, we refined our designs, for example, uniquely oriented detachable blade that facilitates easy cleaning, easy replacement and ensures uniform chopping.

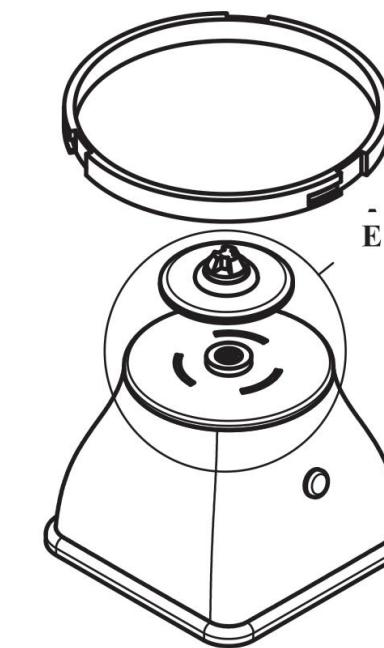
Through the integration of user-replaceable components and sustainable materials, the electric chopper emerges as an eco-conscious, and socially accountable solution, rendering it more sustainable for all stakeholders. In addressing broader issues within the realm of home appliances, our focus on the electric chopper exemplifies a tangible step towards fostering Circularity in everyday kitchen practices.

Keywords: Linear design model, sustainable principles, electric chopper, user research, modularity, environmental footprint, recyclable materials, circularity.

1 Introduction

In the realm of kitchen appliances, the electric chopper has become a ubiquitous tool for Indian households. However, the pervasive linear design model employed in their production and consumption has led to a significant increase in electronic waste on a global scale. This linear model prioritizes continuous production and sales without

Team



Hemanth | Shreya | Somnath | Bagisha



M Des Course Project 2024
New Product Development

• Content

• *Google form and responses*

• *Product functioning videos*

• *Product tear down*

images and videos

• *Requirements*

- *Issues*
- *ISQ*
- *Requirements*
- *Function and function structure*
- *BOM*

• *Product circularity*

• *Target segment*

• *Project Planning*



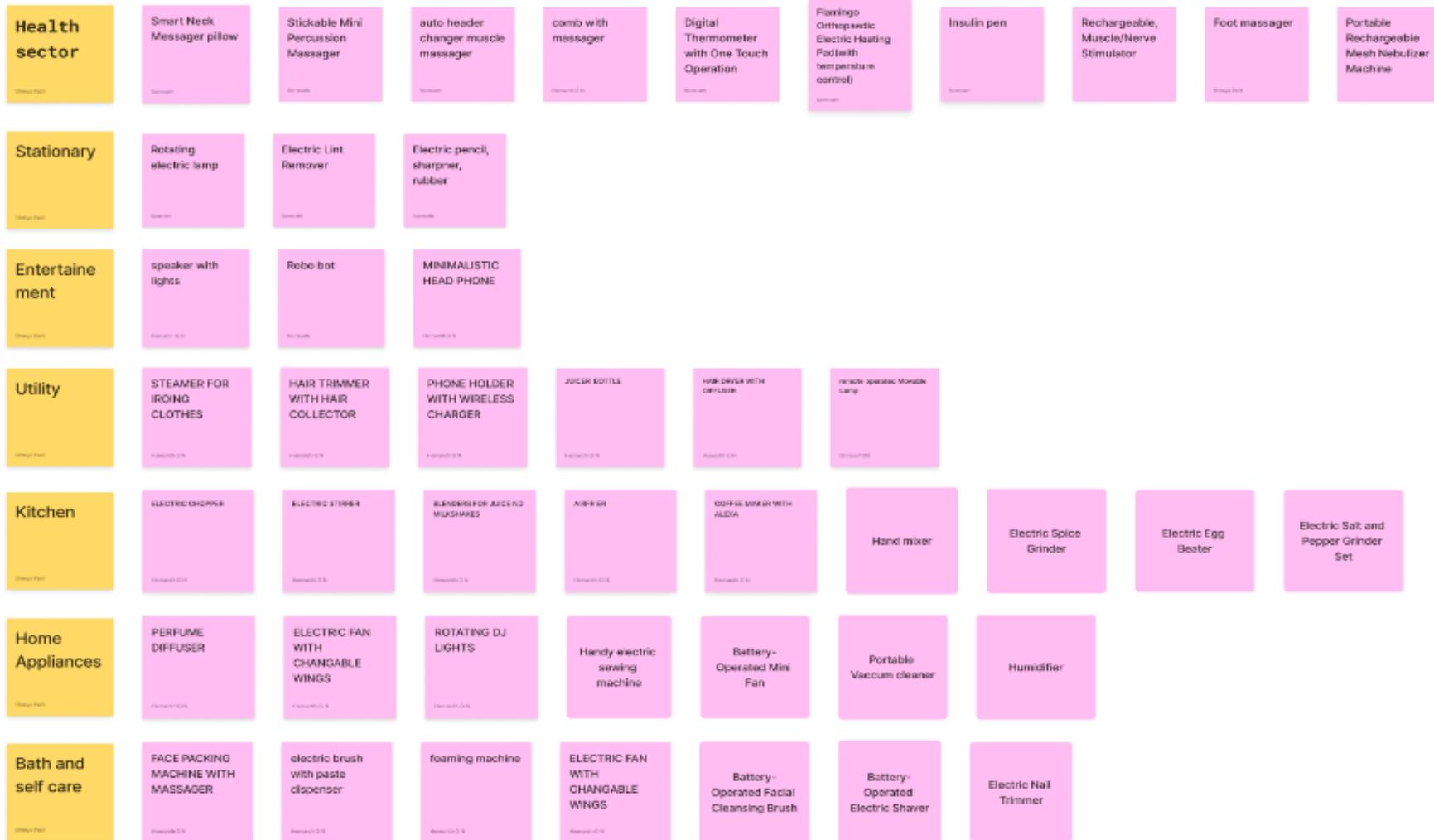
Opportunity Identification

Brainstorming for Opportunity Identification

45 ideas

FACE PACKING MACHINE WITH MASSAGER <small>Hemant G N</small>	Smart Neck Massager pillow <small>Sonam</small>	Rotating electric lamp <small>Sonam</small>	electric brush with paste dispenser <small>Hemant G N</small>	Stickable Mini Percussion Massager <small>Sonam</small>	Electric Lint Remover <small>Sonam</small>	BLENDERS FOR JUICE ND MILKSHAKES <small>Hemant G N</small>	JUICER BOTTLE <small>Hemant G N</small>	Foot massager <small>Gargi Bell</small>
foaming machine <small>Hemant G N</small>	ELECTRIC FAN WITH CHANGABLE WINGS <small>Hemant G N</small>	PERFUME DIFFUSER <small>Hemant G N</small>	ELECTRIC CHOPPER <small>Hemant G N</small>	ROTATING DJ LIGHTS <small>Hemant G N</small>	Robo bot <small>Sonam</small>	ELECTRIC STIRRER <small>Hemant G N</small>	remote operated Movable Lamp <small>Sonam Puri</small>	Portable Rechargeable Mesh Nebulizer Machine
speaker with lights <small>Hemant G N</small>	ELECTRIC FAN WITH CHANGABLE WINGS <small>Hemant G N</small>	Handy electric sewing machine <small>Sonam</small>	Battery-Operated Mini Fan <small>Hemant G N</small>	Portable Vacuum cleaner <small>Sonam</small>	Battery-Operated Electric Shaver <small>Sonam</small>	HANDY VACUM CLEANER <small>Hemant G N</small>	Electric Spice Grinder <small>Sonam</small>	Hand mixer
STEAMER FOR IRONING CLOTHES <small>Hemant G N</small>	Electric Nail Trimmer <small>Sonam</small>	Electric pencil, sharpner, rubber <small>Sonam</small>	MINIMALISTIC HEAD PHONE <small>Hemant G N</small>	auto header changer muscle massager <small>Sonam</small>	Battery-Operated Facial Cleansing Brush <small>Hemant G N</small>	COFFEE MAKER WITH ALEXA <small>Hemant G N</small>	Electric Egg Beater <small>Hemant G N</small>	HAIR DRYER WITH DIFFUSER <small>Hemant G N</small>
comb with massager <small>Hemant G N</small>	Humidifier <small>Sonam</small>	Digital Thermometer with One Touch Operation <small>Sonam</small>	Flamingo Orthopaedic Electric Heating Pad(with temperature control) <small>Sonam</small>	Insulin pen <small>Sonam</small>	Rechargeable, Muscle/Nerve Stimulator <small>Hemant G N</small>	HAIR TRIMMER WITH HAIR COLLECTOR <small>Hemant G N</small>	Electric Salt and Pepper Grinder Set <small>Hemant G N</small>	PHONE HOLDER WITH WIRELESS CHARGER <small>Hemant G N</small>

Affinity Analysis



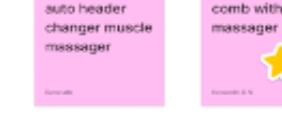
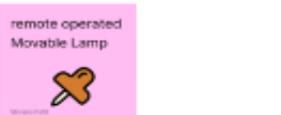
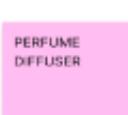
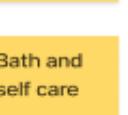
MULTI VOTING

stage 1

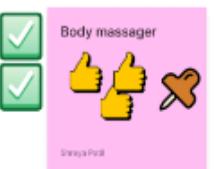
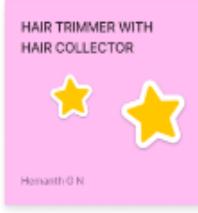
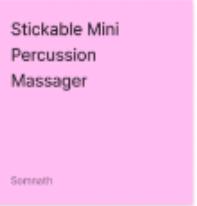
Health sector Smart Pill	Smart Neck Massager pillow Smartpill	Stickable Mini Percussion Massager Smartstick	auto header changer muscle massager Smartauto	combo with massager Smartcombo	Digital Thermometer with One Touch Operation Smarttemp	Flamingo Orthopedic Electric Heating Pad with temperature control Smartflamingo	Insulin pen Smartpen	Rechargeable, Muscle/Nerve Stimulator Smartstim	Foot massager Smartfoot	Portable Rechargeable Mesh Nebulizer Machine Smartnebulizer
Stationary Smart Pill	Rotating electric lamp Smartlamp	Electric Lint Remover Smartlint	Electric pencil, sharpener, rubber Smartpencil							
Entertainment Smart Pill	speaker with lights Smartlight	Robo bot Smartbot	MINIMALISTIC HEAD PHONE Smartheadphone							
Utility Smart Pill	STEAMER FOR IRONING CLOTHES Smartiron	HAIR TRIMMER WITH HAIR COLLECTOR Smarttrimmer	PHONE HOLDER WITH WIRELESS CHARGER Smartphoneholder	JUICER BOTTLE Smartjuicer	HAIR DRYER WITH DIFFUSER Smartdryer	rechargeable Portable Lamp Smartlamp				
Kitchen Smart Pill	ELECTRIC CHOPPER Smartchopper	ELECTRIC Slicer Smartlicer	BLENDER FOR JUICING MILKSHAKES Smartblender	AMPERE Smartampere	COFFEE MAKER WITH AUDIA Smartaudia	Hand mixer Smartmixer	Electric Spice Grinder Smartspice	Electric Egg Beater Smartbeater	Electric Salt and Pepper Grinder Set Smartgrinder	
Home Appliances Smart Pill	PERFUME DIFFUSER Smartdiffuser	ELECTRIC FAN WITH CHANGABLE WINGS Smartfan	ROTATING DJ LIGHTS Smartlights	Handy electric sewing machine Smartsewing	Battery-Operated Mini Fan Smartfan	Portable Vacuum cleaner Smartvacuum	Humidifier Smarthumidifier			
Bath and self care Smart Pill	FACE PACKING MACHINE WITH MASSAGER Smartface	electric brush with paste dispenser Smartbrush	foaming machine Smartfoaming	ELECTRIC FAN WITH CHANGABLE WINGS Smartfan	Battery-Operated Facial Cleansing Brush Smartbrush	Battery-Operated Electric Shaver Smartshaver	Electric Nail Trimmer Smartnail			

MULTI VOTING

stage 2

Health sector  Smart Neck Massager pillow	 Stickable Mini Percussion Massager	 auto header changer muscle massager	 comb with massager	 Digital Thermometer with One Touch Operation	 Flamingo Orthopaedic Electric Heating Pad with temperature control	 Insulin pen	 Rechargeable, Muscle/Nerve Stimulator	 Foot massager	 Portable Rechargeable Mesh Nebulizer Machine	 Body massager
Stationary  Rotating electric lamp	 Electric Lint Remover	 Electric pencil, sharpener, rubber								
Entertainment  speaker with lights	 Robo bot	 MINIMALISTIC HEAD PHONE								
Utility  STEAMER FOR IRONING CLOTHES	 HAIR TRIMMER WITH HAIR COLLECTOR	 PHONE HOLDER WITH WIRELESS CHARGER	 JUICER BOTTLE	 HAIR DRYER WITH DIFFUSER	 remote operated Movable Lamp					
Kitchen  ELECTRIC CHOPPICK	 ELECTRIC STIRRER	 BLENDER FOR LIQUIDS AND MILKSHAKES	 AIRFRYER	 COFFEE MAKER WITH ALEXA	 Hand mixer	 Electric Spice Grinder	 Electric Egg Beater	 Electric Salt and Pepper Grinder Set		
Home Appliances  PERFUME DIFFUSER	 ELECTRIC FAN WITH CHANGABLE WINGS	 ROTATING DJ LIGHTS	 Handy electric sewing machine	 Battery-Operated Mini Fan	 Portable Vacuum cleaner	 Humidifier				
Bath and self care  FACE PACKING MACHINE WITH MASSAGER	 electric brush with paste dispenser	 foaming machine	 ELECTRIC FAN WITH CHANGABLE WINGS	 Battery-Operated Facial Cleansing Brush	 Battery-Operated Electric Shaver	 Electric Nail Trimmer				

MULTI VOTING FOR TOP IDEAS



Winning Opportunities

Electric Vegetable Chopper

Body Massager

EXISTING PRODUCTS



Electric Vegetable Chopper

Ref : https://www.amazon.in/Rust-Resistant-Unbreakable-Polycarbonate-One-Touch-Operation/dp/B0CB3Q2GJS/ref=sr_1_2_sspp?crid=MTUU7ZYBS1GN&keywords=Electric+Chopper&qid=1706760882&sprefix=%2Caps%2C879&sr=8-2-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9hdGY&psc=1

Ref : https://www.amazon.in/beatXP-Blaze-Electric-Massager-Massage/dp/B09NFV919S/ref=sr_1_1_sspp?crid=34FYITXZO7OVJ&keywords=Body+Massager&qid=1706760986&sprefix=body+massager%2Caps%2C301&sr=8-1



Body Massager

IDEA DESCRIPTION

Electric Chopper

- **Product type:** Kitchen Appliance
- **Target Market:** working professionals and parents, elderly individuals, individuals with physical limitations

Physical mechatronic:

- Motor and drive system

Moving parts:

- Rotor blades
- Drive mechanism

Product circularity:

- Recyclable materials
- Modular design
- Repairability

B2C product:

- Target market

Body Massager

- **Product type:** Personal & Health care
- **Target Market:** Individuals seeking relaxation and pain relief, athletes and fitness enthusiast, deskbound professionals, individual with chronic pain

Physical mechatronic:

- Massage Nodes or Rollers Motors
- Adjustable Arms or Handles

Moving parts:

- Massage heads
- Switch

Product circularity:

- Recyclable materials
- Modular design
- Repairability

B2C product:

- Target market



PROCESS

**Criteria
of Product**

Quality

- Durability
- Exterior look
- Material

Speed modes

- High
- Low

Modularity

- Motor & switch
- Container
- Chopper

Cleaning

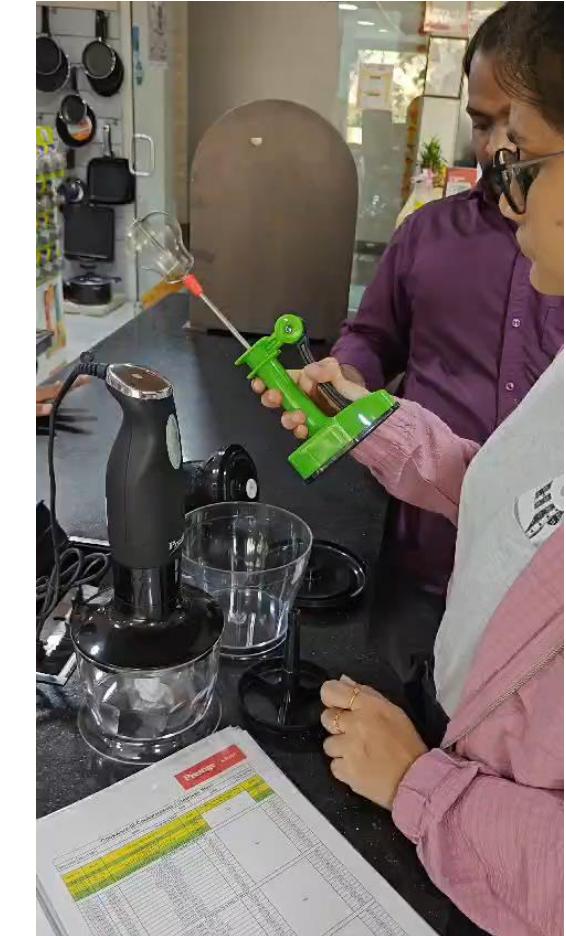
- Easy to Clean

**Frame and
body**

- Compact and
Easy to use

PRODUCT

Prestige PEC 4.0



PRODUCT DETAILS

Prestige PEC 4.0

Message



Prestige
ELECTRIC CHOPPER

CHOPPING, WHIPPING AND MINCING NOW MADE EASY

Prestige
ELECTRIC CHOPPER

CHOPPING WHIPPING MINCING NOW MADE EASY

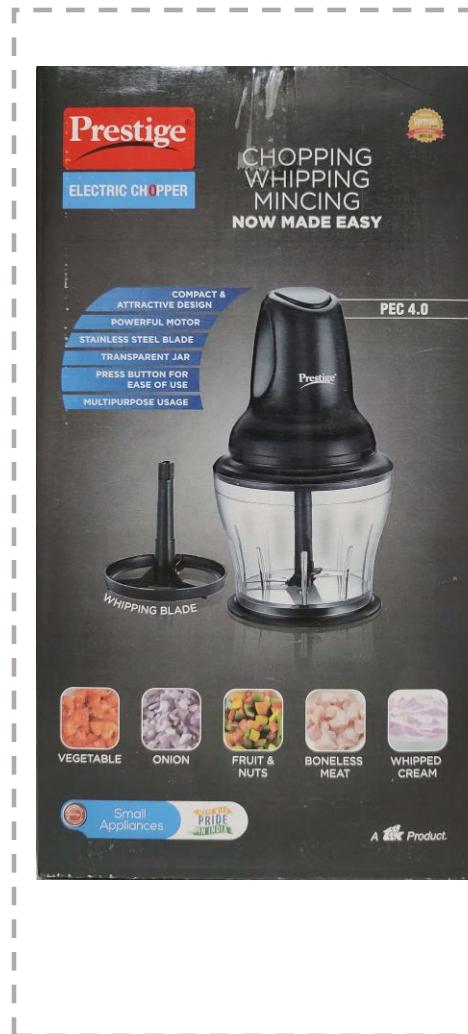
COMPACT & ATTRACTIVE DESIGN
POWERFUL MOTOR
STAINLESS STEEL BLADE
TRANSPARENT JAR
PRESS BUTTON FOR EASE OF USE
MULTIPURPOSE USAGE

PEC 4.0

VEGETABLE ONION FRUIT & NUTS BONELESS MEAT WHIPPED CREAM

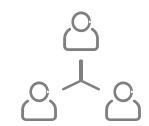
Small Appliances PRESTIGE PRIDE

A  Product



Message

Features



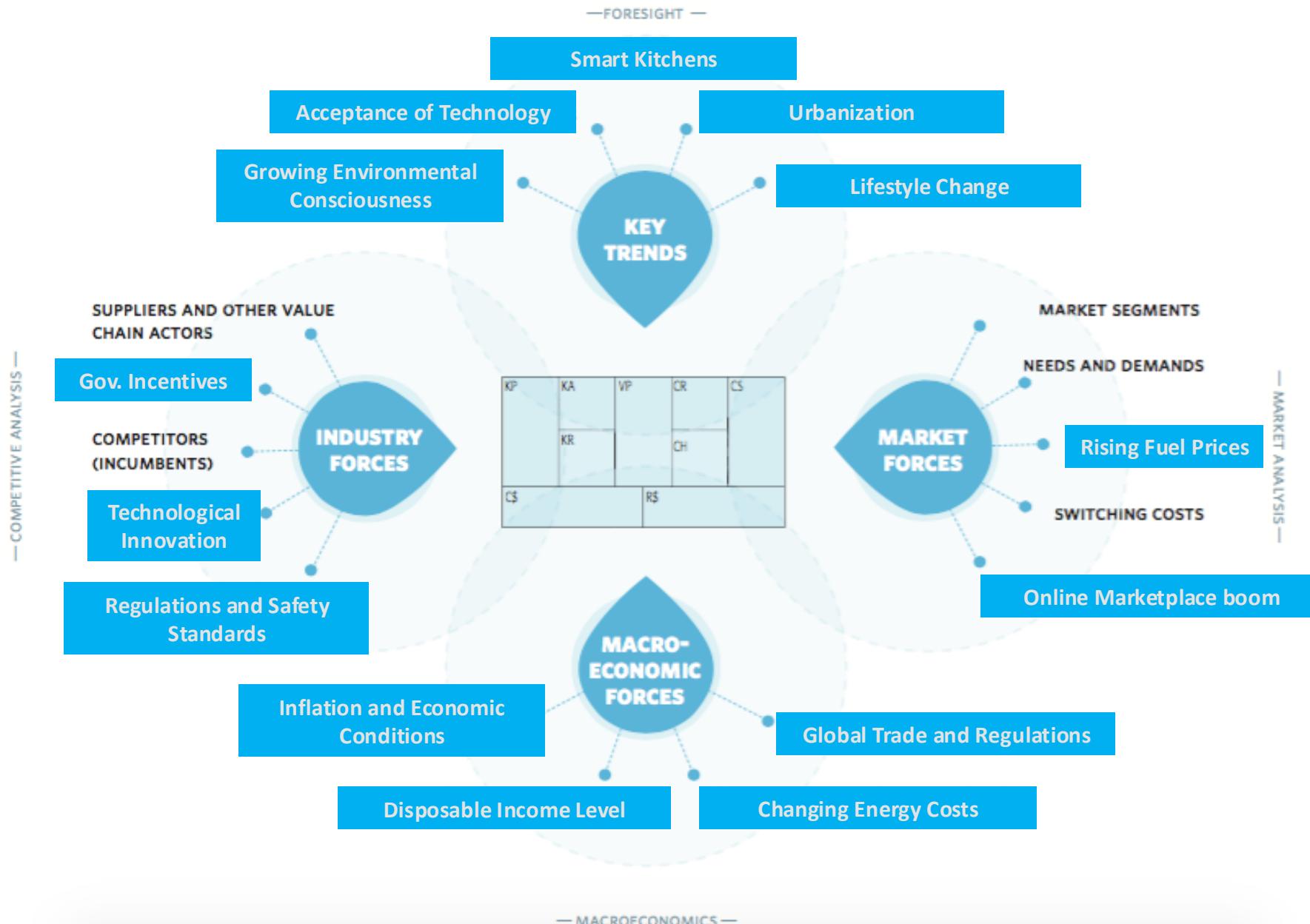
Business Modelling

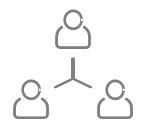


Business Model Canvas

<p>Key Partners</p> <ul style="list-style-type: none"> Raw material suppliers Manufacturing partners Distributors and retailers Design Collaborators Technology partners 	<p>Key Activities</p> <ul style="list-style-type: none"> Product design and dev. Manufacturing and quality control, Marketing and branding Distribution and sales Customer service and after-sales support. <p>Key Resources</p> <ul style="list-style-type: none"> Manufacturing facilities, Design team and partnerships. Distribution network Inventory 	<p>Value Propositions</p> <ul style="list-style-type: none"> Sustainability Supports Circularity Quality and durability Functionality and innovation Safety Design-conscious products 	<p>Customer Relationships</p> <ul style="list-style-type: none"> Building trust, Emotional connection, Customer service <p>Channels</p> <ul style="list-style-type: none"> Retail Stores Online Marketplaces Brand Stores Malls 	<p>Customer Segments</p> <ul style="list-style-type: none"> Working Professionals Nuclear Family Health Freaks Cloud Kitchens Cooking Enthusiasts Senior Citizens
<p>Cost Structure</p> <p>Raw material costs, Manufacturing costs, Marketing and branding expenses, Distribution and sales costs, Research and development</p>		<p>Revenue Streams</p> <ul style="list-style-type: none"> Product Sales, After Sales Service, Selling Spare Parts 		

Business Model Canvas Environment





Market Segmentation Target Market

Market Segmentation / Target Marget





Competitor Study



Product Study

Product 1



Crompton

Product: Crompton ChopMaxx Electric Vegetable Chopper

Features:

- Powerful 300 watts motor for faster operation.
- Dual S-shaped blades for grinding, chopping, and whisking.
- 800 ml see-through food-grade bowl.
- Single-touch operation.
- Whisking attachment for beating eggs, butter, and curd.
- Rust-resistant stainless-steel blade for chopping various ingredients.
- Anti-skid base for stability during operation.
- **Pricing is in the range of 1249-1299 rupees.(variation subjected to seller and sale festivals)**

Ref : [Buy Crompton ChopMaxx Electric Vegetable Chopper | 300 Watts Motors | Twin S-Shaped Ninja blades | 800 ml see through bowl Online at Low Prices in India - Amazon.in](#)

Product Study

Product 2



Borosil

- **Product:** Borosil Chef Delite 300 Watts Electric Chopper
- **Features:**
 - Twin blade technology.
 - 600 ml 'chop-n-store' plastic bowl with a lid.
 - Functions include chopping, mincing, dicing, whisking, and blending.

Pricing ranges from 1949 to 2349 rupees based on watts

[Buy Borosil Chef Delite 260W Electric Glass Chopper For Kitchen Use | White Chopper | Low Noise Operation | Kitchen Accessories Items | Stainless Steel Blades, Whisking Blade for Cream, Chaas, Lassi Online at Low Prices in India - Amazon.in](#)

Product Study

Product 3

Black + Decker



Product: Black+Decker 3-Cup Electric Food Chopper

Black+Decker Bxch1201In 120-Watt Electric Mini Chopper | 350ML Jar

- **Features:**
- Compact design with a 3-cup capacity.
- Suitable for chopping vegetables, nuts, and herbs.
- Easy-to-use one-touch operation.

Price : 3245 rupees

[Buy Black+Decker Bxch1201In 120 Watt Electric Mini Chopper | 350ML Jar Capacity | Stainless Steel Blade | 2-Year Warranty \(White\) Online at Low Prices in India - Amazon.in](#)

Product Study

Product 4



Pigeon

Product: Pigeon Zoom Electric Chopper 350 ml,

Features

- Chopper Capacity: 350 ml
- Powerful Motor: 30 W, 1700 RPM, 5.0V DC
- Battery type: Li-Ion Battery
- Battery Capacity: 1500 mAh
- Long Lasting Charge: 4 Hr charge can be used for 30 min One Chop: 10 to 15 Sec. Battery Support: 100+ Chops Power Cord Length: 1 meter

Price : 770 rupees

.(variation subjected to seller and sale festivals)

[Buy Pigeon Zoom Electric Chopper 350 ml, Portable with 3 Stainless Steel Blades for Effortlessly Chopping Vegetables and Fruits - Green, 30 Watts Online at Low Prices in India - Amazon.in](#)

Product Study

Product 5



EMSON

Product: Bionic Blade Countertop Personal Blender

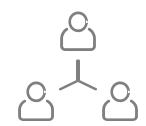
Features

- Chopper Capacity: 468 g
- Weight = 499g
- Powerful Motor: 150 W,
- Operational Voltage : 7.4V
- Blade Material Stainless Steel
- Special Feature Lightweight
- Style Modern
- Power Source Corded Electric

Price : 3570 rupees

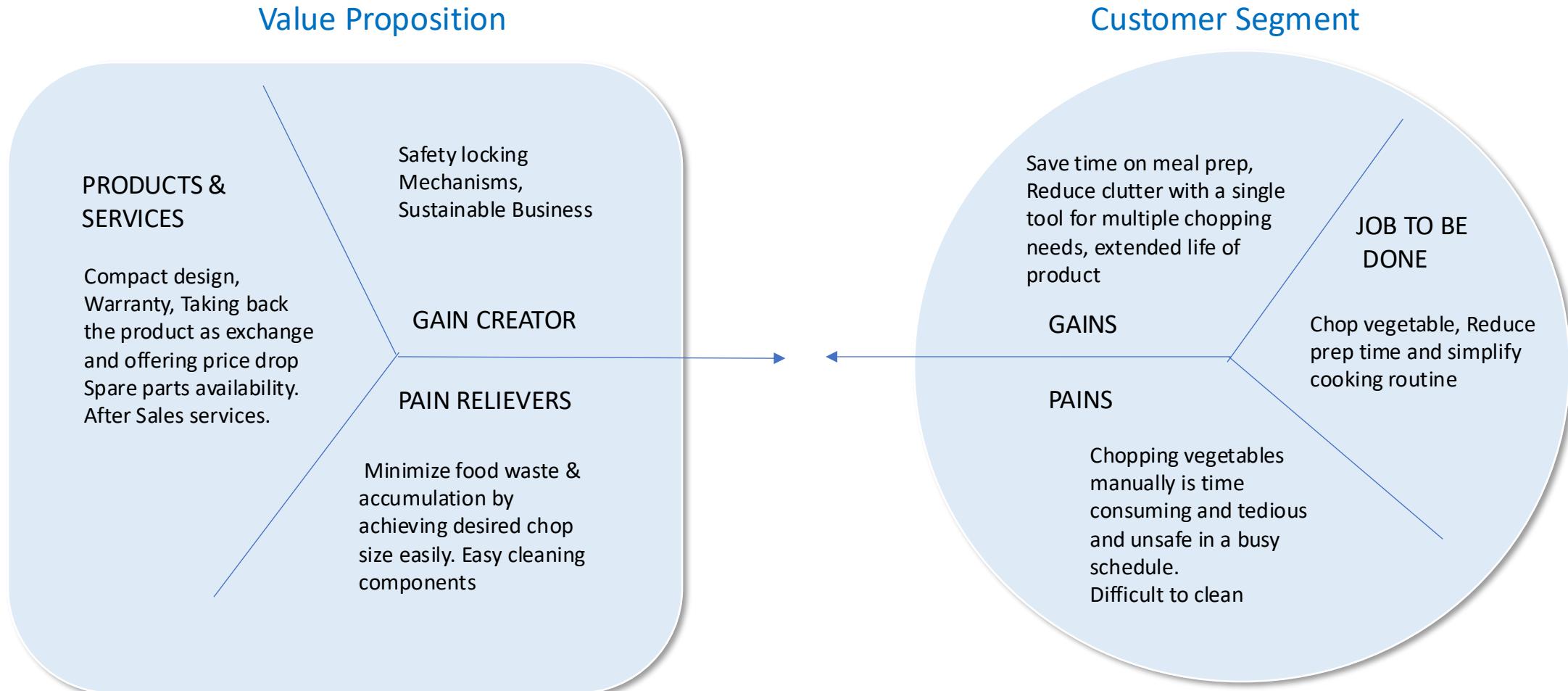
(variation subjected to seller and sale festivals)

[Buy Bionic Blade Countertop Personal Blender Online at Low Prices in India - Amazon.in](#)



VP & Differentiation

Value Proposition Canvas





Value Proposition

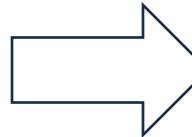
"Save time and chop vegetables safely and easily with our versatile electric chopper. It's the perfect tool for busy cooks who want to simplify meal prep and avoid the hassle of using knives."

Differentiators

WHAT ARE THE THINGS LACKING IN THE CURRENT PRODUCT ?

Cleaning is hard
No consideration of Circularity
Single blade option
Not comfortable to hold
Lid is not transparent

HOW ARE WE DIFFERENT?



Easy cleaning:

Considering the Bowl size and gaps formed for interlocking and reducing the accumulation of particles.

Circular Product:

We are planning to add a circularity perspective to our product where we introduce more components which can be reusable if the attaching components were damaged.

Changeable Blade Component:

For different sized chopping we are providing different attachments of blades which is modular and can be changed easily by the user.

Ergonomic Form:

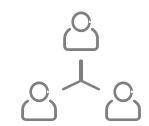
The current form which doesn't have any handle or other form of grippers causing user issue with balancing so, we changed the form of the Chopper to more ergonomic form.

Transparent bowl and lid:

To increase the visibility and the progress of the work we are providing transparent Bowl and Lid which increase even the visual appeal.

Differentiators

Features	Differentiator	Dimensions of Differentiations
Ease of Use and Cleaning	Easy-to-clean components for hassle-free operation.	Ergonomic design, Lesser crevices
Safety Features	Enhanced safety features that prioritize user protection during operation and handling.	Safety lock mechanisms, non-slip base
Durability	Robust construction using high-quality materials that ensure long-lasting durability and performance.	Material quality, warranty period



Target Company



Target Company

- Prestige is a titan in the Indian kitchen appliance market. They have a well-established brand reputation synonymous with quality, reliability, and innovation.
- Their products have a wide reach and strong distribution network. Partnering with Prestige would ensure your enhanced electric chopper would find its way into homes across the country.
- Prestige has a history of embracing new technologies. This open-mindedness aligns with the focus on smart features and automation within your improved electric chopper.



Prestige PEC 3.0 250-Watts
Electric Chopper (White)
Electric Chopper



Prestige Partner Stainless Steel
Food Processor 1000 W
Food Processor

Product Range:

TTK Prestige offers a wide range of kitchen appliances like

Pressure cookers

Cooktops: Gas stoves and induction cooktops.

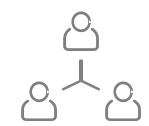
Kitchen appliances: Mixer grinders, electric kettles, vacuum cleaners.

Cookware: Non-stick cookware, fry pans, and other kitchen essentials.

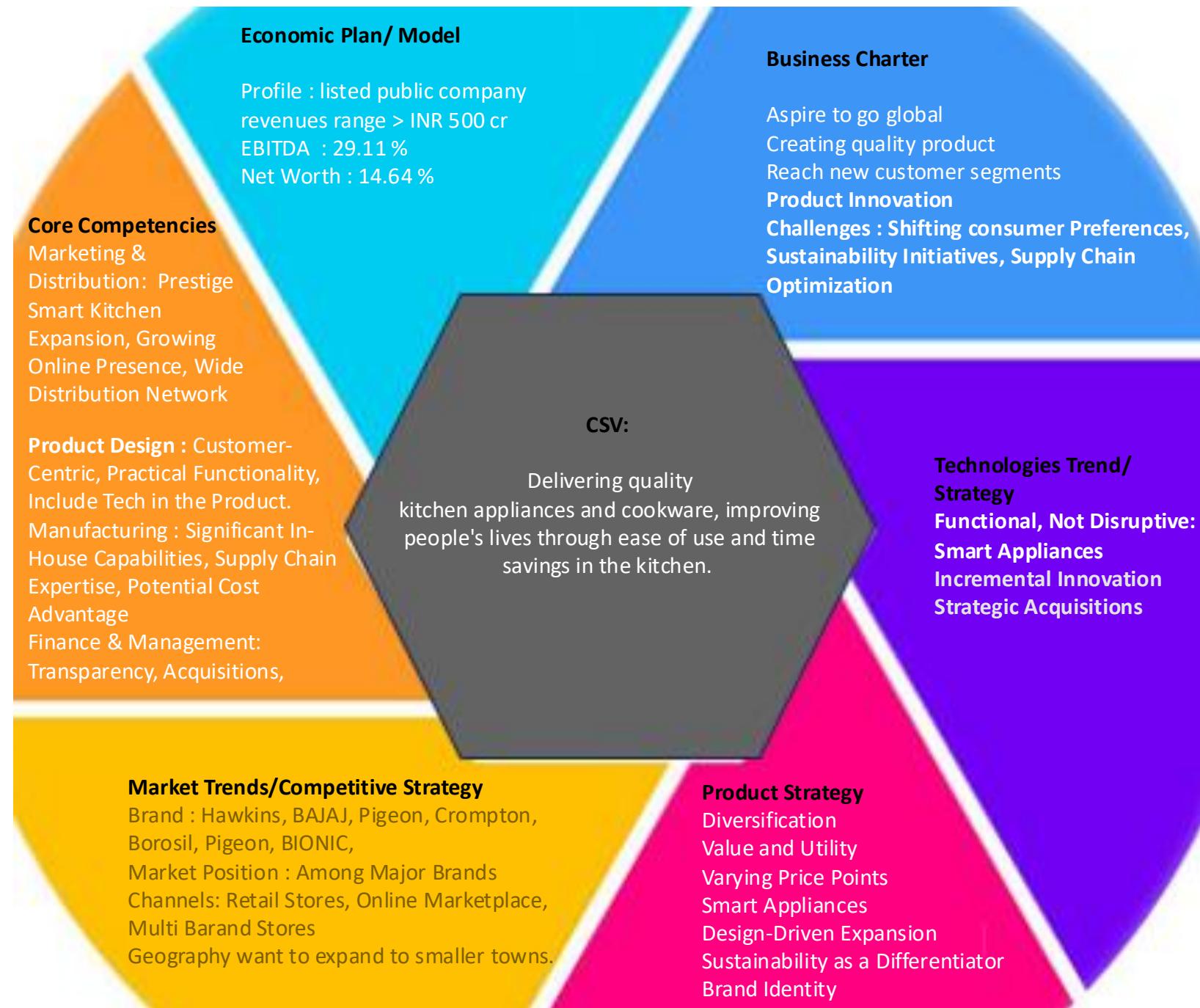


Why Target Fit

- **Brand and Market Fit:** Our improved electric chopper offers a level of convenience, safety, and technological advancement that complements Prestige's existing product line. It has the potential to be an appealing addition to their kitchen solutions.
- **Synergies in Technology:** Prestige is already exploring smart kitchen appliances. Our project, with its use of sensors and automation, aligns with this future direction. This could potentially open avenues for collaboration and technology sharing.
- **Shared Values:** Prestige emphasizes customer satisfaction and convenience. Our focus on safety and enhanced features through smart technology demonstrates a shared commitment to delivering user-centric products.



Core Strategic Vision

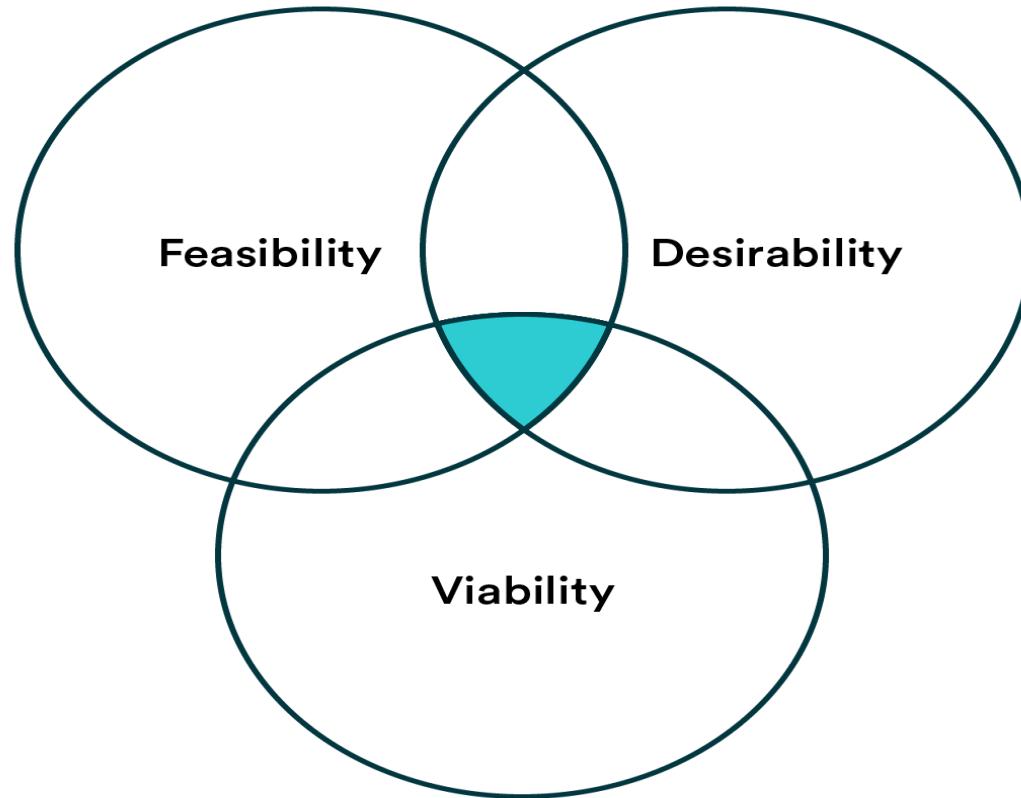


Assessment of Feasibility, Desirability, Viability

Technical: Existing technology can be readily applied, making it technically feasible to develop and manufacture.

Operational: Prestige has a well-established manufacturing infrastructure and distribution network for kitchen appliances.

Financial: Considering the potential market size and existing competitor pricing, there's a good chance the product can be priced competitively and achieve profitability within a reasonable timeframe.



Market Size and Growth: The global and Indian electric vegetable chopper markets are expected to experience positive growth driven by convenience, rising disposable income, and changing demographics.

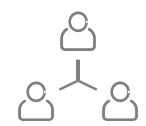
Competition: The market is saturated, but Prestige's brand reputation and focus on differentiation can help them compete effectively.

Profitability: The target price point, combined with efficient manufacturing and a large potential customer base, suggests the product can be profitable.

Market Need: Busy lifestyles and growing interest in healthy cooking create a demand for appliances that simplify food preparation.

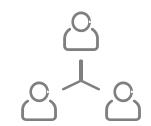
Target Audience: Busy professionals, elderly individuals, and single people are all potential target segments who would likely find the convenience and time-saving benefits of an electric chopper desirable.

Competitive Advantage: The interchangeable blade system offers greater versatility compared to fixed-blade choppers. Transparency and focus on easy cleaning address pain points of existing models.



Timeline

Project Planning



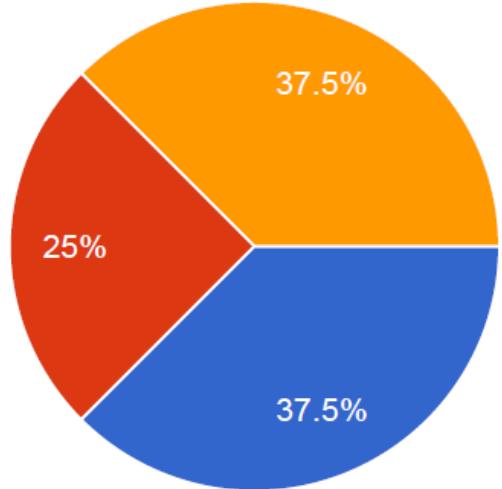
Survey

Google form and responses

Survey & Analysis on Electric Chopper

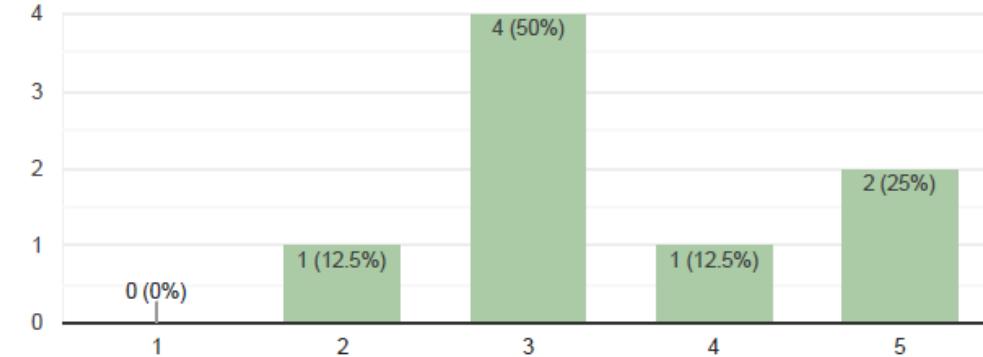
1

- Have you ever used any kind of 'Electric Chopper'.



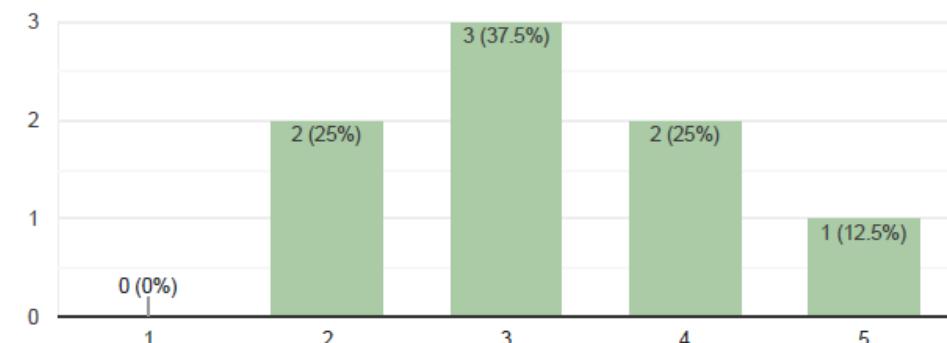
2

- How satisfied are you with the Electric chopper?



3

- How would you rate the chopping performance of the electric chopper?

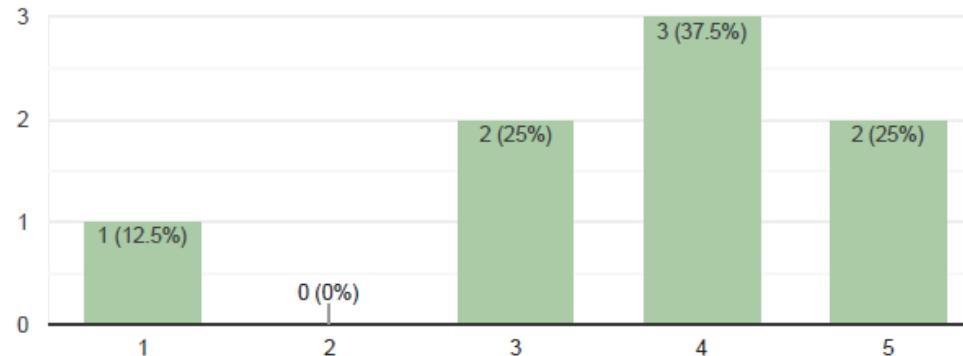


Google form and responses

Survey & Analysis

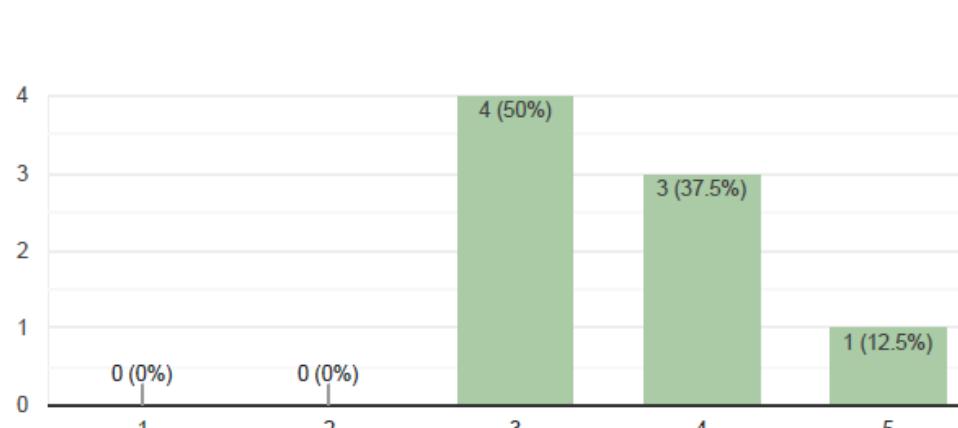
4

- How easy is it to assemble the electric chopper for you?



6

- How easy is it to operate the electric chopper?



5

- Are there any **specific features** or functions of the electric chopper that you find particularly convenient or inconvenient? Please elaborate.

Effortless

Blades are sharp

It's time saving machine

No

Charging capabilities

1. Cleaning
2. Prechopping is required
3. Blades will deteriorate easily
4. Requires frequent changing of components

Google form and responses

Survey & Analysis

7

- Are there any additional features you would like to see added to the electric chopper?

Auto cleaning of cutting blades

Bigger container to cut bigger vegetables

Slices

No

Chopper cum juice maker

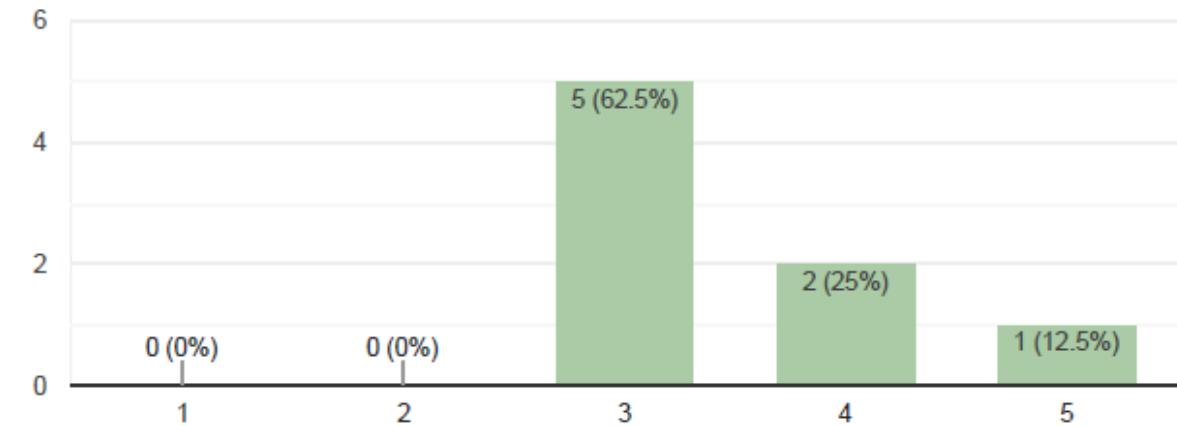
1. Single blade (say with rotation or sliding) for multiple size chopping

NIL

auto cleaning

8

- How durable do you find the electric chopper?



Google form and responses

Survey & Analysis

9

Is there anything else you would like to share about your experience with the electric chopper?

Nahi

Pretty good

Jo

No

Nil

NA

NIL

no

10

How do you typically decide which kitchen gadgets to buy? What typical points do you consider before buying any Kitchen gadgets. (Like Quality of Product, Functionality, Compactness, Heaviness, Look & Feel, Price...e.t.c)



Overall views

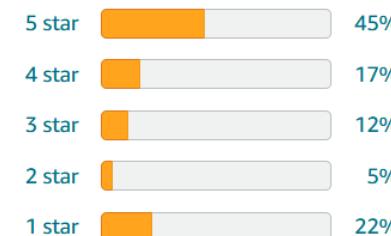
Survey & Analysis



Customer reviews

★★★★★ 3.6 out of 5

74 global ratings



3.6 out of 5

3★ Good

Ok product helpful for small families

Ayesha Customer Certified Buyer, Bangalore



Rohan

★★★★★ Power

Reviewed in India on 17 October 2023

Verified Purchase

Cutting power low..



Placeholder

★★★★★ Prestige chooper

Reviewed in India on 7 August 2023

Verified Purchase

Chopping ability not at all good

2★ Decent product

It only cut lower part. Remaining will stay same. Waste of money for chopping vegetables.

Amjath Mohammed Certified Buyer, Kanjirappally 2 months ago



Market Research



Market Research

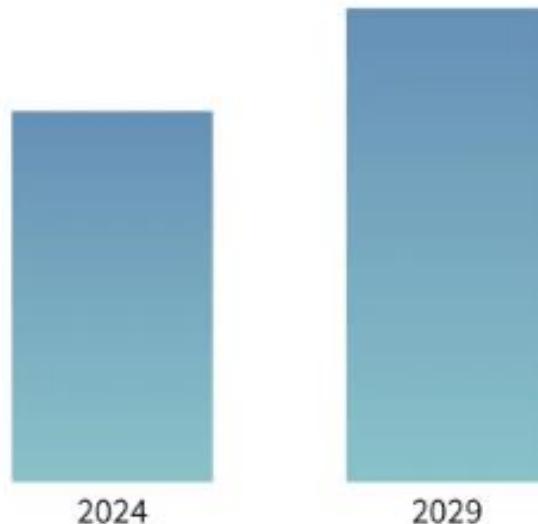
Indian Market

Share

India Electric Vegetable Choppers Market

Market Size

CAGR >5%



Source : Mordor Intelligence



Study Period 2020 - 2029

Base Year For Estimation 2023

Forecast Data Period 2024 - 2029

Historical Data Period 2020 - 2022

CAGR > 5.00 %

Market Concentration High

Major Players



*Disclaimer: Major Players sorted in no particular order

Market Research

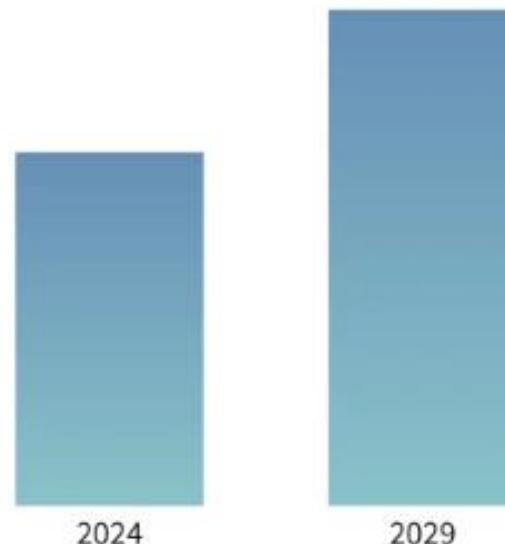
Global Market

Share

Electric Vegetable Chopper Market

Market Size

CAGR >7%



Source : Mordor Intelligence



Study Period 2020 - 2029

Base Year For Estimation 2023

Forecast Data Period 2024 - 2029

Historical Data Period 2020 - 2022

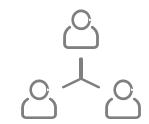
CAGR > 7.00 %

Market Concentration Medium

Major Players



*Disclaimer: Major Players sorted in no particular order

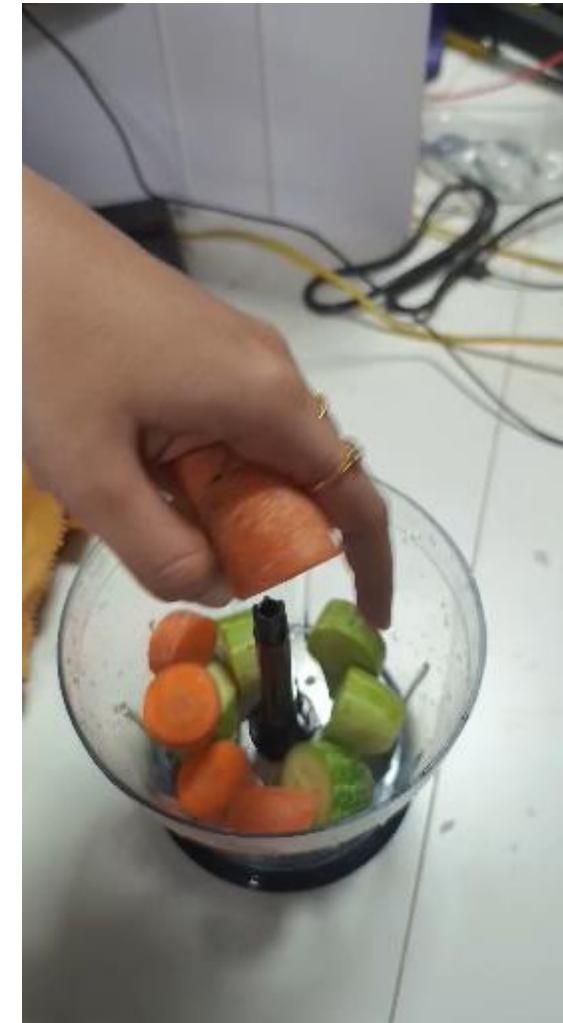


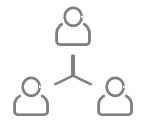
Product Function



Product Functioning videos

Whipping Blade, Chopping & Mincing blade



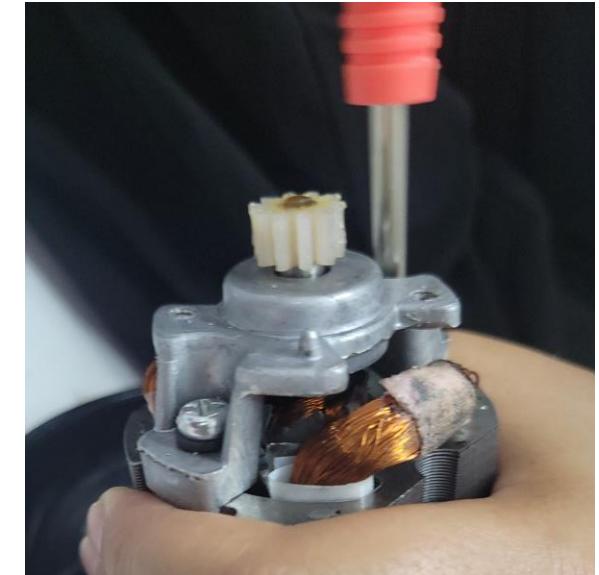
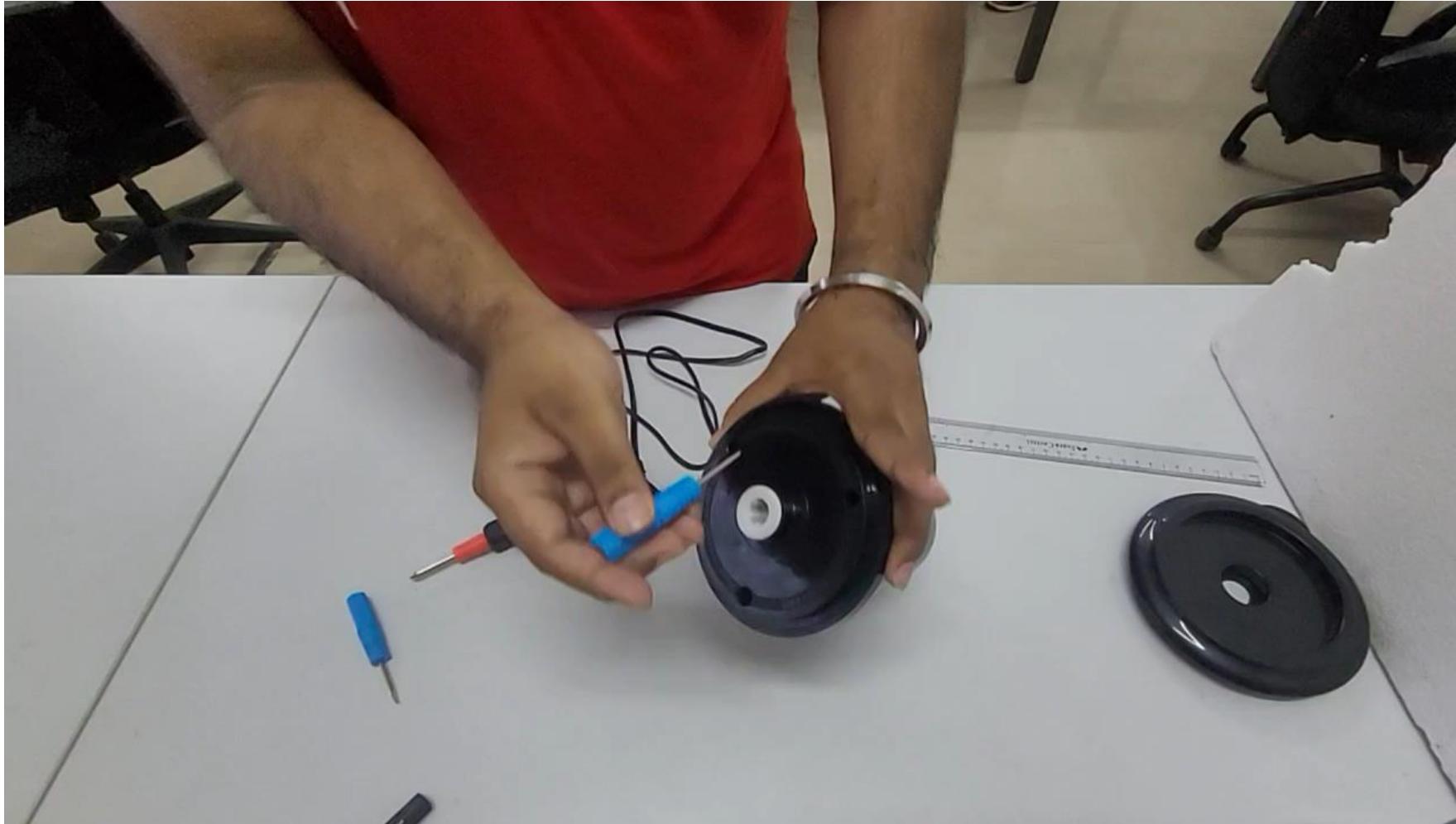


Product Teardown



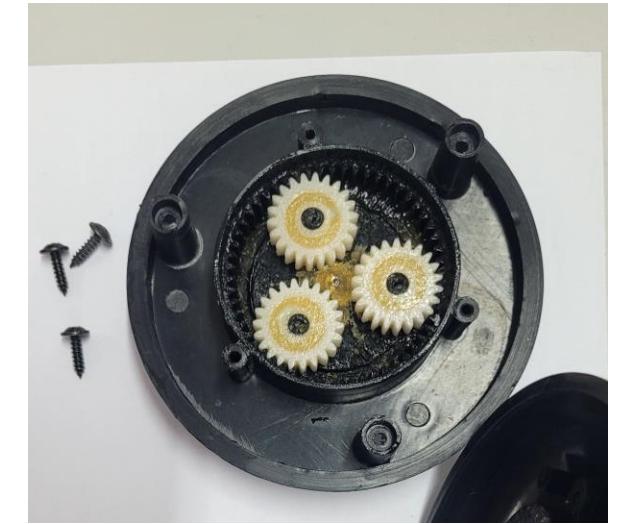
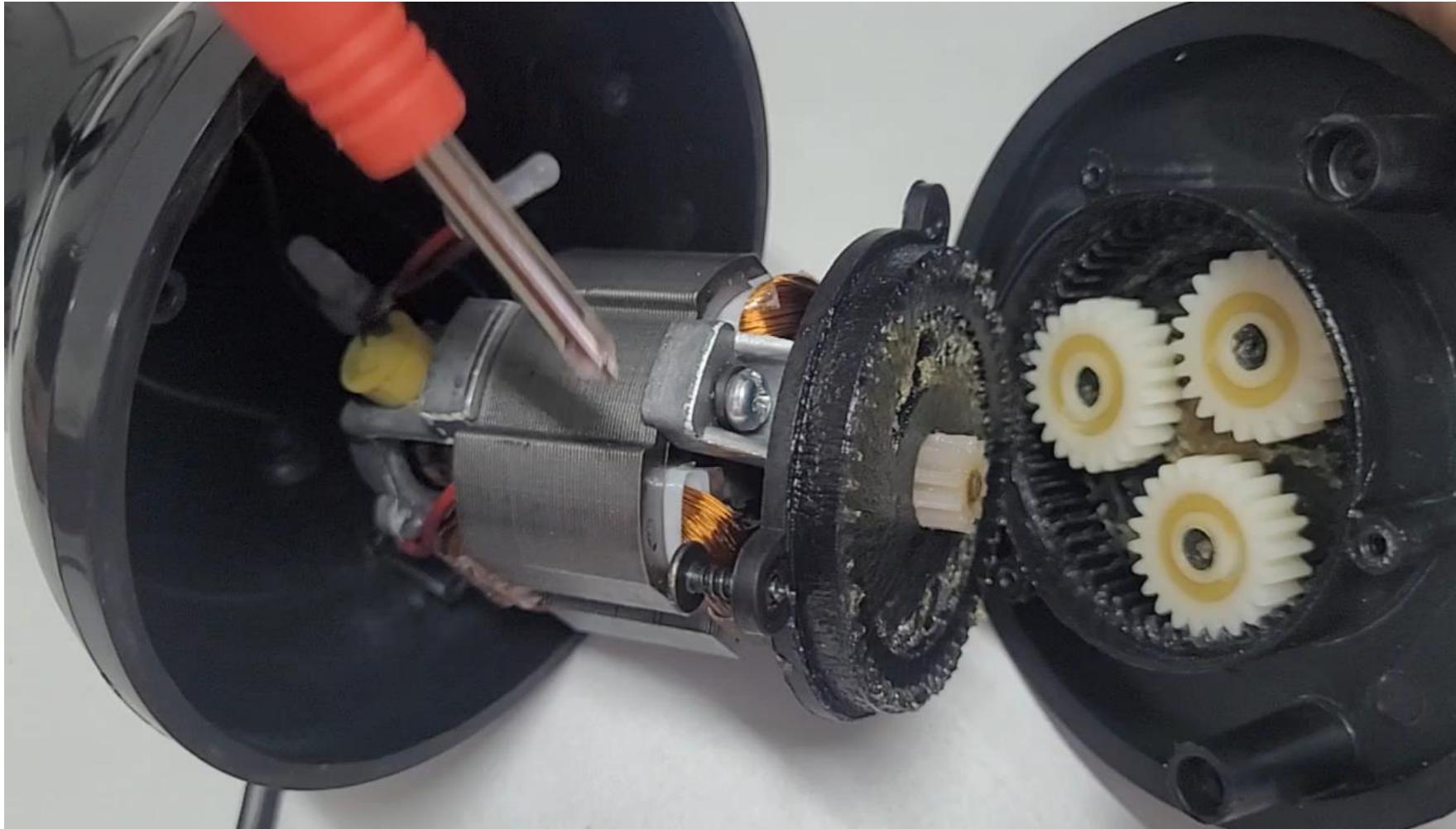
Product Tear Down

Process



Product Tear Down

Process



Product Tear Down

Process



1



2



3



4



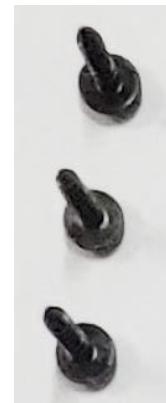
5



6



6a



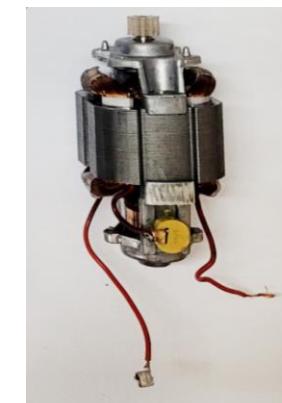
6b



7



7a



8

1. Operating Lid
2. Chopper Blade
3. Whipper wheel
4. Bowl
5. Gear Mechanism
6. Gear Cover
- 6a. Screw – 20mm
- 6b. Screw – 40 mm
7. Motor Cover/ Housing
- 7a. Screw –15 mm
8. Motor

Issues

Listing of issues..

Cleaning Time Consumption



1

Each part requires individual cleaning, leading to extended cleaning sessions.

Sharp Blade Cleaning Difficulty



2

The sharpness of the blades poses challenges during cleaning.

Drying Time



3

The hollow structure of the appliance prolongs the drying process after cleaning.

Issues

Listing of issues..

Inconsistent Chopping Results:



4

inconsistencies in
chopping, leading to
unevenly sized pieces.

Integrated Blade Housing



5

The blades are integrated with the
blade housing, potentially
complicating maintenance and
replacement.

Lack of Speed Adjustment:



6

Users find it inconvenient
that they cannot adjust the
chopping speed to their
desired preference.

Issues

Listing of issues..

Overheating Issue



7

during prolonged usage, which could affect the appliance's performance and longevity.

No Lid Interlocking System



8

absence of an interlocking system in the bowl lid, which affects secure closure.

Heavy Build



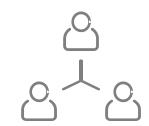
9

The appliance is noted for its heavy body, which may pose handling challenges for some users.

Innovation Situation Questionnaire

ISQ..

Elements	Description
Name	Electric Chopper
Primary Function	Chopping vegetables
Structure	Electric motor, Blades, Chopping Bowl, Lid, Power Cord, Base.
Functioning	Preparation, Assembly, Power on, Chopping process, Adjustments, Completion, Disassembly, Cleaning, Drying and Storage
Available Resources	Material, Electric energy, Heat
Problems to be solved	Motor overheating, Difficulty in cleaning components thoroughly, Lack of durability in blade assemblies, Limited versatility.
Allowable Changes	Material, Dimensions, Form



Function Structure





Functions

Listing of Functions..

1 Preparation

2 Assembly

3 Input signal

4 Chopping

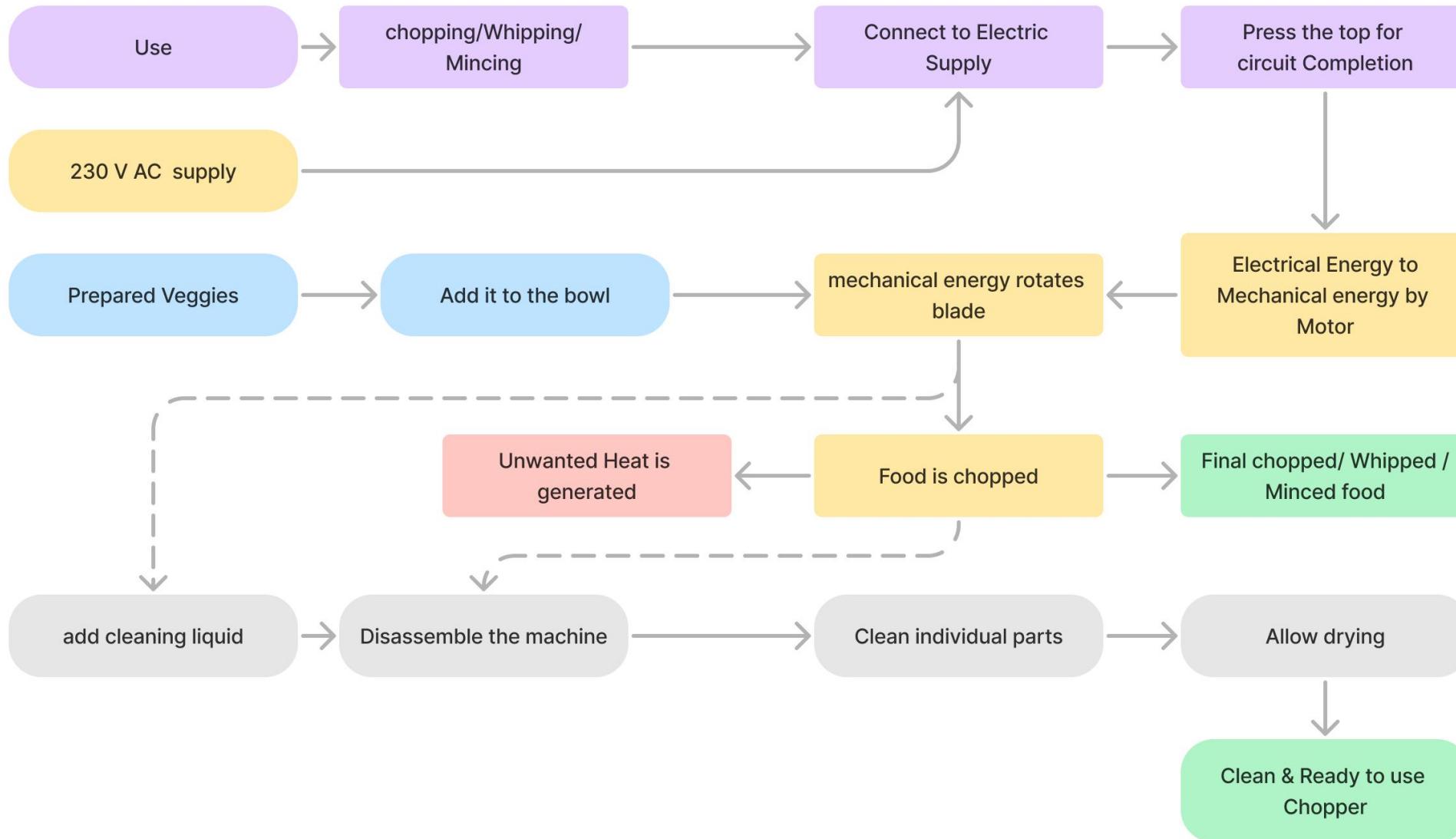
5 Completion

6 Disassembly

7 Cleaning and storing

Function Structure

Flow Diagram





BOM



BOM

Bill of Materials

Component	Sub - Component	Description	Quantity
Motor	Stator		1
	Pole Shoe		1
	Armature		1
	Commutator		
	Shaft		1
	Field Winding		
Motor Assembly	Motor housing	Aluminium Housing	
	Wiring harness	Copper wires	
	Motor coupling	Stainless steel	
Blade Assembly		Stainless steel	2
Chopping Bowl Assembly	Plastic chopping bowl	Food grade ABS	
	Bowl lid	Transparent polycarbonate	1
	Bowl base	ABS plastic	1
Control Panel	Control panel housing	ABS plastic	
	Button	ABS plastic	1
	Wiring connections	Copper wires, Pvc Insulation	
Frame and Housing	plastic housing	ABS plastic	
Power Components	Power cord	Copper wires, Pvc Insulation	
	Power switch	Plastic	
	Power connector		
Packaging	Outer packaging box	Recyclable cardboard	1
	Inner packaging materials	Plastic	3
	Instruction manual and warranty information		1
Screws	15mm		3
	10mm		3
	40mm		2
Washer	4mm dia		2
Miscellaneous	User manual and warranty card		



Circularity



Product circularity

Opportunities

Acrylonitrile butadiene styrene (ABS) is a common thermoplastic known for its strength, impact resistance, and moderate heat tolerance.

Transparent Polycarbonate (PC) is a high-performance thermoplastic known for its exceptional clarity, impact resistance, and heat tolerance

Recycling: ABS & PC is theoretically recyclable under code 7 (Other Resins/Mixed Plastics).

Existing challenges exist

- **Contamination:** Food residue and mixed materials can complicate sorting and reprocessing.
- **Downcycling:** Recycled ABS often ends up in lower-quality applications due to degradation during processing.
- **Limited infrastructure:** Recycling facilities dedicated to ABS, especially food-grade, might be scarce in some regions.
- **Design for disassembly:** Modular designs with easily separable food-contact parts and housing could facilitate recycling.
- **Bio-based alternatives:** Exploring bio-based plastics with similar properties but greater compostability could enhance circularity.

Product circularity

Opportunities

Material selection

Investigating alternative materials with better inherent circularity or biodegradability, while maintaining safety and performance.



Design for recycling

Integrating design features that simplify disassembly and promote sorting of food-contact parts from the housing.

Recycling infrastructure

Advocating for improved recycling facilities and processes dedicated to food-grade ABS specifically.



Consumer education

Raising awareness about proper disposal and recycling options for food-grade plastic components and products.



Requirements

Requirements

Listing of Requirements..

1

Ease of Cleaning

2

Modular Blade Design

3

~~Adjustable Speed Settings~~

4

Quick Drying

5

Weight Optimization

6

Heat Management

7

Secure Lid Closure

8

~~Uniform Chopping Results~~

9

~~Mix periodically~~



Needs

Flexibility to
change the blades

Easy Cleaning

Fine and Uniform
Chopping

Grip for Secure
and Safe chopping

Secure Lid Closure

Quick Drying



Requirements

Listing of Requirements..

1

Flexibility to
change blades

2

Easy
Cleaning

3

Uniform
Chopping

4

Base Grip

5

Secure Lid
Closure

6

Cost

7

Circularity

Matrix Method

Customer Requirements

1. Modular Blade Design
2. Easy Cleaning
3. Uniform Chopping
4. Grip
5. Secure Lid Closure
6. Cost
7. Circularity

	1	2	3	4	5	6	7	Sum
1	--	1	1	0.5	1	0.5	0.5	4.5
2	0	--	0.5	0	1	1	0	2.5
3	0	0.5	--	0	0.5	0.5	0.5	2
4	0.5	1	1	--	0.5	0	0.5	3.5
5	0	0	0.5	0.5	--	0	1	2
6	0.5	0	0.5	1	1	--	0.5	3.5
7	0.5	0	0.5	0.5	0	0.5	--	2

Technical Requirements

Requirements	Metrics	Ideal Value
Multifunction chopper Blade	Standard attachment system	
Easy cleaning	Cleaning time	5-10 Mins
	Minimum Crevices	
Uniform Chopping	Size variance of chopped ingredients (mm)	3 to 6mm
	Motor RPM	1000-2000rpm
	Motor Power	200-500W
Base Grip	Nonslip	
Secure Lid Closure	Lid locking mechanism	100% Airtight (No leakage)

Technical Requirements

Requirements	Metrics	Ideal Value
Base Grip	Nonslip	
Secure Lid Closure	Lid locking mechanism	100% Airtight (No leakage)
Cost	Rupees	1500 – 2000 Rs
Circularity	Recyclable Material	
	Durable	

Relative Importance

QFD

1. Standard attachment system
2. Cleaning time
3. Minimum Crevices
4. Size of chopped ingredient
5. Motor rpm
6. Motor Power
7. Nonslip
8. Locking mechanism
9. Recyclable Material
10. Durable

	1	2	3	4	5	6	7	8	9	10	Sum
1	--	1	0.5	0	0.5	1	0.5	0.5	1	0.5	5.5
2	0	--	0	0.5	0	0	0	0	0	0	0.5
3	0.5	1	--	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5
4	1	0.5	0.5	--	0.5	0.5	0	0	0.5	0.5	4
5	0.5	1	0.5	0.5	--	0.5	0.5	0	0.5	0.5	4.5
6	0	1	0.5	0.5	0.5	--	0.5	0.5	0.5	0.5	4.5
7	0.5	1	0.5	1	0.5	0.5	--	0.5	0	0	4.5
8	0.5	1	0.5	1	1	0.5	0.5	--	0	0	5
9	0	1	0.5	0.5	0.5	0.5	1	1		0.5	5.5
10	0.5	1	0.5	0.5	0.5	0.5	1	1	0.5		6

Product Evaluation

QFD



Our product



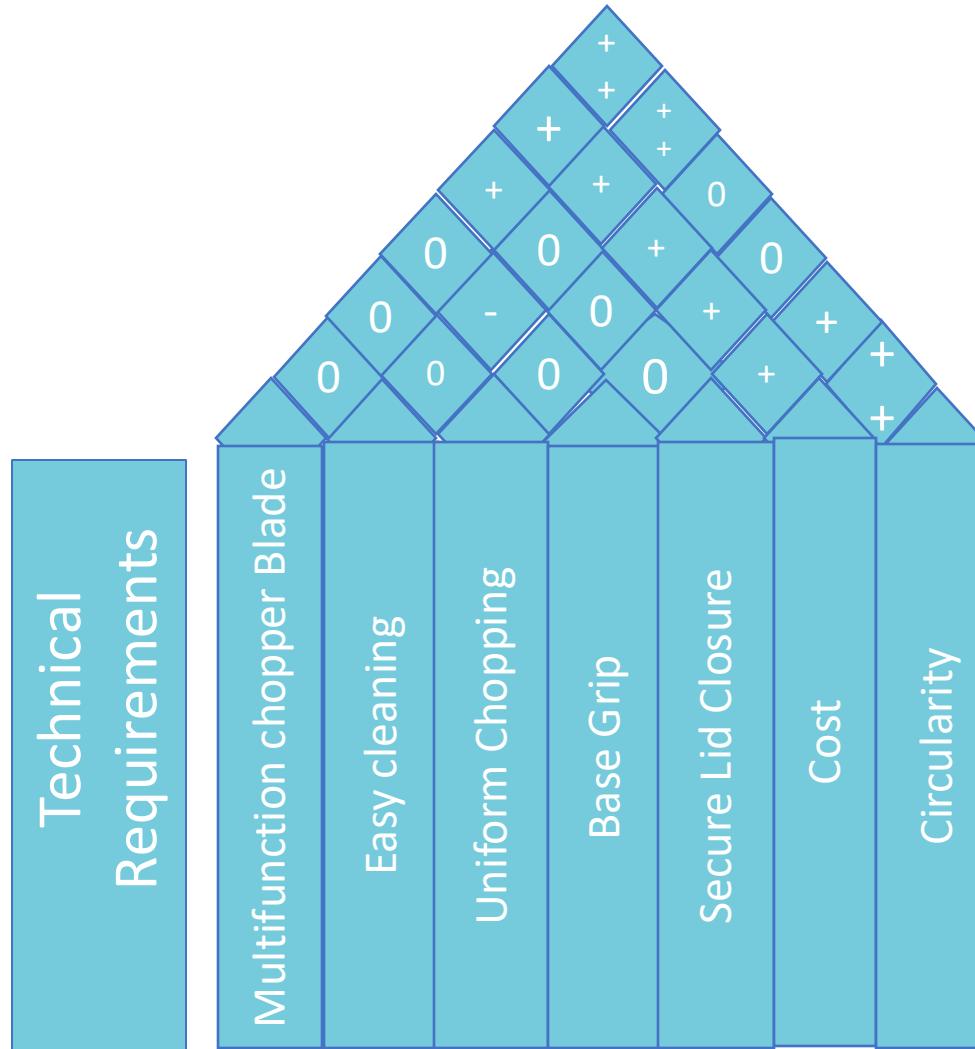
Competitor product

Product Evaluation

QFD

	Borosil	Prestige							
	1	2	3	4	5	Target Value	Improvement Rate	Weight	
Multifunction chopper Blade [5]		1	2	3	4	5	5	1.25	6.25
Uniform Chopping [3]		1	2	3	4	5	4	1.3	5.2
Circularity [3]		1	2	3	4	5	4	1.3	5.2
Easy Cleaning [2.5]		1	2	3	4	5	3	1.2	3.6
Secure Lid Closure [1.5]		1	2	3	4	5	2	1.3	2.6
Cost [4.5]		1	2	3	4	5	5	1.1	5.5
Grip [0.5]		1	2	3	4	5	1	2	2

Interrelationship b/w Technical Parameters





Target Values

QFD

	1	2	3	4	5	6	7	8
Prestige	0	10mins	5-7mm	-	120mm	80mm	-	250W
Borosil	0	15mins	-	-	126mm	100mm	-	260W
Target Value	<=3	5-10mins	3-5mm	1500rpm	120-130mm	30-50mm		



Patent Study

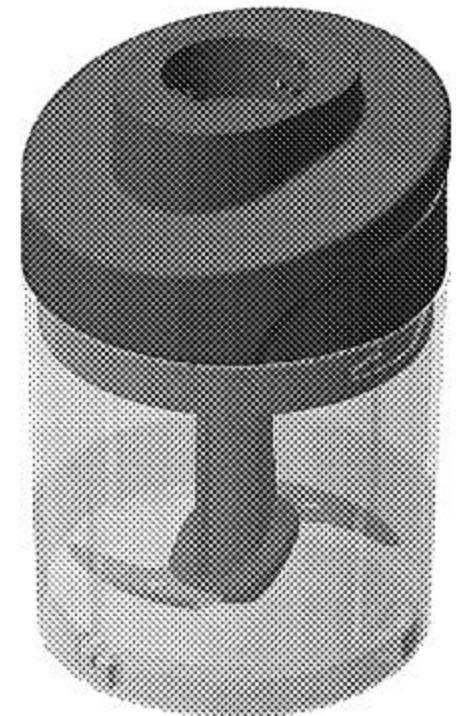
Patent Study

The existing Patents for Electric Chopper and its electronic circuit components are mainly design patents.

The Patent number US D933,417S has been awarded in OCT, 19, 2021 to **Sophie Bourgeois and it was filed by Babyliss Faco SPRL.**

CLAIM

- The ornamental design for an electric chopper, as shown and described.



Ref : [USD950305S1 - Electric chopper - Google Patents](https://www.google.com/patents/USD950305S1)

Patent Study

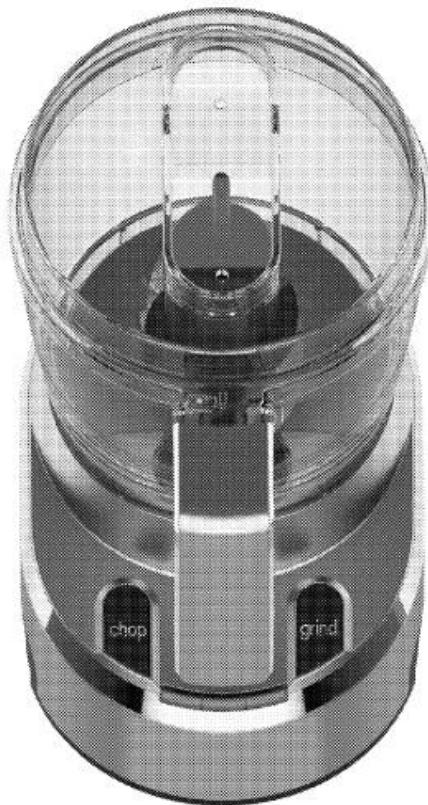
Patent no.	Inventor	Country	References
US D933,417S OCT, 19, 2021	Sophie Bourgeois	USA	USD950305S1 - Electric chopper - Google Patents
DE550617C	H Putsch G mbh & Co	Germany	DE550617C - Electrically powered chopping machine - Google Patents
D999587	Sophie Bourgeois	USA	US Patent for Electric chopper Patent (Patent # D 999,587 issued September 26, 2023) - Justia Patents Search

Patent Study

1.3



1.7



1.8



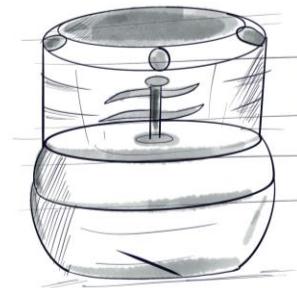
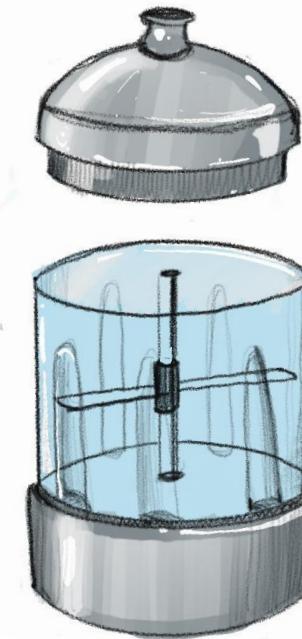
Ref : [USD950305S1 - Electric chopper - Google Patents](https://www.google.com/patents/USD950305S1)

Solution Neutral Problem Statement

Current electric choppers available in the Indian market often suffer from design flaws that lead to inconsistent results, cleaning difficulties, premature product failure, safety concerns, and a lack of environmentally sustainable practices in their design and manufacture.

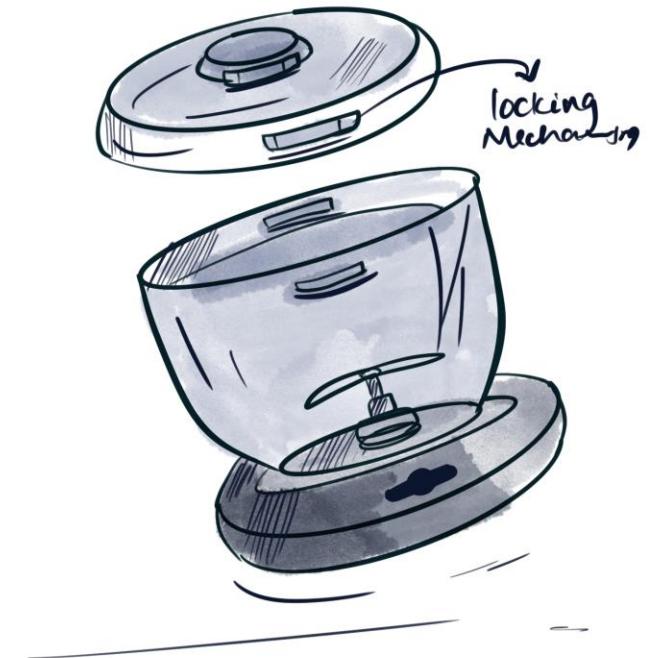
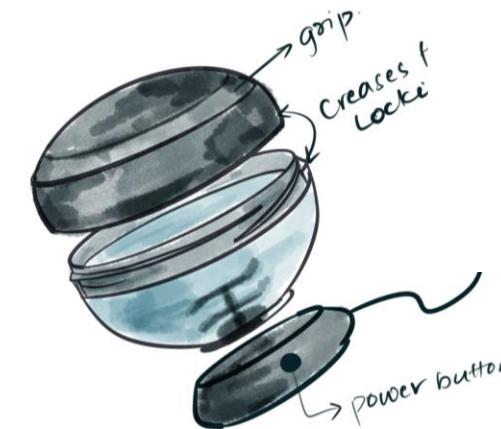
Concepts

Selection of Concepts



Concepts

Selection of Concepts





Final Concept



Concept





Embodiment



Embodiment Determining Requirements

Layout

- **Form Factor:** Shape of the base, bowl, and lid impact handling and storage should be appealing.
- **Durability:** Materials must withstand regular use, heat from the motor, and cleaning.
- **Assembly Method:** Designed for ease of assembly and potential repair.
- **Safety:** Locking mechanism should be designed to withstand downward pressure during chopping.
- **Electrical Safety:** Compliance with applicable electrical product safety standards.
- **Ease of Cleaning:** Design favoring easy disassembly and dishwasher-safe parts.
- **Aesthetics:** Color choices and overall design to appeal to target consumers.
- **Bottom Grip** for firm grip and stability during Chopping.
- **Blade Locking** to the shaft for modularity.

Embodiment Determining Requirements

Dimensional view

Dimensions: Must fit within average kitchen storage constraints (countertop or cabinet space).

Bowl Capacity: 3-5 cups

Height: 10-14 inches

Base Diameter: Likely between 5-8 inches, depending on the shape and design.

Weight: 1-2kg for reasonable portability and stability during use.

Bowl Shape: Cylindrical bowls are common for efficient chopping . A wider, shallower bowl could reduce height.

Power Cord: A retractable cord or thoughtful storage solution prevents it from entangling and additional effort.

Embodiment Determining Requirements

Materials

Bowl: BPA-free clear plastic (Tritan is durable) or glass (heavier, but heat resistant)

Base: Durable plastic with non-slip feet for stability.

Blades: Stainless steel for sharpness and longevity.

Smooth and non porous inner surface of bowl.

Additional Requirements

Noise level: Target a reasonable volume for user comfort in a home kitchen.

Ease of Cleaning: Dishwasher-safe bowl and lid are ideal. Blade design should allow for easy rinsing.

Durability: Materials and construction should withstand regular use and cleaning.

250-watt motor that operates silently

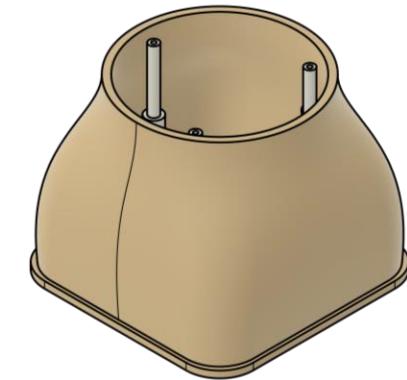
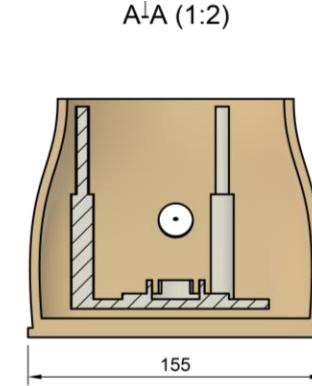
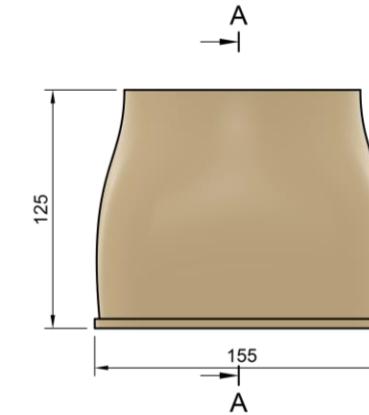
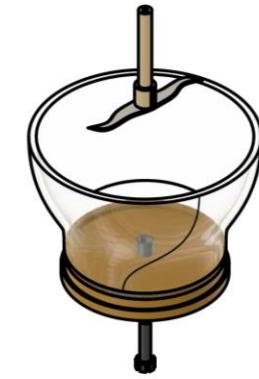
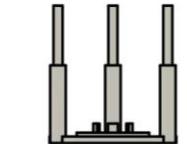
Function Carrier

Function		Function Carrier
Multifunction Chopper Blade	Chop, blend, whip	Interchangeable blade set with different blade geometries
Circularity	Recycled material	Bowl, lid
	Design for Assembly and Disassembly	Overall design
Uniform Chopping	Consistent blade rotation speed	Motor Specification
	Sharp blades	Stainless steel with sharp edges

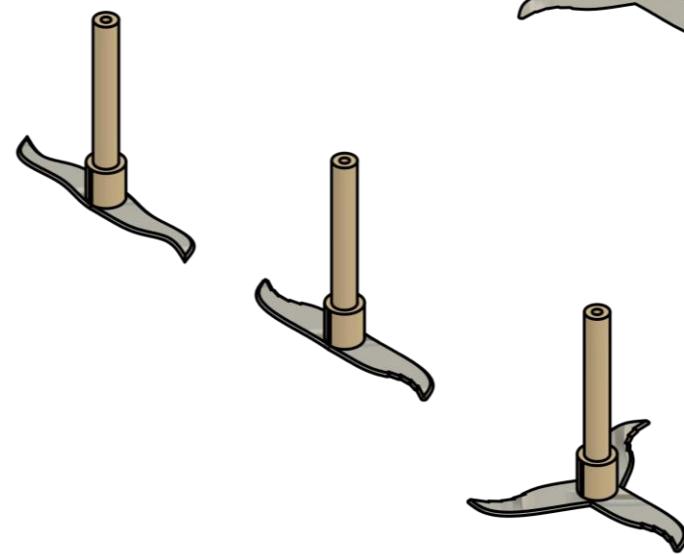
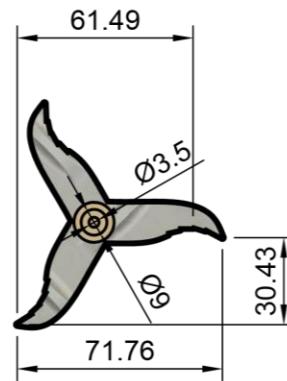
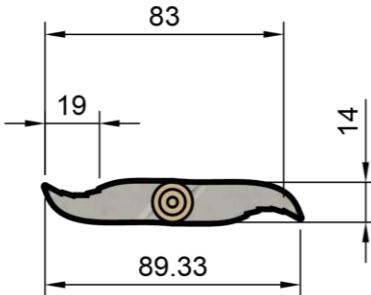
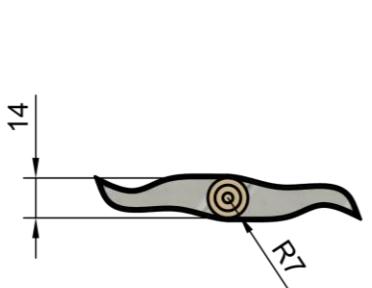
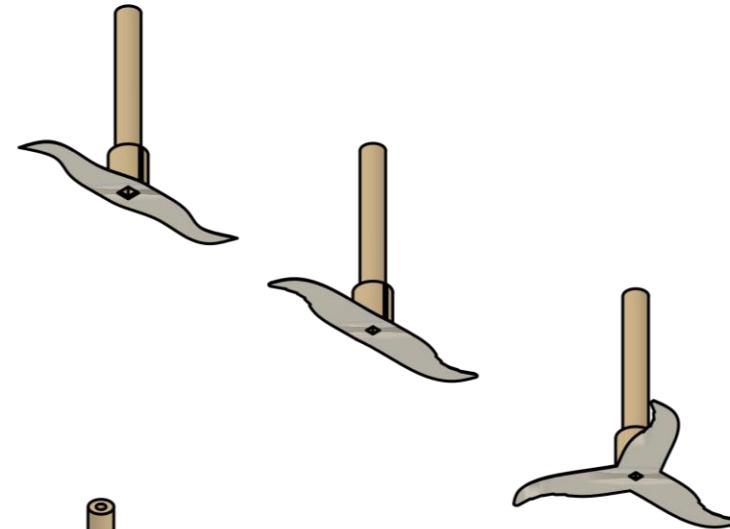
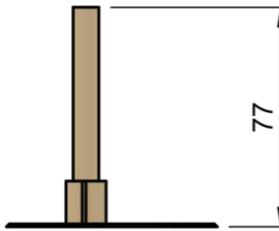
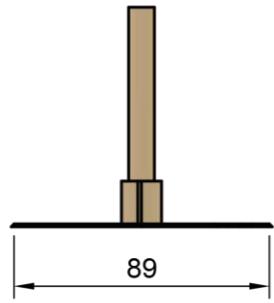
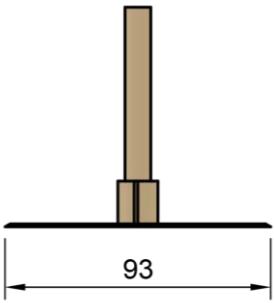
Auxiliary Function

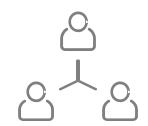
Auxiliary Function	Auxiliary Function Carrier
Power Cord Storage	Wrap-around cord storage
Non-Slip Base Pads	Rubber or silicone feet attached to the bottom
Attachment of motor holder with motor unit	Screws

Exploded View & Details

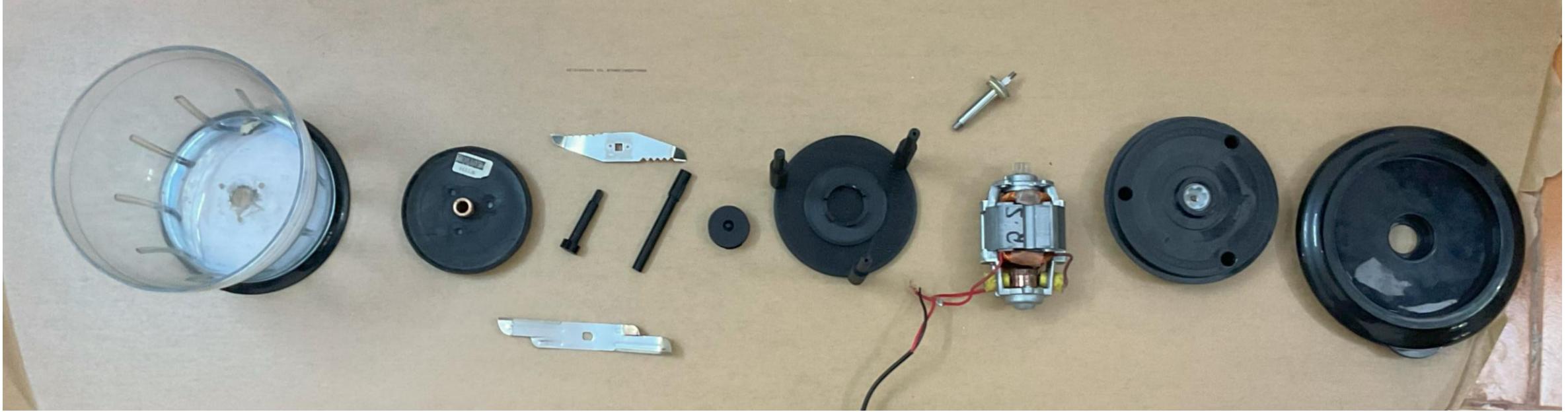


Details



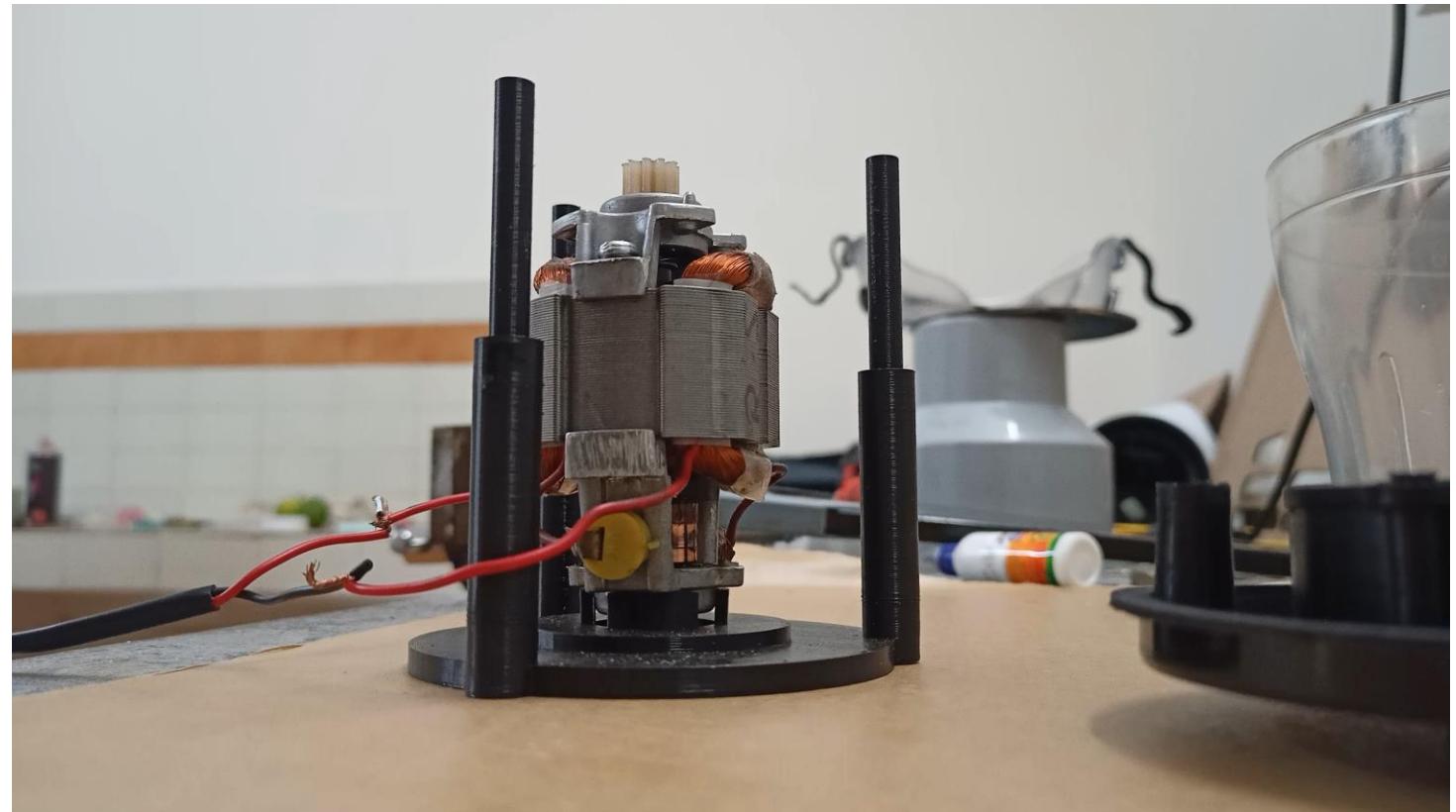
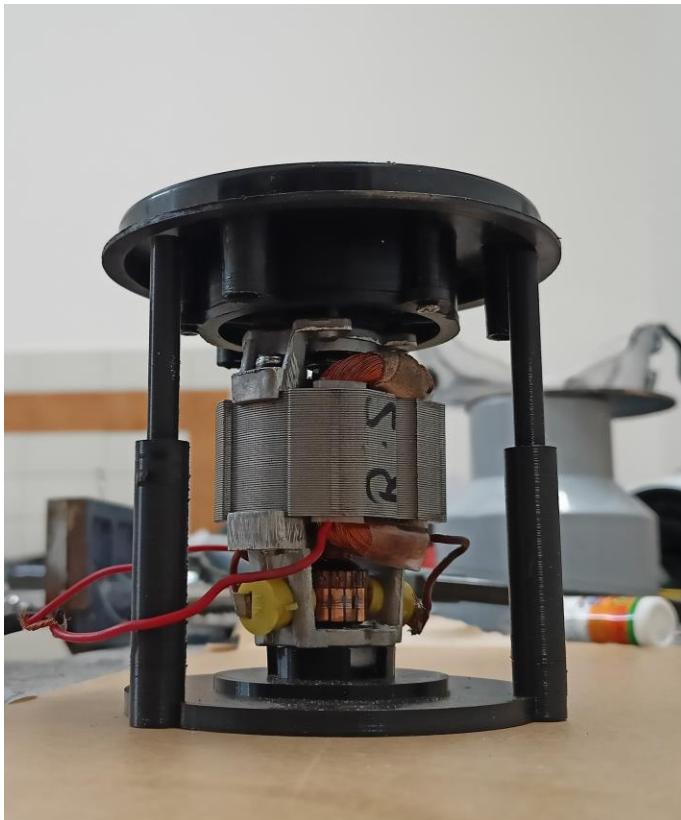


Testing





Testing

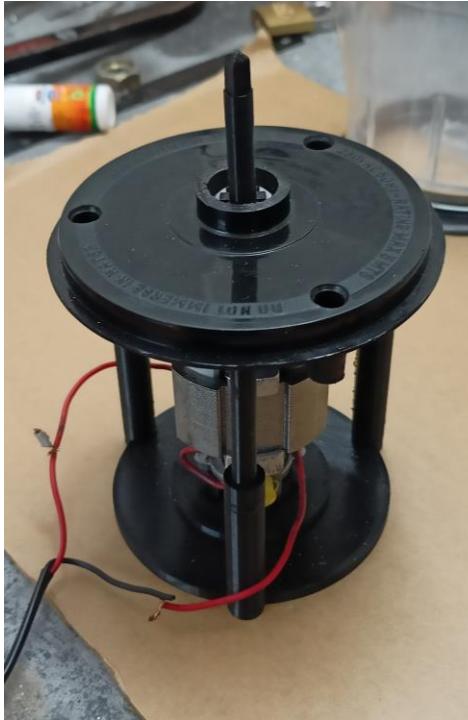
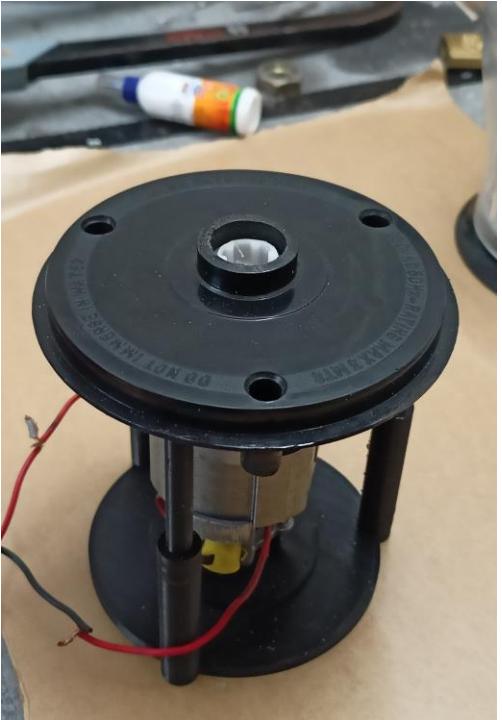




Testing



Testing

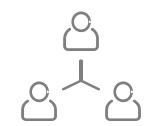


Testing



Final Prototype





Business Planning



Real, Win, Worth-it

1. Is there a real market and a real product?	Yes/No/May be
Is there a need?	Yes
Can the customer buy?	Yes
Will the customer buy?	May be
Is there a real product concept?	Yes
Is the product acceptable within the social, legal, and environmental norms?	Yes
Is the concept feasible?	Yes
Will our product satisfy the market?	May be
Can be linked with other products made by the company?	Yes
Can it be produced at low cost?	No
Are the risks perceived by the customer acceptable?	May be



Real, Win, Worth-it

2. Can we win? Can our product/service be competitive?	Yes/No/May be
Do we have a competitive advantage? Is it sustainable?	Yes
Is the timing right?	May be
Does it fit our brand?	Yes
Will we beat our competition?	No
Do we have superior resources?	Yes
Do we have the management that can win?	Yes
Do we know the market as well or better than our competitors?	May be



Real, Win, Worth-it

3. Is it worth doing? Is the return adequate and the risk acceptable?	Yes/No/May be
Will it make money?	Yes
Do we have the resources and the cash to do this?	May be
Are the risks acceptable to us?	Yes
Does it fit our strategy?	Yes

New BOM

Component	Material	Description	Quantity	Amount(Rs)
Motor		250 W AC motor	1	650
Motor housing	HDPE		1	32/kg
Gear Set	HDPE	Attached with the motor housing cover	1	30
Bowl	Glass fibre/ Polycarbonate	Transparent	1	50
Lid	Glass fibre/ Polycarbonate	Transparent	1	30
Shaft	Stainless Steel	Attachment between bowl and base	1	10
Blades	Stainless Steel		2	60
Blade Shaft	HDPE		1	32/kg
Screws			6	10
Washer			3	2
Base Grip	Silicon Rubber		1	50
Motor Holder	ABS		1	50-85

Occasion (Shadi)

On an average 10 MILLION wedding is celebrated in India

Cloud Kitchens

Requires fast Cutting and Chopping

Nuclear Families

Dual Income Couples with kids

People with White Collar Job

18.1 million people are involved



Small Restaurants

Foodies & cooking Enthusiasts

Young Professionals
(22-40 yr age group)

Senior Citizen
(50yr & above)

Need assistance in cooking and physically demanding

Target Market Segments

Revenue Projection

Key Assumptions	
Segment Assumption	Nuclear Family Middle Income
% of potential buyers	40%
Penetration Rate	1%
Population growth rate	0.81%
% SAM	30%
Average selling price (ASP)	Rs 1500
Development cost price	Rs 1000

[Total Households in India \(2010 – 2021, Million\) - GlobalData](#)

Direct & Indirect Costs

Middle Income Nuclear Households	Estimated Customers	% of potential buyers	TAM	SAM(30%)	Target market size (50%)	Penetration Rate	Units	Average selling price(Rs)	Revenue (CR)	Direct Cost(800) (CR)	Indirect cost(100) (CR)
Year 1	166320000	40%	66528000	19958400	9979200	1%	99792	1500	14.9	7.9	1.9
Year 2	167667192	40%	67066877	20120063	10060032	2%	201201	1500	30	16	4
Year 3	169025296	40%	67610119	20283036	10141518	3%	304246	1500	45.6	24	6
Year 4	170394401	40%	68157760	20447328	10223664	4%	408947	1500	61	32	8

Projected P&L & EBITDA

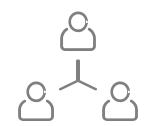
	Yr1 - Q4	Yr1	Yr2	Yr3	Yr4
Revenues (Rs. Thousands)	149688000	149688000	301800946	456368300	613419844
Direct Costs (Rs. Thousands)	79833600	79833600	160960504	243396427	327157250
Gross Profit (Rs. Thousands)	69854400	69854400	140840441	212971873	286262594
Gross Profit (%)	47%	47%	47%	47%	47%
Indirect Costs (Overheads) (Rs Thousands)	19958400	19958400	40240126	60849107	81789313
Total Costs (Rs Thousands)	99792000	99792000	201200630	304245533	408946563
EBITDA (Rs Thousands)	49896000	49896000	100600315	152122767	204473281
EBITDA %			33%	33%	33%

Investment Requirement, NPV

		Year 1		Year 2			
		Q3	Q4	Q1	Q2	Q3	Q4
Product 1 Revenue				37422000	42865200	42865200	42865200
Product Development	14968800	14968800					
Production Ramp Up		14968800	14968800				
Marketing and Support	29937600	29937600	29937600	29937600	29937600	29937600	29937600
Production cost		14968800	14968800	14968800	14968800	14968800	14968800
Period Cash Flow	44906400	74844000	-22453200	-2041200	-2041200	-2041200	-2041200
PV Year 1, r=30%	-49260960	-69622326	-19429486	-1643086	-1528452	-1421815	

Year 3				Year 4			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
75450236	86424816	86424816	86424816	114092075	130687286	130687286	130687286
29937600	29937600	29937600	29937600	29937600	29937600	29937600	29937600
14968800	14968800	14968800	14968800	14968800	14968800	14968800	14968800
30543836	34986576	34986576	34986576	69185675	85780886	85780886	85780886
19791231	21088330	19617051	18248420	33568469	38716619	36015459	33502753

Project NPV (Cr)	7.76
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Thank You