

Smart Kitchen Appliance

Project 2

under the guidance of **Prof. P. Kumaresan**

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01

Introduction

Introduction

Lesser area in future residence for small family

Elimination of proper kitchen – adapting **Open Kitchen Concept**

People need something to save area, energy and have good food within lesser time

Design Opportunity

From the above scenario and affordability power of the people, there is a very good opportunity to design a very compact & smart device which will have the major electronic devices for kitchen utility purposes with some other necessary attributes.



02

Target Users & Goals

Target users

Upper middle class | Upper class
of India for domestic use only

Goals

Multi-purpose

Energy efficient

Affordable

Space saving

Easy maintenance

03

Problem Statement

Problem Statement

Design a Smart Electronic Kitchen Appliance
which can make **major Indian recipes**,
can save space & time and
also give a pleasant User Experience.

Core Benefits to the Users

- (i) Multipurpose - All device can be used simultaneously
- (ii) It will save a space considerably – Good for small kitchen
- (iii) Time saving obviously, healthy food
- (iv) Affordable and Economic
- (v) Energy efficient
- (vi) Pollution free – no CO₂ and CO emission
- (vii) “Buy N Install”– so the wattage of whole machine should be within the average limit of the households’ electric meter.

User and User Experience related issues

- (i) Safe – no major burning accident, also for children
- (ii) It should be accommodated with different height of Kitchen Top
- (iii) Modularity – for clarity of the function
- (iv) Internet of Things (IOT) – Mobile App based control and alert system
- (v) Smart and user friendly User Interface
- (vi) May be a “Moving Kitchen” with expandable kitchen top, some storage for spices, utensils & accessories
- (vii) Touch sensed Compact control panel (may be gesture sensed also)
- (viii) Pre fed menu list in the memory which can assist novice users and also can interact in some case
- (ix) It should be felt as a member of the family.

Ergonomics related issues

- (i) All the functions should be in the easy reach of the user (in this case Standard Indian)
- (ii) As the preliminary working condition is Kitchen, it should fit with the environment and should give a pleasant experience.
- (iii) The machine should not give high cognitive load to the users.

Manufacturing related issues

- (i) The parts should be easily manufacturable or may be the same which they are using now, minimal changes in Process Line
- (ii) Modularity in Design, to maintain and service easily
- (iii) The materials should be adequately heat resistant and hygiene should be assured.
- (iv) Durable enough.

04

Data Collection and User Study

Existing Product

Elite by MaxiMatic (US based company) manufactures 3 in 1 Breakfast Makers having Toaster Oven, Coffee maker and Griddle.

Price range: \$30-60, price in India – Rs.6000+



Elite
BY MAKI-MATIC®
CUISINE

3-in-1
Multifunction
Breakfast Deluxe

Toaster Oven
15-minute timer control
Temperature control setting
Indicator light
500 Watts

▪

Coffeemaker
Swing-out filter compartment
Pause 'N Serve anti-drip feature
4-6 Cup capacity
ON OFF Switch
650 Watts

▪

Griddle
6-inch diameter frying griddle
Uses energy and heat
from toaster oven

Perfect for frying eggs and
other breakfast foods



Specifications of Existing Product

Toaster Oven

- 500 Watts
- 15-minute Timer Control
- Temperature Control Settings
- Indicator Light

Coffee maker

- 650 Watts
- Swing-out Filter Compartment
- Pause-N-Serve Anti-drip feature
- 4-6 Cup capacity

Griddle

- 6-inch diameter frying griddle
- Uses energy and heat from toaster oven

Commonly used Electronic Kitchen Appliances for Indian Foods

Timings	Food Items	Cooking Process involved	Device needed	
			Primary	Secondary (optional)
Breakfast Tiffin	Bread Toast	Grilling	Toaster	Microwave Oven
	Pao Bhaji	Frying	Induction Cooktop	
	Egg Toast	Grilling, Frying	Induction Cooktop	
	Sandwich (grilled)	Closed Tight Grilling	Sandwich maker	Microwave Oven
	Boiled Egg	Boiling	Egg Boiler	Electric Kettle, Induction Cooktop
	Omlet, Anda bhurji	Frying	Induction Cooktop	
	Chapati/Roti	Heating	Roti maker	Induction Cooktop
	Plain paratha/ Aloo paratha	Heating, Frying	Steamer, Induction Cooktop	
	Puri bhaji	Frying	Induction Cooktop	
	Egg/Chicken/Mutton Roll	Frying	Induction Cooktop	
	Maggi/Noodles	Boiling, Frying	Induction Cooktop, Steamer	
	Dosa	Frying	Mixer/Grinder, Induction Cooktop	
	Idli	Steaming	Idli maker, Mixer/Grinder	Steamer (with mould)

Commonly used Electronic Kitchen Appliances for Indian Foods

Timings	Food Items	Cooking Process involved	Device needed	
			Primary	Secondary (optional)
	Dal vada	Frying	Mixer/Grinder, Induction Cooktop	
	Momos	Steaming	Steamer	
	Coffee	Heating	Coffee maker	Induction Cooktop
	Tea	Heating	Electric Kettle	Induction Cooktop
	Cake	Convection Heating	Microwave Oven	
	Pop corn	Frying		Induction Cooktop
	Fruit Juice	Crushing fruits	Juicer	
Lunch Dinner	Rice	Steaming	Rice maker	Induction Cooktop
	Fried Rice	Steaming, Frying	Rice maker	Induction Cooktop
	Biriyani	Steaming, Frying	Rice maker	Induction Cooktop
	French fries	Frying	Induction Cooktop	
	Dal	Boiling	Induction Cooktop	
	Vegetables	Steaming, Frying etc.	Steamer	Induction Cooktop
	Egg Curry	Frying, Heating, Boiling	Microwave Oven	Induction Cooktop
	Fish Fry/Curry	Frying, Heating	Induction Cooktop	Microwave Oven
	Chicken items	Frying, Heating, Boiling	Microwave Oven	Induction Cooktop
	Mutton items	Frying, Heating, Boiling	Microwave Oven	Induction Cooktop
	Pizza	Convection Heating	Microwave Oven	Induction Cooktop



**How different Electronic
Kitchen Appliances works**

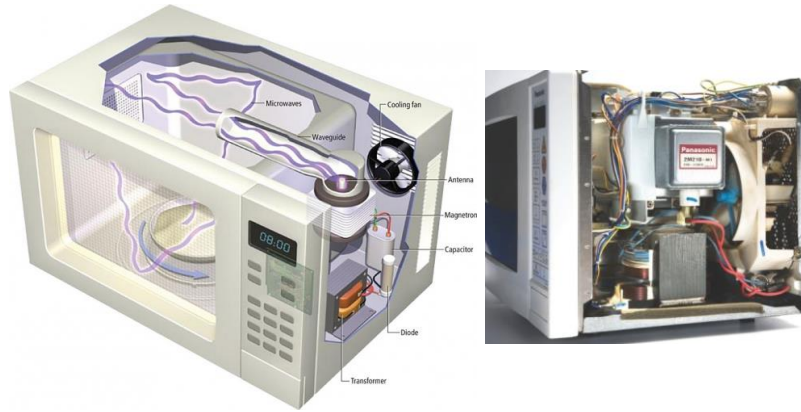


Common Elec. Kitchen Appliances

1. **Microwave Oven** | Rs. 5000 - 30000
2. **Induction Cooktop** | Rs. 1000 - 26500
3. **Rice Cooker** | Rs.1000 - 40878
4. Bread Toaster | Rs. 699 - 27894
5. Sandwich maker | Rs.675 - 9849
6. Coffee maker | Rs.400 - 105000
7. Hand Juicer | Rs.279 - 1000
8. Mixer/ Grinder/ Juicer | Rs.1200 - 11485
9. Roti maker | Rs.599 - 10465
10. Steamer | Rs. 438 - 5000
11. Egg Boiler | Rs.280 - 9313
12. Electrical Kettle | Rs.350 - 27859



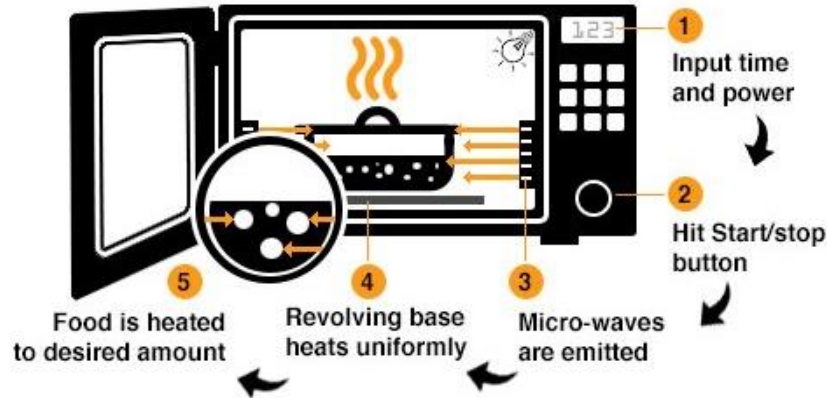
Prices are taken from www.amazon.in



How Microwave Oven works

A Microwave Oven uses 'micro' or radio waves to heat food. It does this agitating water and fat molecules present in the food. This energy gets converted into heat that cooks the food.

Another Important benefits of electromagnetic waves is that is not absorbed by many kinds of plastic, glass or ceramics.



Elements of Microwave Oven

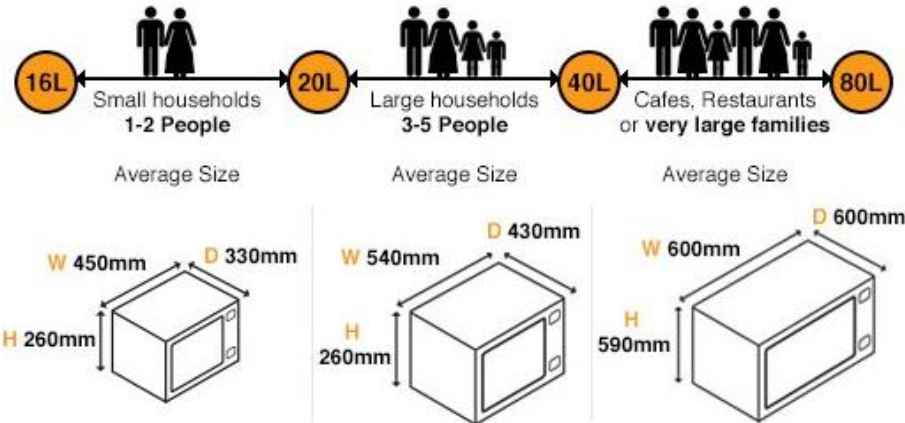
- (i) Basically a Steel Box, metal shielded front Open Door
- (ii) Control Panel, Display Section & Total Elec. Circuit
- (iii) Magnetron - microwave generating device
- (iv) Fan and Heat Sink - for cooling
- (v) Turntable, Metal Racks & Trays, Compatible Utensils

Food	Solo	Grill	Convection
Boil Water	✓	✓	✓
Heat Milk	✓	✓	✓
Coffee/Tea	✓	✓	✓
Re-heat Food	✓	✓	✓
Cook Rice	✓	✓	✓
Pasta & Macaroni	✓	✓	✓
Pop-Corn	✓	✓	✓
Grill Paneer		✓	✓
Kebabs		✓	✓
Grilled Items		✓	✓
Tandoori Chicken		✓	✓
Brownies			✓
Cakes & Breads			✓
Baked Lasagna			✓

Different types of Microwave Oven

Types of Microwave Oven

- (i) Solo Microwave Oven (mechanical knob control)
- (ii) Grill Microwave Oven (push button control)
- (iii) Convection Microwave Oven (touch panel control)



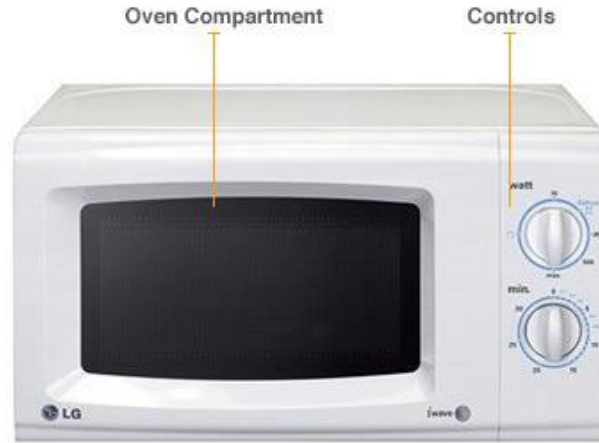
Different types of Microwave Oven

1. Solo Microwave oven

This is the basic kind of Microwave oven. It comes with a 'Microwave only' mode. It provides uniform heating for defrosting, reheating or cooking food. However, you cannot grill or bake in a solo Microwave oven.

Key Features

- ✓ Heat, defrost & cook
- ✓ Small & compact
- ✓ Easy to use with few options
- ✓ Consumes less electricity
- ✓ Small, slim and occupies less space



Useful for...



Defrosting
frozen foods



Making Tea
& Coffee

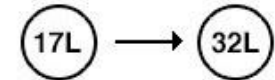


Cooking Rice
Pasta & Macaroni

Price Range



Capacity (Litres)



Power (Watts)



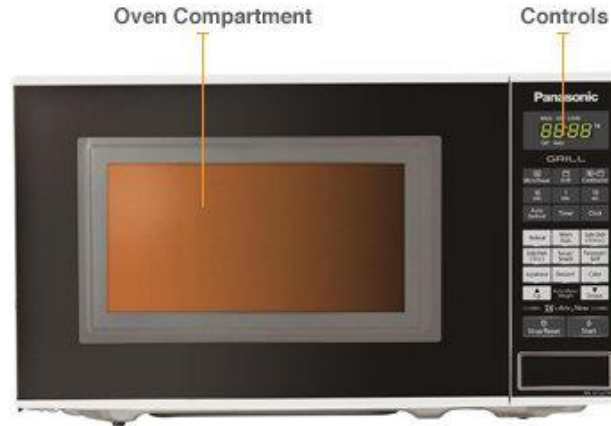
Different types of Microwave Oven

2. Grill Microwave oven

A Grill Microwave oven is a Solo Microwave oven equipped with heating coils and can be used to grill, toast or roast food. The grill function comes as a mode or setting and requires use of a grilling plate or a metal rack, which ensures that the food is close to the grill. This type of Microwave oven is ideal for making kebabs, tikkas and parathas.

Added Features (over Solo Microwave)

- ☒ Heat, defrost, cook & grill
- ☒ Browns food items to make them crispier from outside and juicer from inside
- ☒ Various settings and options for different food types
- ☒ Internal memory remembers foods and processes



Useful for...



Grilling
Paneer cubes



Making
Kebabs



Grilling food like
Tandoori chicken



Price Range

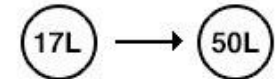
₹6000

₹23000

Basic

Advanced

Capacity (Litres)



Power (Watts)

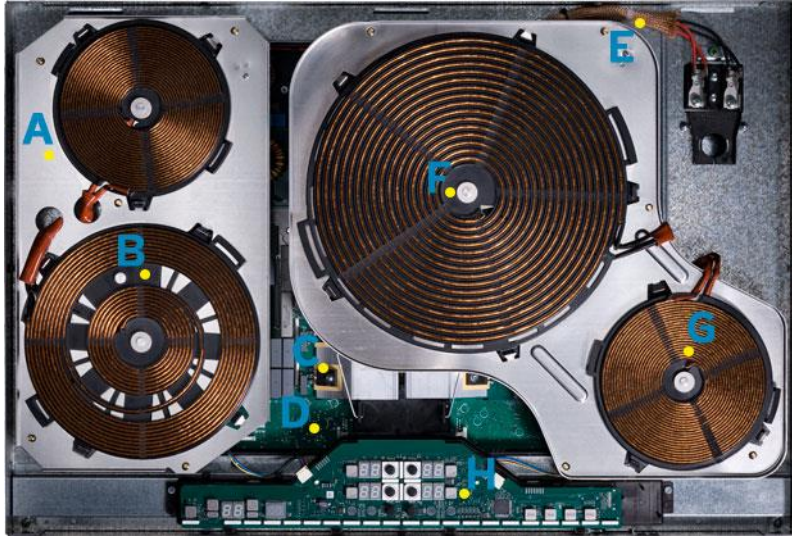
750

1600

Low

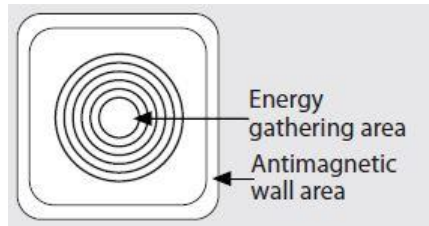
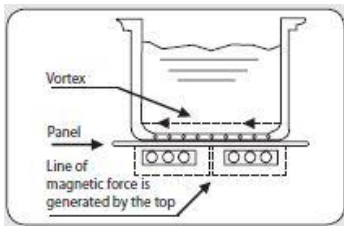
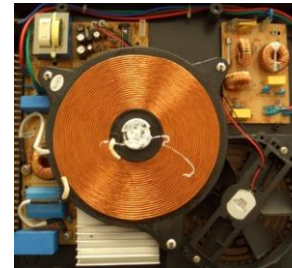
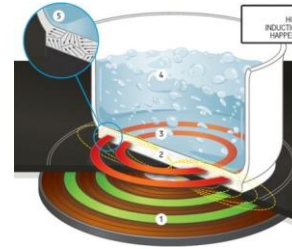
High

Induction Cook Top



Elements of Induction Cook Top

(a) Aluminium Plates, (b) Ferrites, (c) Insulated Gate Bipolar Transistor (IGBT), (d) Central Processing Unit, (e) Wiring to CPU and Burners, (f) Cookware Sensors (g) Inductors (Burners), (h) Control Panel



JAMES
PRESCOTT
JOULE
(1818–1889)

IT TOOK YOU PEOPLE
MORE THAN 150 YEARS TO
APPLY MY FIRST LAW TO
AN INDUCTION COOKTOP?
THE EQUATION IS SIMPLE.
MULTIPLY TIME, RESIS-
TANCE AND CURRENT
SQUARED, AND YOU GET
HEAT. MORE RESISTANCE?
MORE HEAT!

$$Q(\text{heat}) = I^2 (\text{current}) \times R (\text{resistance}) \times T (\text{time})$$

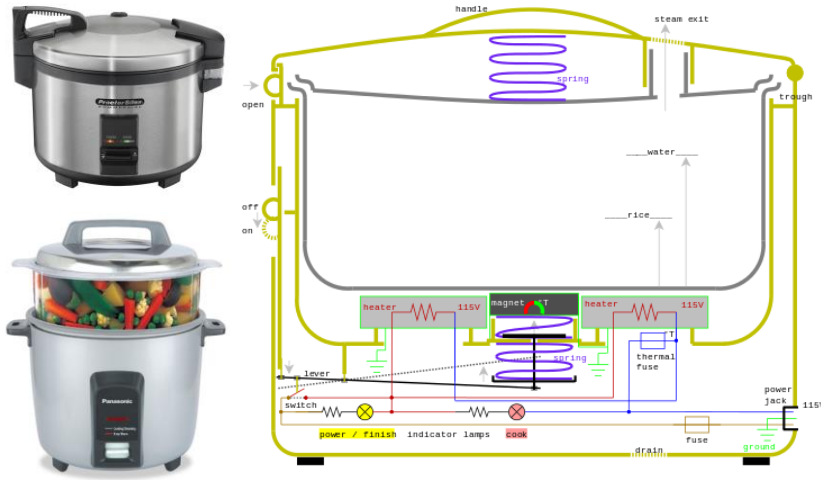
Rice Cooker

Elements of Rice Cooker

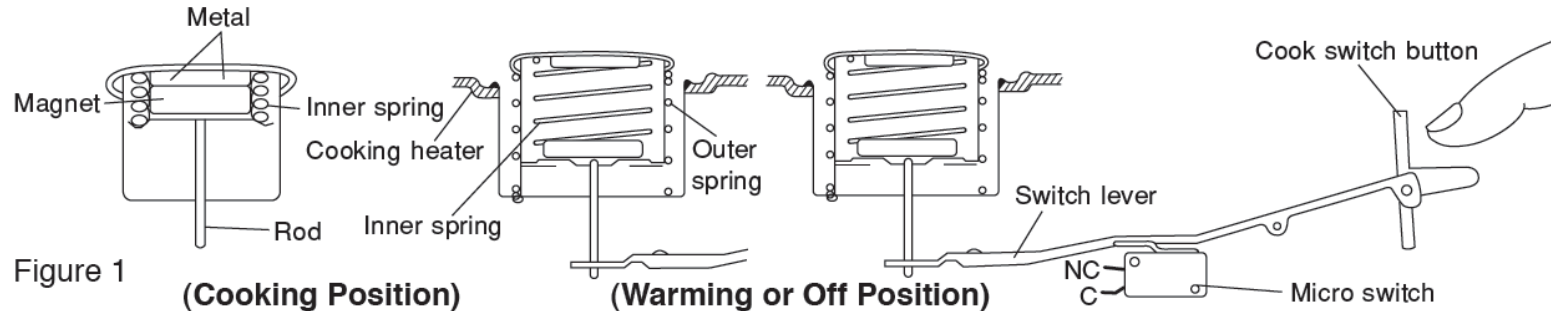
(a) Thermocouple – thermal sensing device, (ii) Electric Heating plate, (iii) Inner Cooking Pan, (iv) Rice cooker main body (v) Programme Menu, (vi) Extra inner lid

Types of Rice Cooker (acc. to functionality)

- (i) Rice Cooker
- (ii) Rice Warmer



Center thermostat construction



Rice Cooker

HOW A RICE COOKER WORKS



Types of Rice Cooker (acc. to heating mechanism)

(i) Electric heating plate

(ii) Induction Heating

Cooking rice happens in four phases:

1. Sitting in water, 2. Boiling,
3. Absorbing water (steaming), 4. Resting



Roti maker



ROTI MAKER

Elements of Roti maker

(a) Heavyweight die-cast aluminium or stainless steel top and bottom cooking plates with non-stick coating, (b) chromed steel housing (c) heat resistant handle, (d) heat control knob, (e) electric connections & PCB

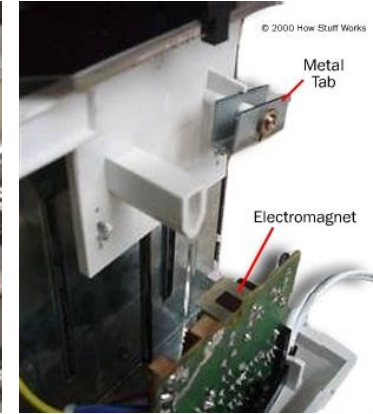
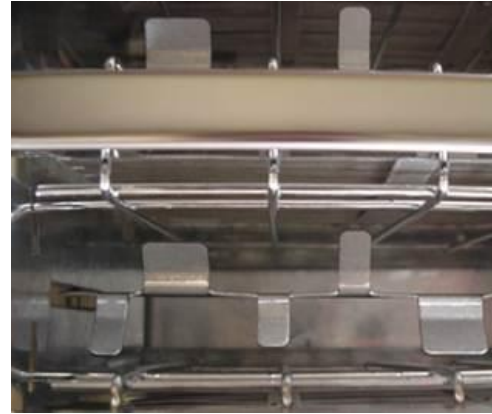
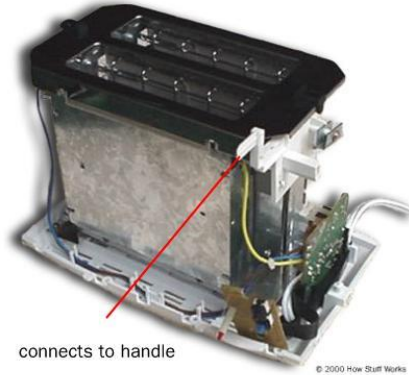


Bread Toaster



Elements of Bread Toaster

(a) Steel housing (b) Nichrome wire for heating/radiation, (c) Trays, (d) Switch and Control panel, (e) Electric connections and PCB (f) Heater and conveyer belt for commercial purposes machines.



Coffee maker

Different types of Coffee recipe

- (i) Espresso
- (ii) Cappuccino
- (iii) Moka
- (iv) Napoletana
- (v) Brewed Coffee (chemex and pour over)
- (vi) Turkish Coffee (by cezve pot)
- (vii) French Press





How Mixer-Grinder-Juicer works

Now days often Mixer, grinder and juicer clubbed up in one single device. It is also a economic and efficient solution for the users.



How Electric Kettle works

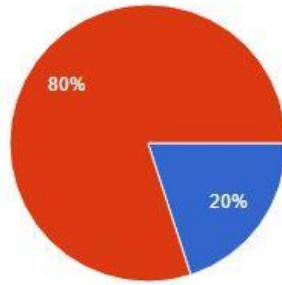
Elements of Electric Kettle

(a) Heating coil or plate, (b) Heat Sensor (c) Bimetallic Thermostat, (c) Switch, (d) Electric Connection and PCB.



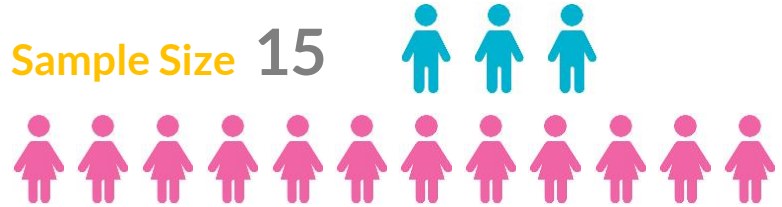
User Study

Gender (15 responses)

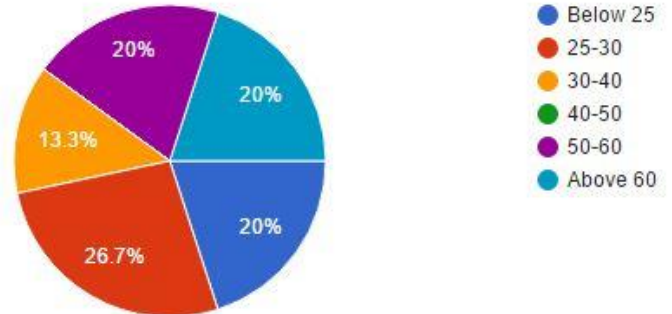


● Male
● Female

Sample Size 15



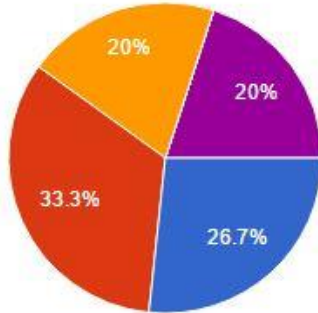
Age (15 responses)



● Below 25
● 25-30
● 30-40
● 40-50
● 50-60
● Above 60

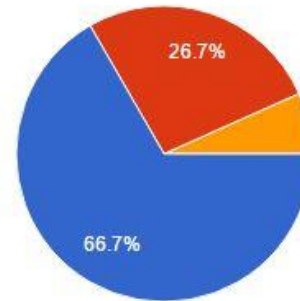
User Study

Occupation (15 responses)



- Housewife
- Student
- Employed
- Self Employed
- Other

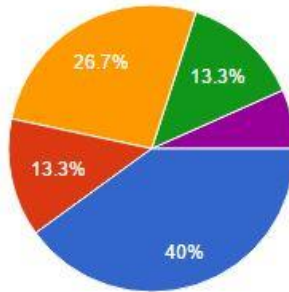
Marital Status (15 responses)



- Married
- Unmarried
- Other

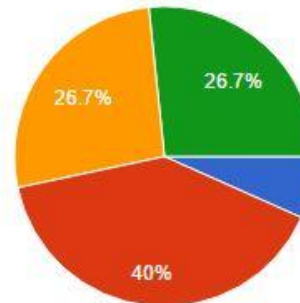
User Study

Number of Family Members (15 responses)



- 2
- 3
- 4
- 5
- More than 5

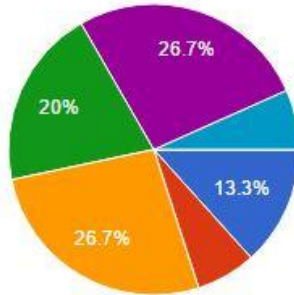
Annual Family Income (15 responses)



- Below Rs. 2 lakh
- Rs. 2-5 lakh
- Rs. 5-10 lakh
- More than Rs. 10 lakh

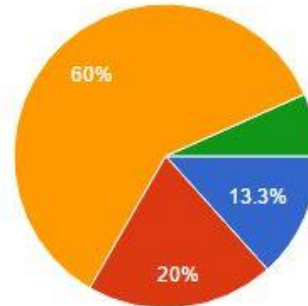
User Study

Floor Area of the house (15 responses)



- Below 500 sqft
- 500-700 sqft
- 700-1000 sqft
- 1000-1200 sqft
- 1200-1500 sqft
- 1500-2000 sqft
- More than 2000 sqft

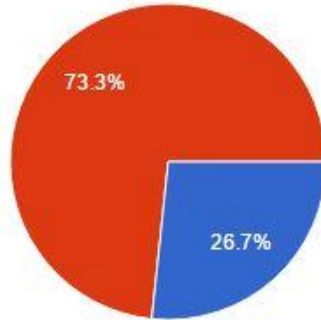
Floor Area of the Kitchen (15 responses)



- Below 50 sqft
- 50-75 sqft
- 75-100 sqft
- More than 100 sqft

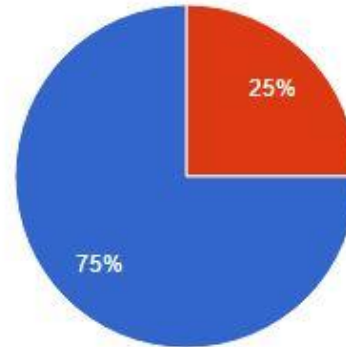
User Study

Is there any Open Kitchen (15 responses)



● Yes
● No

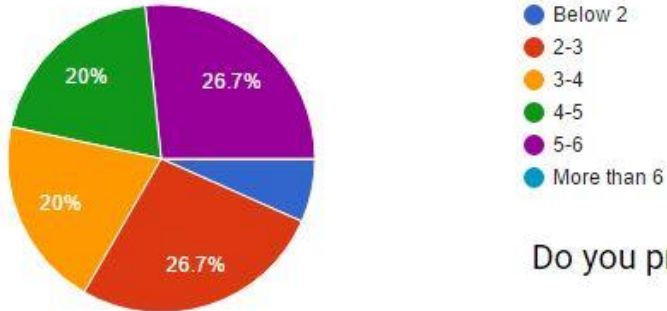
Smartphone User (12 responses)



● Yes
● No

User Study

How many hours generally spend in kitchen in a day (15 responses)

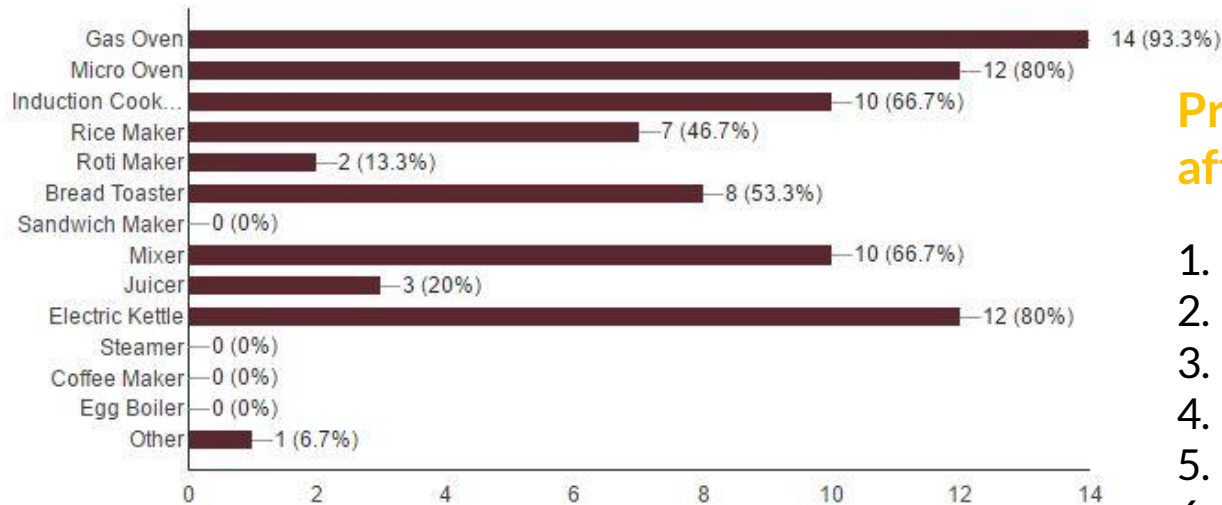


Do you prefer Electronic Kitchen Gadgets (15 responses)



User Study

What are the cooking gadgets in your kitchen (15 responses)

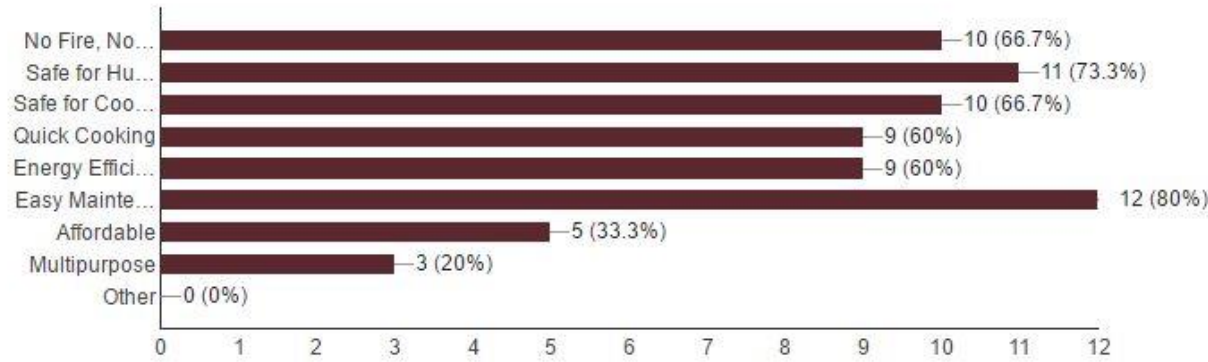


Present Cooking Gadget after Gas Oven

1. Microwave Oven
2. Electric Kettle
3. Induction Cooktop
4. Mixer
5. Bread Toaster
6. Rice Cooker
7. Juicer
8. Roti Maker
9. Sandwich maker

User Study

Reason for preferring Electronic Kitchen Gadgets (15 responses)

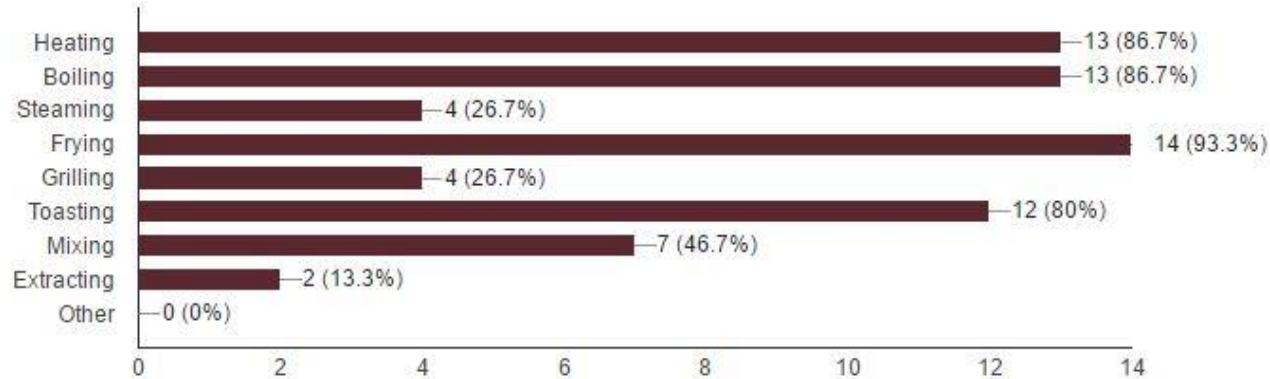


Preferred features

1. Easy maintenance
2. Safe for Human
3. No fire, No Pollution
4. Safe for cooking
5. Quick cooking
6. Energy efficiency
7. Affordable
8. Multipurpose

User Study

What are the cooking facilities you want in the new appliance (15 responses)



List of cooking option preference

1. Frying
2. Boiling
3. Heating
4. Toasting
5. Mixing
6. Steaming
7. Grilling
8. Extracting

Combination of different appliances users wants

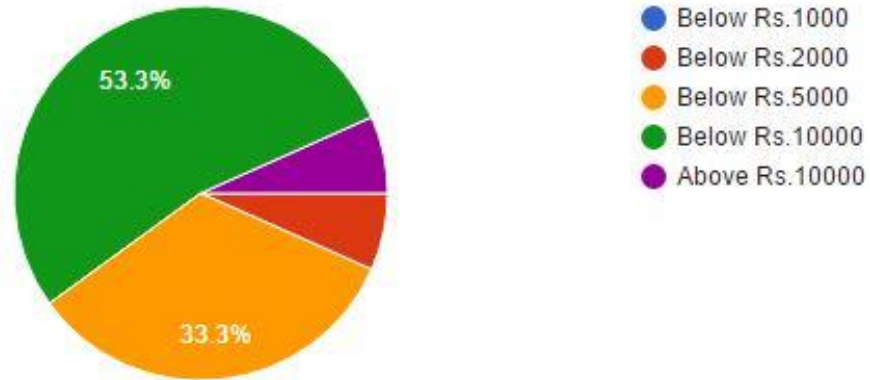
MICROWAVE OVEN -INDUCTION COOKER -TOASTER-ELECTRIC KETTLE
Gas oven, micro oven, electric kettle, induction cook top
Microwave Oven
Gas oven, Micro oven, Toaster, Mixie
Gas oven, Micro oven, Induction cooker
Gas oven, Micro oven, Induction
induction cooktop, toaster, rice cooker
induction, microwave oven, mixer, toaster
microwave oven, toaster, induction, juice maker
Micro oven, Induction cooker, Roti maker, Electric kettle
rice cooker, induction, toaster, microwave oven
Roti maker, mixer, micro wave
induction cooktop, rice cooker, toaster, mixer
induction cooktop, roti maker, rice cooker, toaster
roti maker, induction cooktop, toaster

Most demanding appliances to be combined

1. Microwave Oven
2. Induction Cooktop
3. Rice Cooker
4. Bread Toaster
5. Electric Kettle
6. Mixer
7. Roti Maker

User Study

What is price range you wish to have it (15 responses)



User Study – kitchen photos and context



User Study – kitchen photos and context



Inferences from Analysis of Collected Data

Most demanding appliances to be combined

1. Microwave Oven
2. Induction Cooktop
3. Rice Cooker
4. Bread Toaster
5. Electric Kettle
6. Mixer
7. Roti Maker

Observations from User feedbacks

Microwave Oven

1. Sideway open front door of microwave oven reduces accessibility
2. Load distribution of microwave oven is not uniform, concentrated at one side
3. Turntable reduces the area of cooking, though there are lots of space inside which is totally unutilised
4. Cleaning the cooking area is an issue and people are very scared about the turntable which is made of glass, even putting turntable in a proper position is not so intuitive
5. People prefer smooth mechanical knob or touch screen control panel over press buttons

Observations from User feedbacks

Induction Cooktop

1. Press button is not preferred, because quick reducing of temperature is not possible
2. Only one oven, slower cooking speed

Rice Cooker

1. The inner pan can be with non-stick coating
2. The heating mechanism can be induction method to heat more effectively

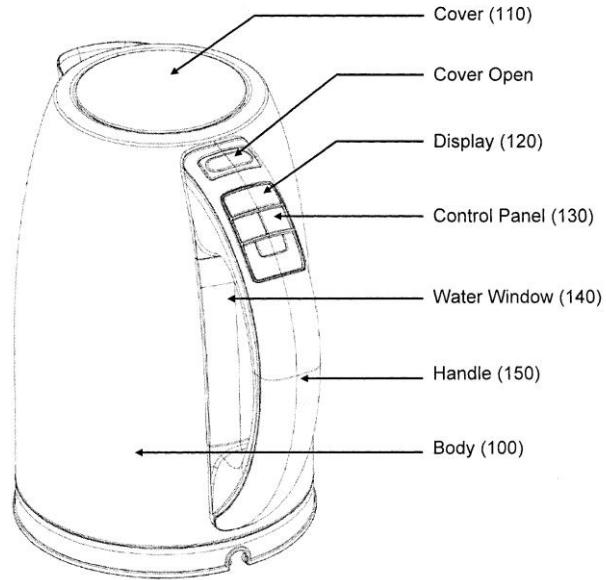
Selected appliances to be combined

1. **Microwave Oven** (for Heating, grilling, baking related recipes and some autocook menus)
2. **Induction Cooktop** (for open cooking)
3. **Rice Cooker** (for cooking rice, idli, momo etc. items which need steaming with accessories)

05

Patents and Paper Study

Patents Study

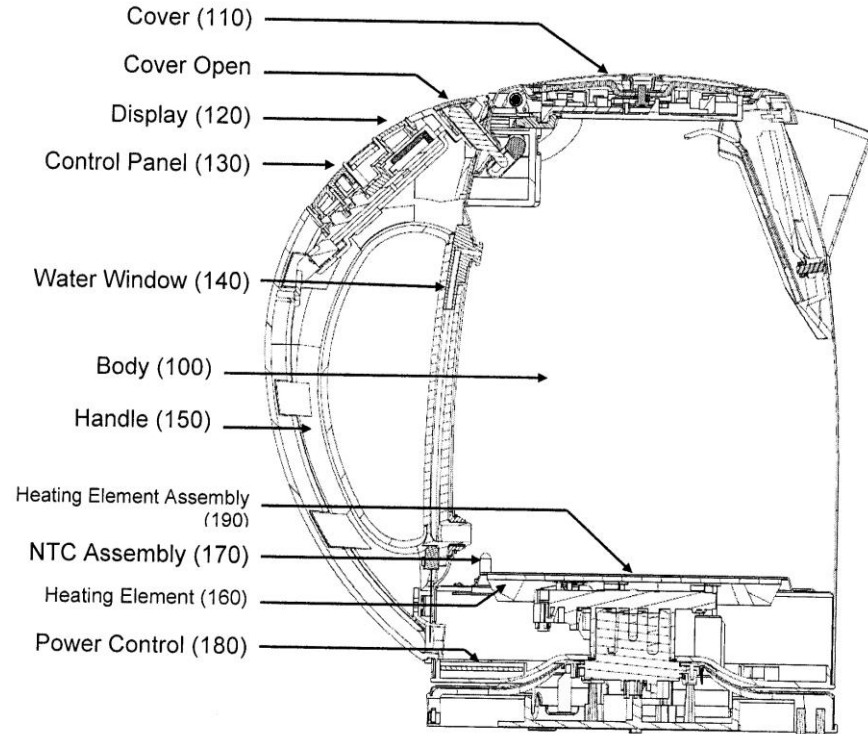


1. Intelligent Electric Kettle

Name of the Inventor: Wing Chung Li

Patent No : US 20110259871 A1

Publication Date : 27 October 2011



Papers & Patents Study

2. Attention-Based Design of Augmented Reality Interfaces

Name of the Inventor: Leonardo Bonanni, Chia-Hsun Lee, Ted

Selker from MIT Media Laboratory

Published in : CHI 2005

drawing 2 : blockdiagram of the chip (sensor unit)

3. Kitchen Robot with smart mixing Arm

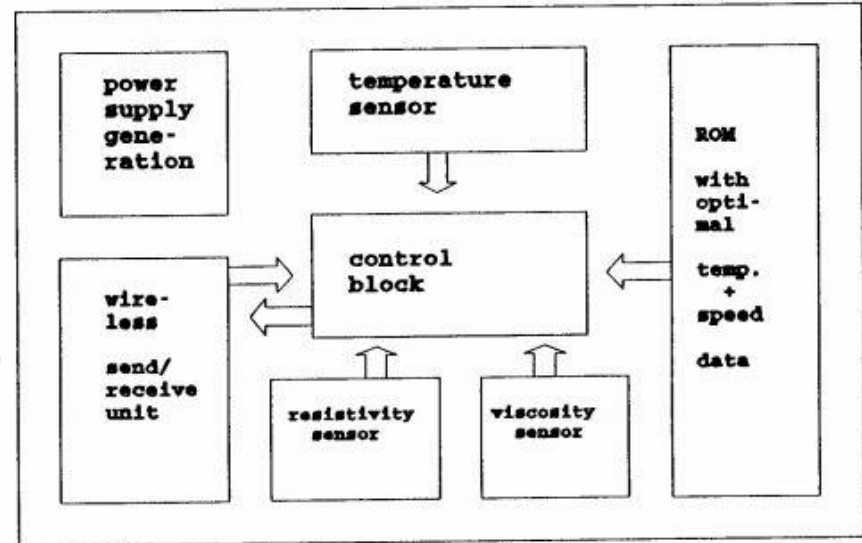
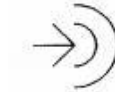
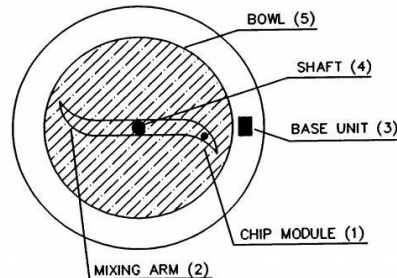
Applicant: SIGMA-DELTA N.V

Inventor: Duchatelet Roland

European Patent No: 0 589 093 A1

Publication Date: 30 March 1994

drawing 1 : schematic representation of the intelligent mixer



Papers & Patents Study

4. Apparatus and Method for a Smart Kitchen Appliance

Name of the Inventor: Bruce Ancona, Rober A Varakian from NY, USA

Patent No: US 2002/0009016 A1 Publication Date: 24 January 2002

5. Smart Ultrasonic Device for vitro-ceramic Cooker safety control

Name of the Author: Lazaro, A., Serrano, I., Guardado, F.J. and Herrero, R.

Published at: 7th IEEE International Conference, 1999

6. Collapsible type telescoping hidden laying vessel device

Name of the inventor: [张庆三](#)

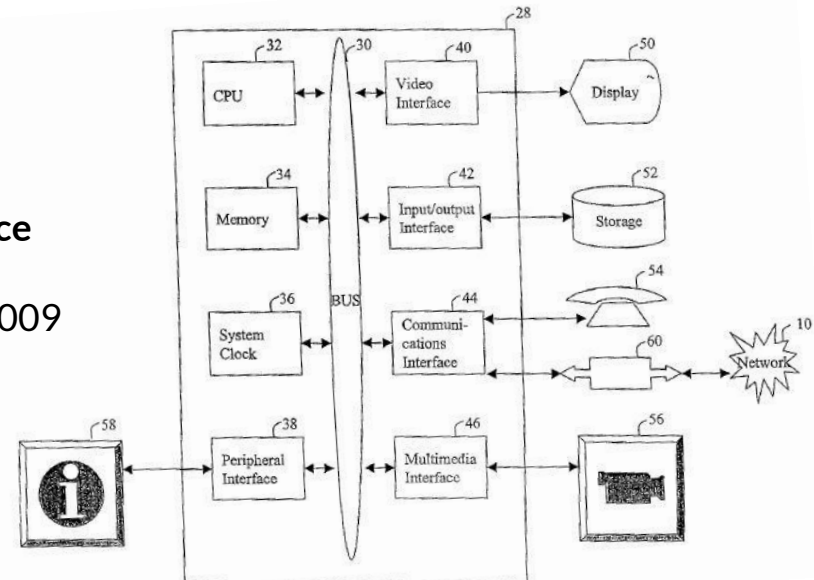
Patent No: CN201267410Y Publication Date: 08 July 2009

7. Multifunctional Kitchenware Frame

Name of the inventor: [张洁](#)

Patent No: CN201469103U

Publication Date: 19 May 2010



06

Design Brief

Design Brief

Smart Electronic Kitchen Appliance to make major Indian recipes

- for upper middle class & upper class
- for kitchen size – 75-100sqft
- price range is below Rs.10,000
- quick & hassle-free cooking
- easy to clean
- pollution free

07

Persona

Persona I



Type of people

Upper Middle Class

Urban context

Sex Female (inclu. housewife & senior citizens)

Nos. of Family Members

3-4 people

Educational Qualification

Literate & able to read and write English

Occupation

Student, Unemployed or Employed in Private or Public sector

Family Income per month

Rs.25000 - Rs.50000

Mobile User | Yes **Smartphone User** | Yes/No **Internet User** | Yes/No

Familiarity with Electronic Gadgets | Yes/No

Familiarity with Smart User Interface | No

Touch points

It should be Safe | It should be energy-efficient | Pollution free | Simple & User-friendly Control Panel | Space saving | Multi-cuisine

Persona II



Type of people

Upper Class

Urban context

Sex mostly Female

Nos. of Family Members

1-2 people

Educational Qualification

Graduate & fluent in reading and writing English

Occupation

Employed in Private or Public sector

Family Income per month

Above Rs.50000

Mobile User | Yes **Smartphone User** | Yes **Internet User** | Yes

Familiarity with Electronic Gadgets | Yes

Familiarity with Smart User Interface | Yes

Touch points

It should be Safe | It should be energy-efficient | Pollution free |

Smart Control Panel | Remote Controlling | Smartphone App based

Control system | Recipe Downloading | Space saving | Multi-cuisine

08

SWOT Analysis of this project

SWOT

Analysis

STRENGTH

Future demand in Indian Upper-middle and Upper class families
Multipurpose - different recipes can be made simultaneously
Pollution free World, as the device is electrical and no fuel is going to be use

OPPORTUNITIES

There can be different combination of appliances to make the new one.
It can be customisable according to different cultural zones
There can be further accessories to fit
Remote control by mobile app
Memory to store different recipe settings

WEEKNESS

For the first time, some people might find this product bit complex, as they prefer single functional appliances

THREAT

Other competitive product after first launch of this type of product

09

Design Brief & scope of work

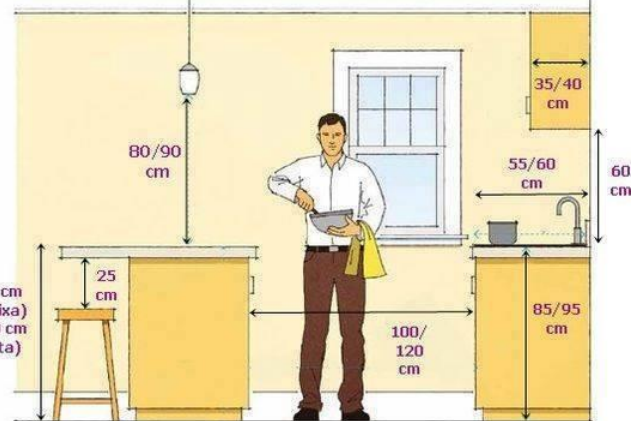
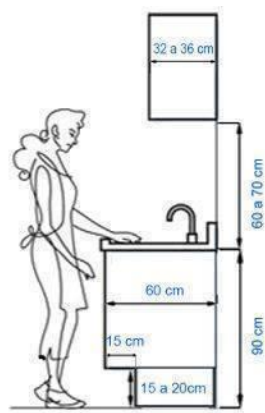
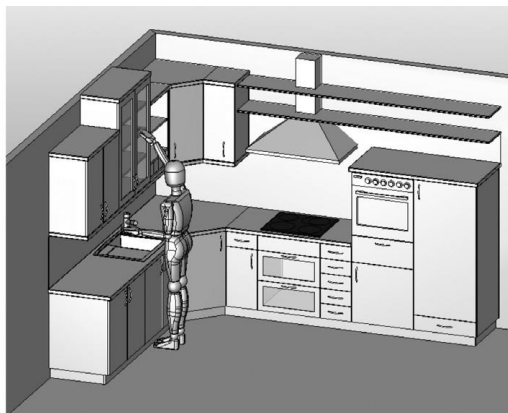
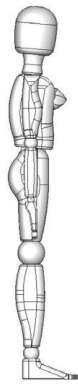
Design Brief

Smart Electronic Kitchen Appliance to make major Indian recipes

- for upper middle class & upper class
- for kitchen size – 75-100sqft or bigger
- price range is below Rs.10,000
- quick & hassle-free cooking
- easy to clean
- pollution free

10

Anthropometric Study

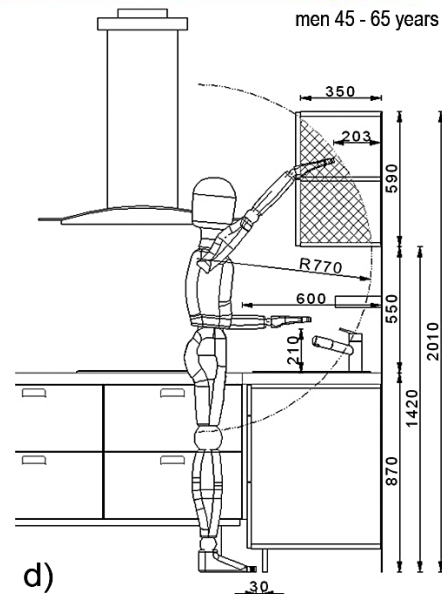
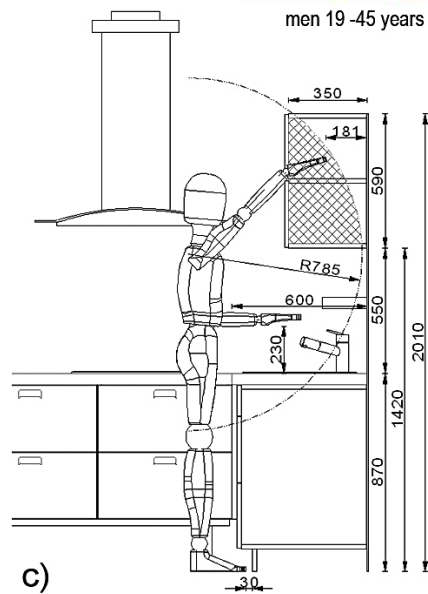
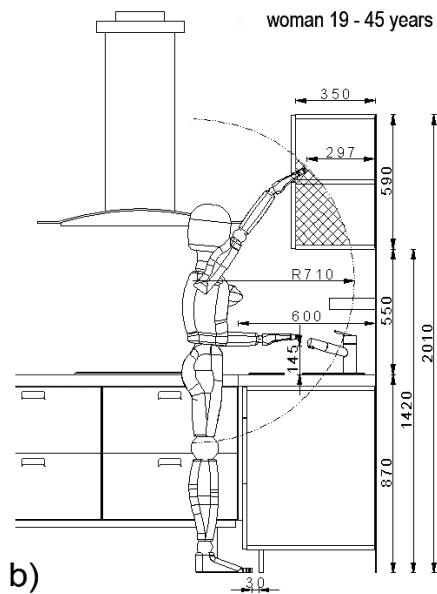
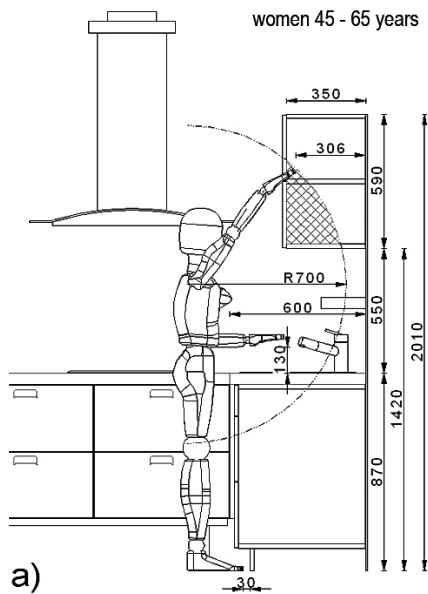


women 45 - 65 years

woman 19 - 45 years

men 19 - 45 years

men 45 - 65 years



a)

b)

c)

d)

Inference from Anthropometric Study

1. Average height of Kitchen Tabletop is 750-900mm
2. Average width of Kitchen Tabletop is 600mm
3. Comfortable height for cooking 900-1050mm
4. Zone of comfort in height 750-1600mm
5. Maximum reach(vertical) is 700mm diameter area from the shoulder
6. Maximum reach(horizontal) is 1200mm

Ideal dimension for the new appliance
900mmx600mmx450mm (if in one enclosure),
otherwise according to customizable to kitchen top
and overall arrangement of the kitchen.

11

New Technological Intervention

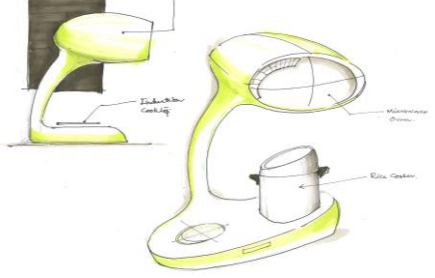
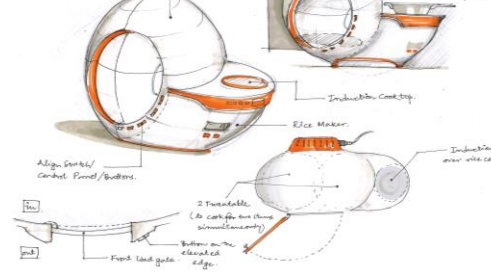
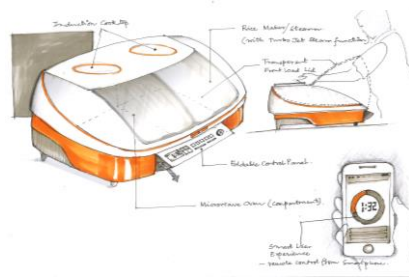
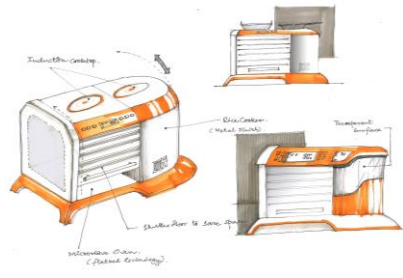
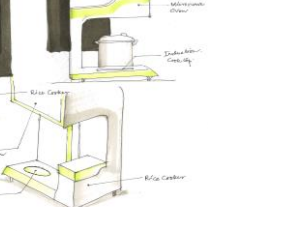
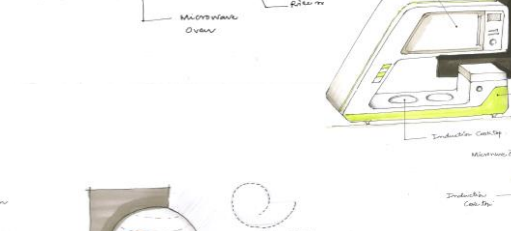
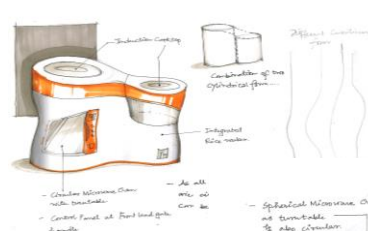
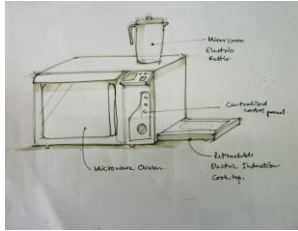
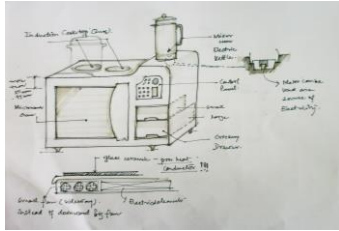
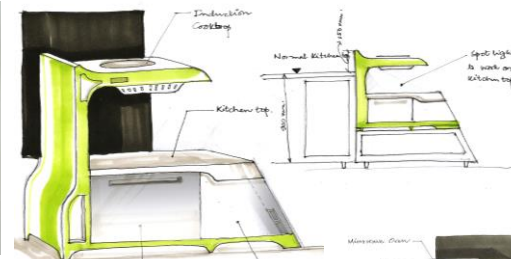
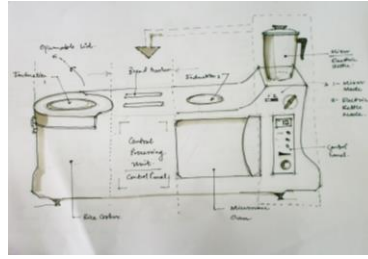
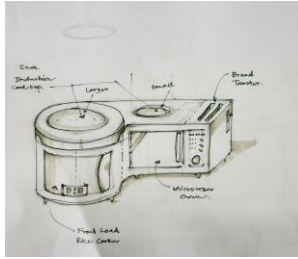
New Technological Interventions

1. Flatbed Design with position and change in mechanism of microwave antenna (it is going to be much costlier)
2. Smart User Interface with appropriate balance between mechanical and electronics part to make it more affordable
3. Easy accessibility for opening the door and loading food
4. Intuitive Integrated Control System
5. Internet of Things, Remote Control from Smartphone

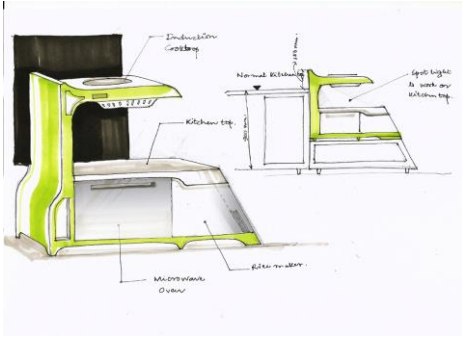
12

Ideations

Preliminary Ideations



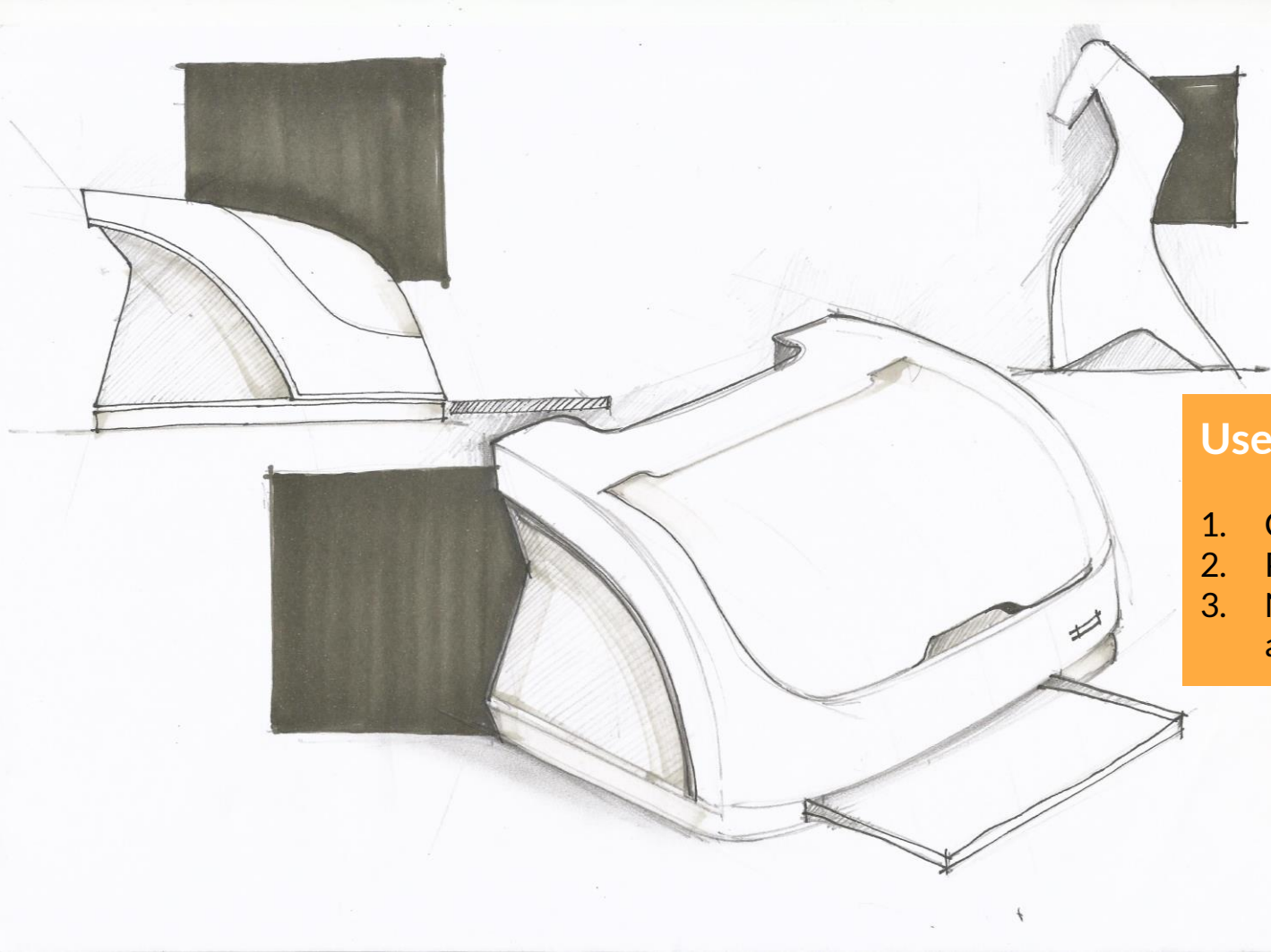
Preliminary Final Ideation & Prototype



Visual Perception Matrix



Ideation -13



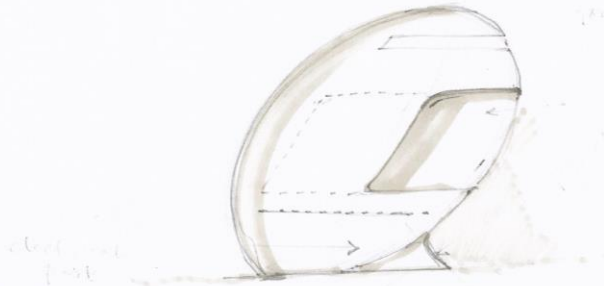
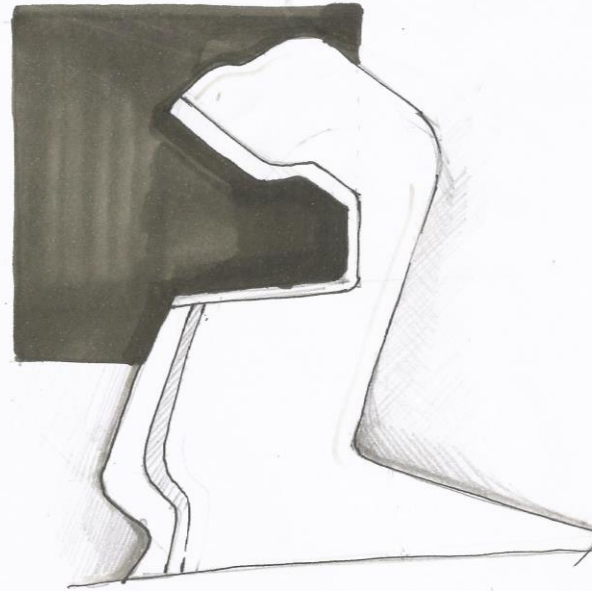
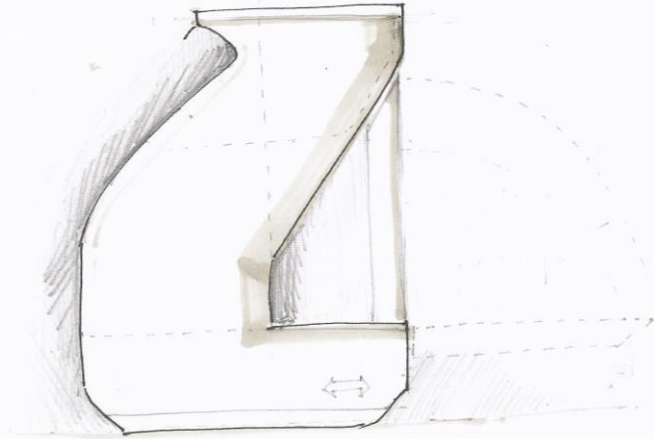
User feedback

1. Confused form
2. Printer like form
3. Not going to Kitchen ambience

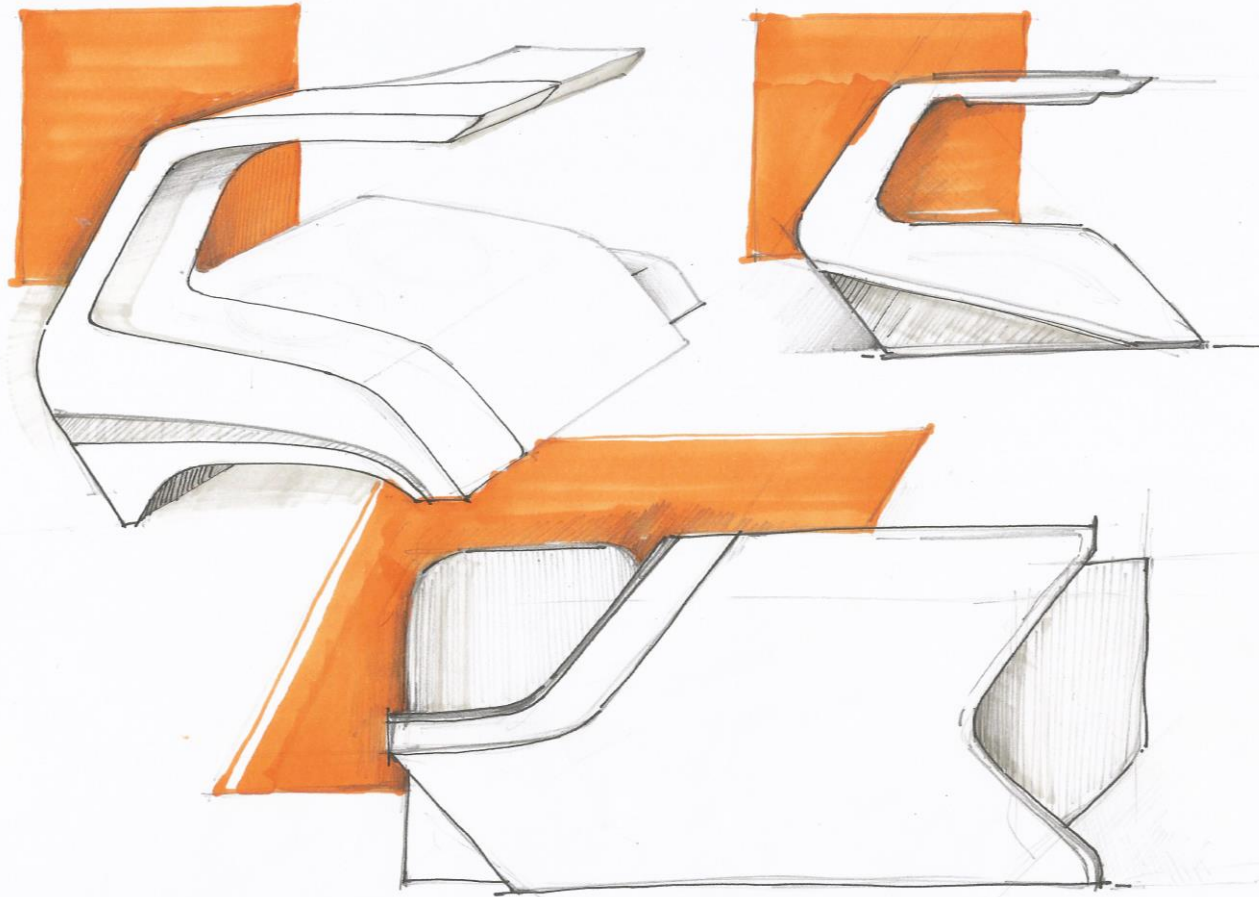
Ideation -14

User feedback

1. Confused form
2. Functions are not clear
3. Not going to Kitchen ambience



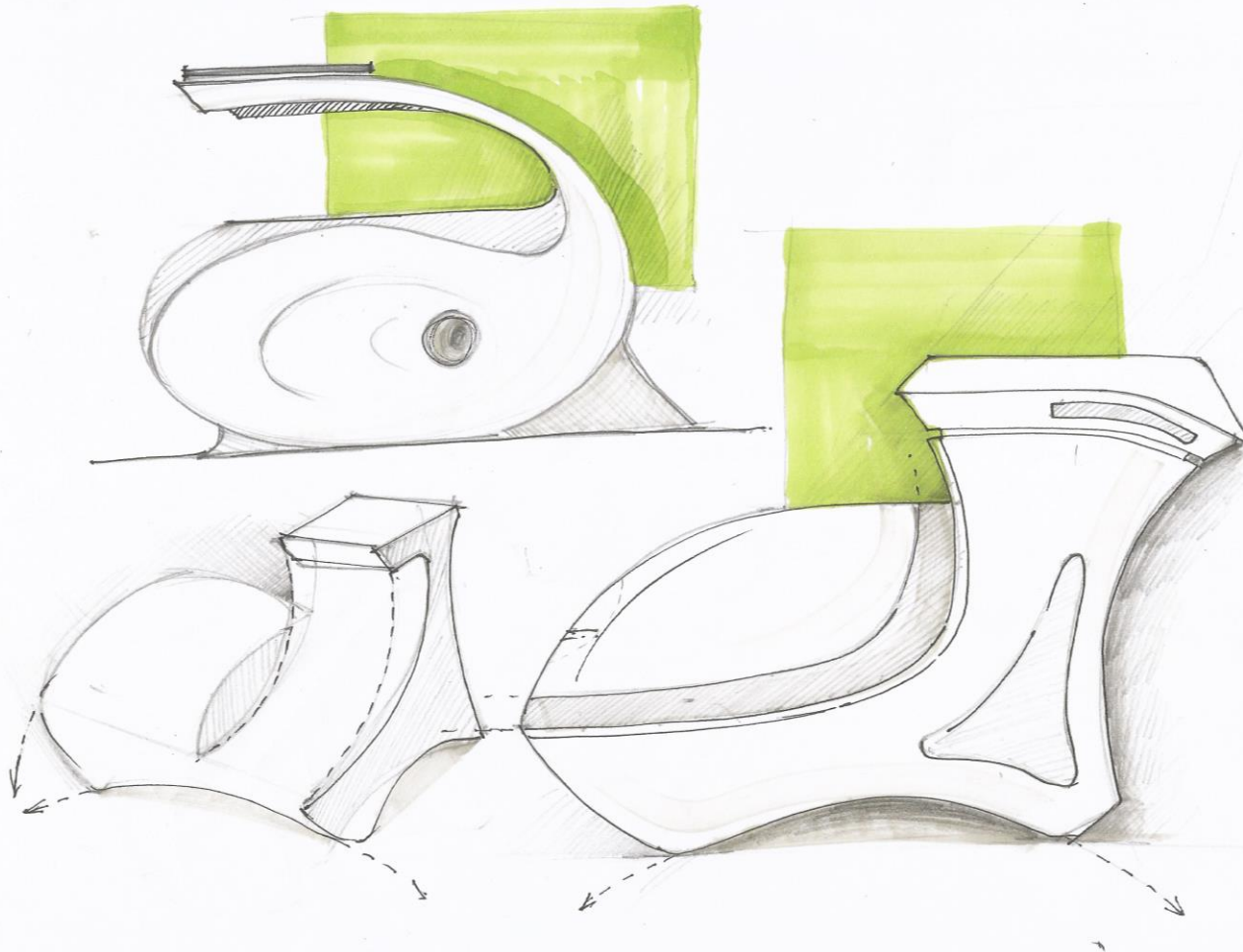
Ideation -15



User feedback

1. Dynamic Form
2. Looking good
3. Induction at upper level is not preferred

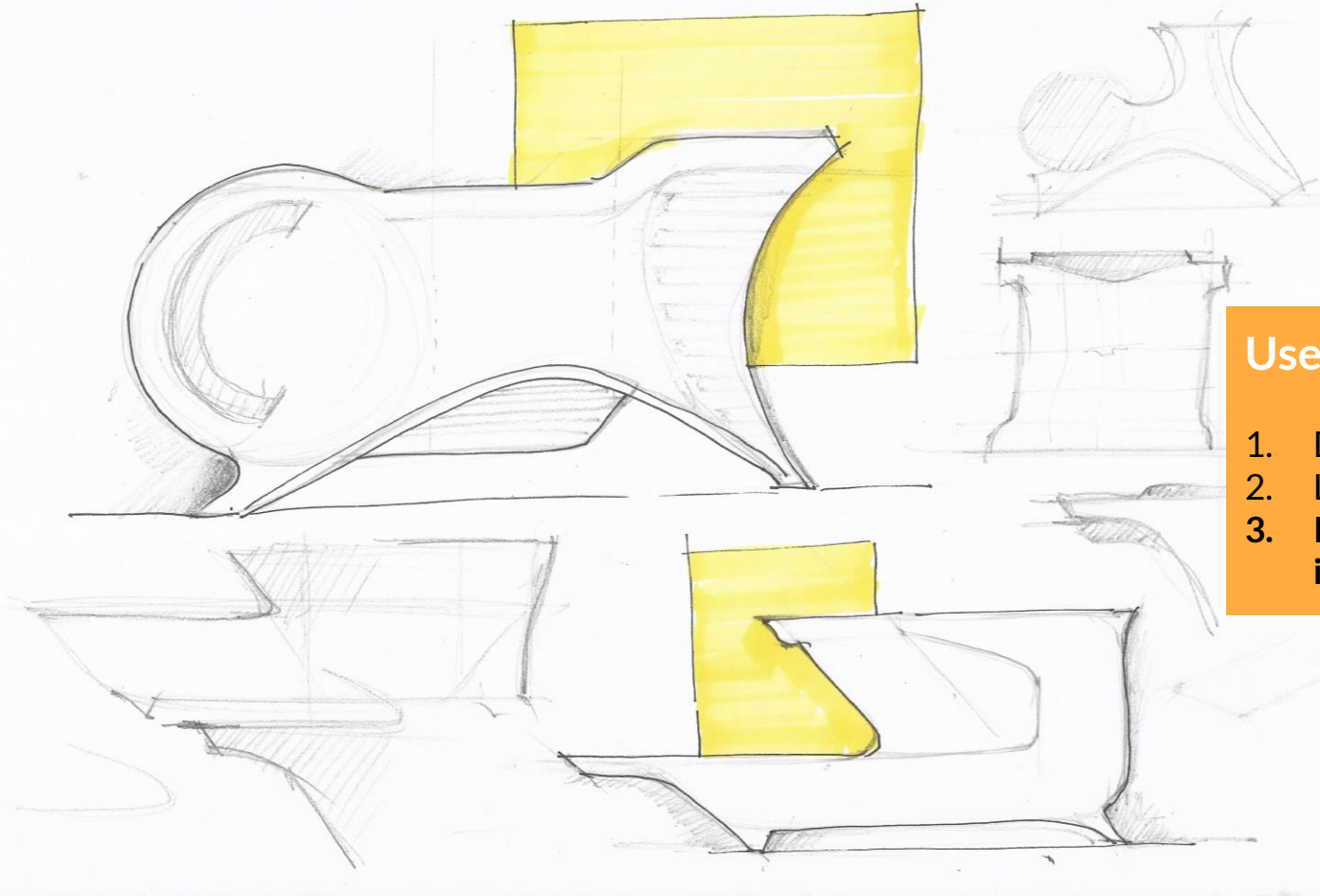
Ideation -16



User feedback

1. Smooth Form
2. Looking good
3. Functions are not easily communicated
4. Induction at upper level is not preferred

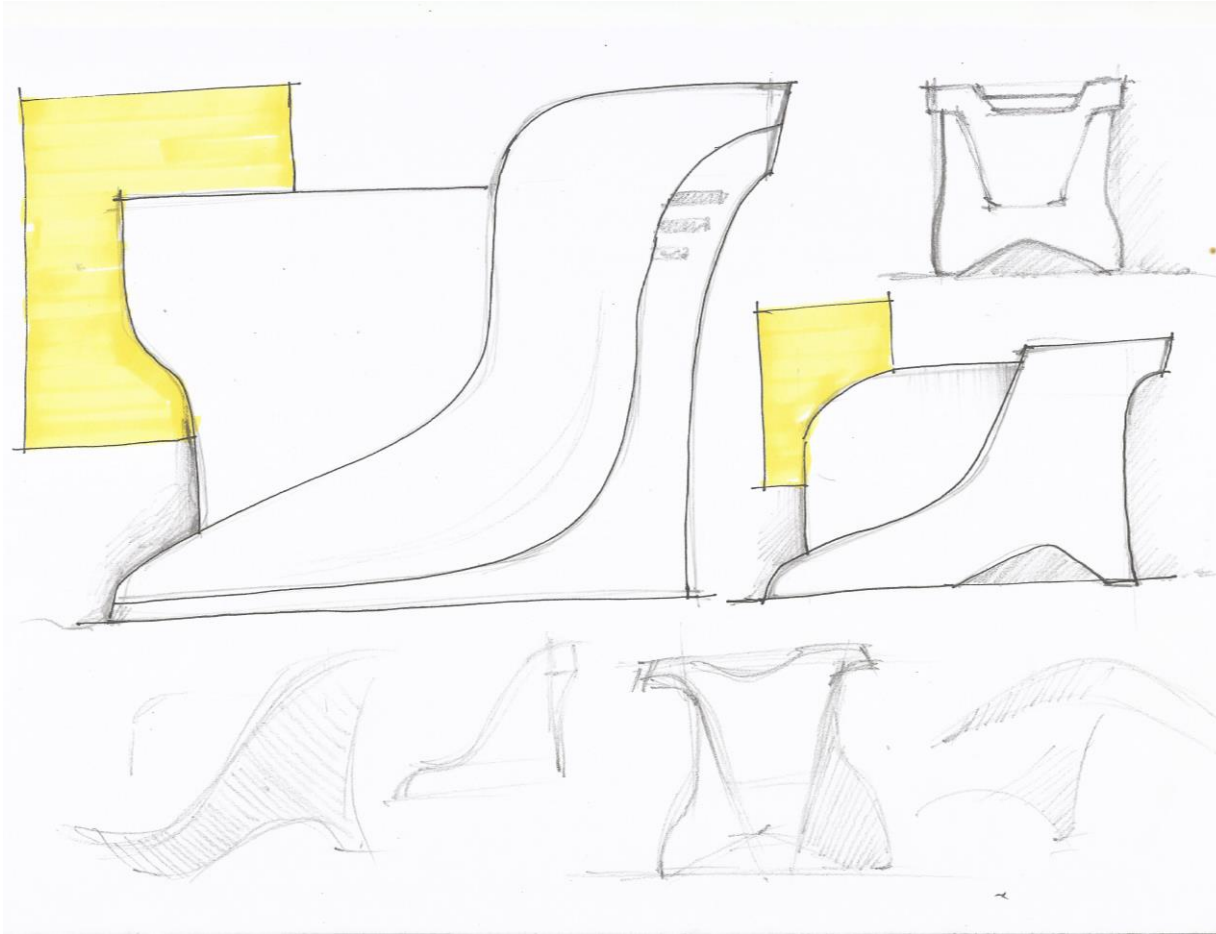
Ideation -17



User feedback

1. Dynamic Form
2. Looking good
3. Induction at upper level is not preferred

Ideation -18



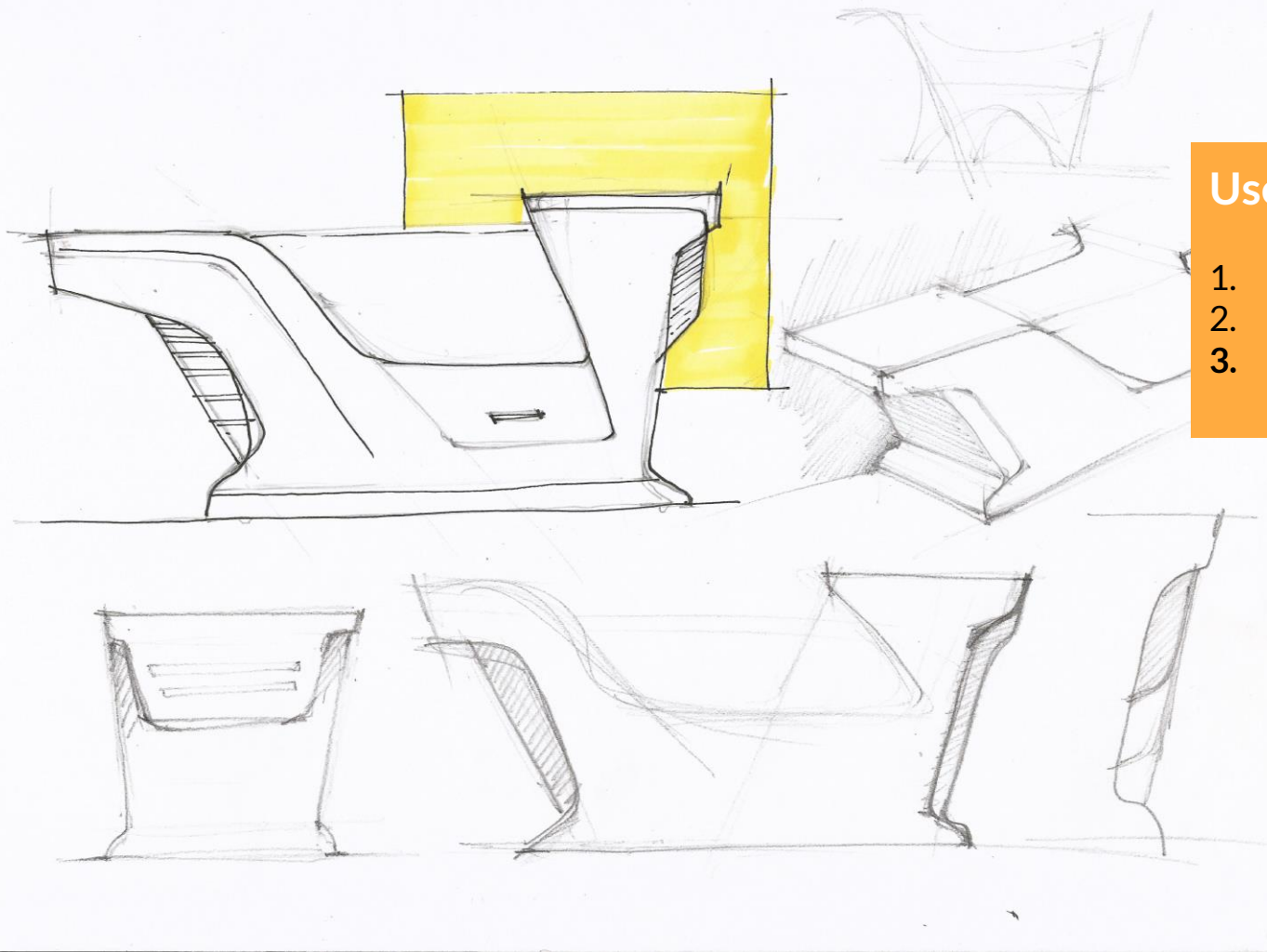
User feedback

1. Dynamic Form
2. Looking not so bad
3. Functions are not easily communicated
4. **Induction at upper level is not preferred**

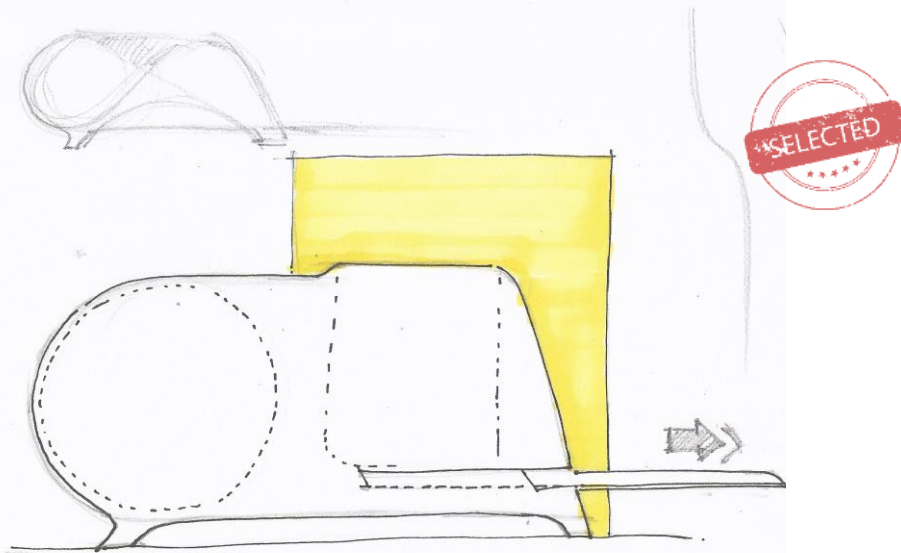
Ideation -19

User feedback

1. Dynamic Form
2. Looking not so bad
3. Induction at upper level is not preferred



Ideation -20



User feedback

1. Simple Form
2. Looking good
3. Functions are easily communicated
4. Function at same position is preferred

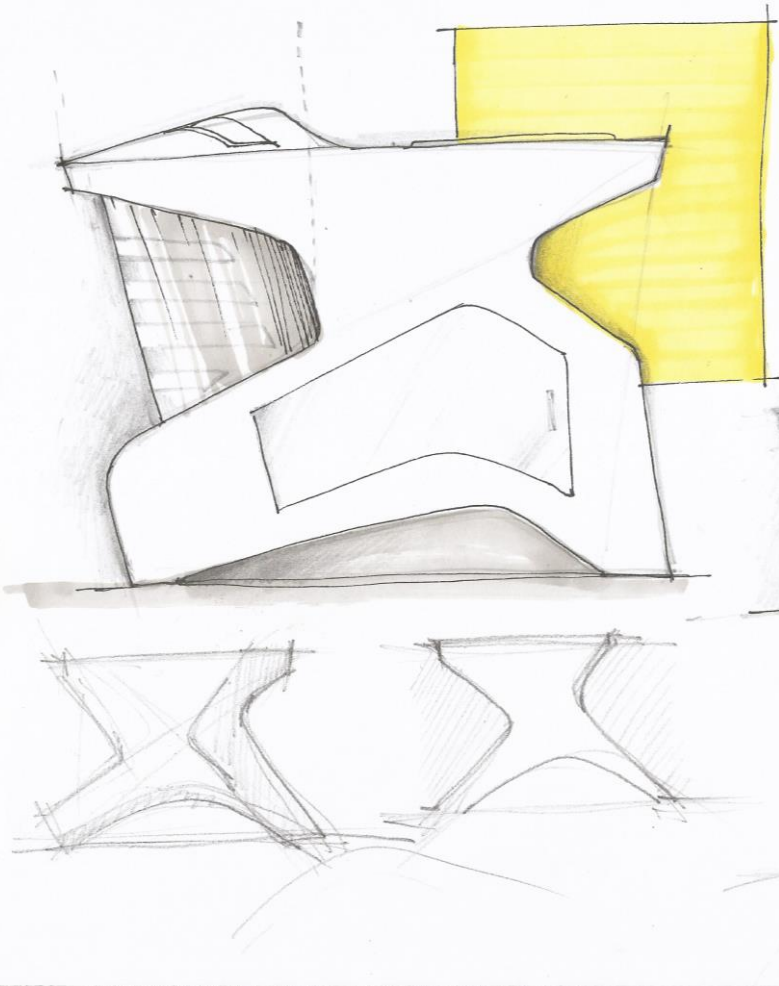
Ideation -21



User feedback

1. Cylindrical Form new as kitchen appliance but looks like water purifier
2. **Induction at upper level is not preferred**

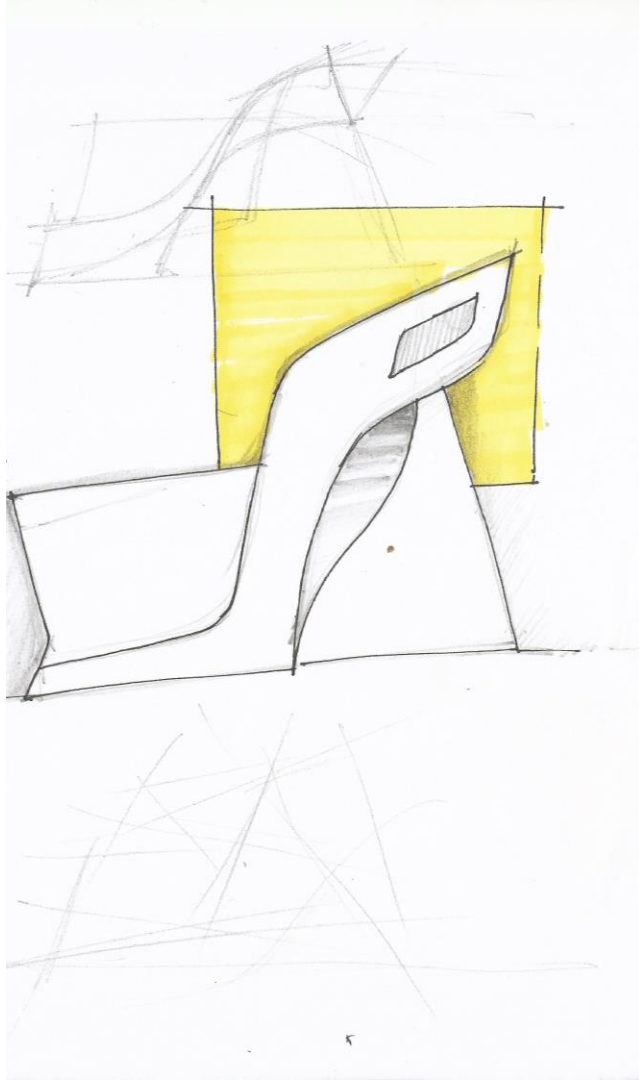
Ideation -22



User feedback

1. Dynamic Form
2. Looking good
3. Functions are not easily communicated
4. **Induction at upper level is not preferred**

Ideation -23



User feedback

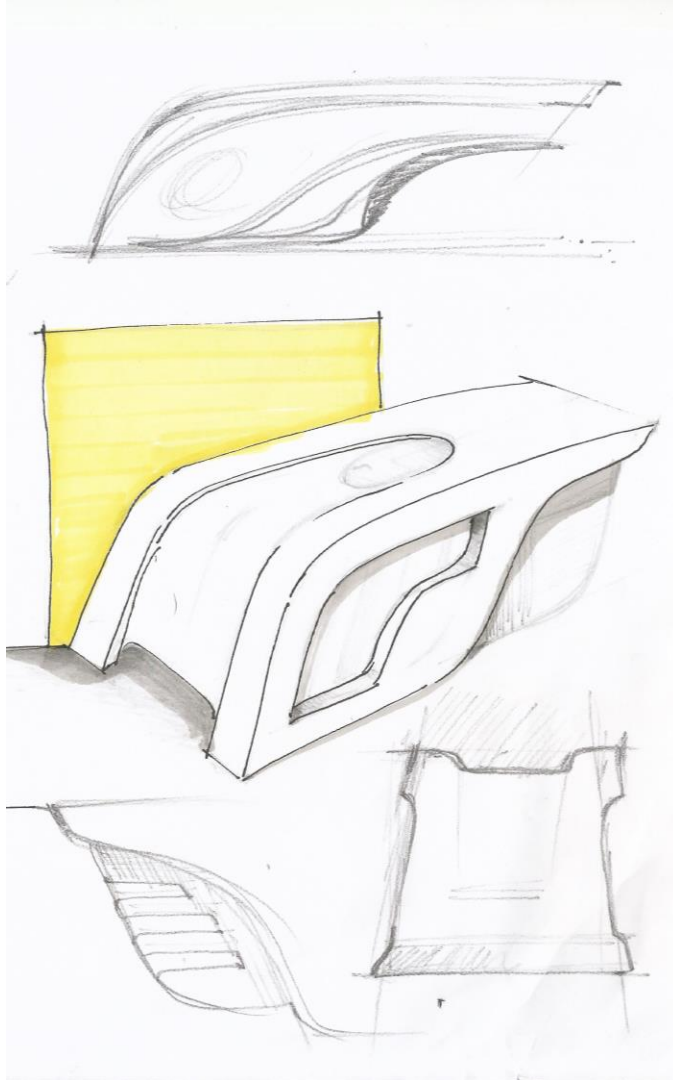
1. Dynamic Form
2. Looking good
3. Functions are not easily communicated
4. **Induction at upper level is not preferred**

Ideation -24

User feedback

1. Dynamic Form
2. Looking good
3. Functions are not easily communicated
4. **Induction at upper level is not preferred**

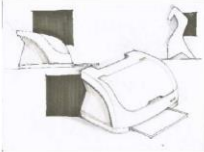
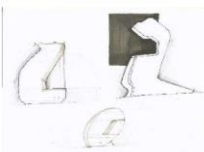
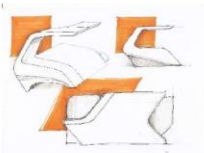
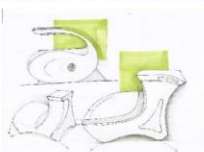
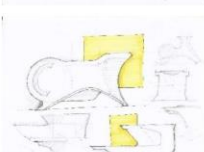
Ideation -25



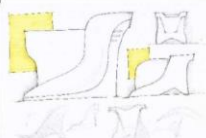
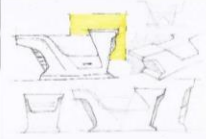
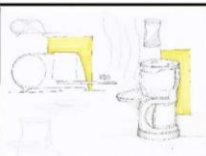
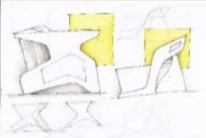
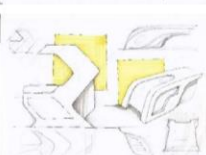
User feedback

1. Dynamic Form
2. Looking good
3. Functions are not easily communicated
4. **Induction at upper level is not preferred**

Evaluation of Idea

Sl. No.	Concepts	Functional Aspects				Aesthetical Aspects						Ranking (given by users)	
		Functions	Features	Assesibility	User Interface	Experience	Overall Appearance	Form	Colour	Finish	Line Quality		Balance
1		Microwave Oven, Induction Cooktop, Rice Cooker	Turntable - Cost effective, cheaper	From Frontside only	Central Control Panel	Different loading experience	Desktop printer influence form as Table top kitchen appliance	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced	9
2		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From Frontside only	Central Control Panel	No new experience	Not so Appealing	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Visually Imbalanced	10
3		Microwave Oven, Induction Cooktop, Rice Cooker	Turntable - Cost effective, cheaper	From Frontside only	Central Control Panel	No new experience	Automotive influenced, smooth transition of form	Interesting form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced, but visually week	3
4		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From three side	Central Control Panel	Smooth form	Smooth curvilinear form	Unconventional form	Grey with bright contrast colour	Metallic finish	Gross looking, small radius fillet treatment to the edges	Balanced but visually not soothing	4
5		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From Frontside only	Central Control Panel	No new experience	Dynamic Form - appealing	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced but bit crazy form, will not go with all type of kitchen	2

Evaluation of Idea

Sl. No.	Concepts	Functional Aspects				Aesthetical Aspects							Ranking (given by users)
		Functions	Features	Assesibility	User Interface	Experience	Overall Appearance	Form	Colour	Finish	Line Quality	Balance	
6		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From Frontside only	Central Control Panel	No new experience	Smooth curvilinear form	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced but bit crazy form, will not go with all type of kitchen	8
7		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From Frontside only	Central Control Panel	No new experience	Terracotta horse influenced	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced but bit crazy form, will not go with all type of kitchen	7
8		Microwave Oven, Induction Cooktop, Rice Cooker	Turntable - Cost effective, cheaper	From two side	Central Control Panel for Microwave Oven and rice cooker, induction cooktop will have separately	Different loading experience, retractable induction cooktop with multifunctional use, social networking	Simple, clean appeal, functions easily communicated	Almost conventional form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced and visually very calm form, can be adapted in any kitchen	1
9		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From Frontside only	Central Control Panel	No new experience	Automotive influenced, smooth transition of form	Unconventional interesting form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced but bit crazy form, will not go with all type of kitchen	6
10		Microwave Oven, Induction Cooktop, Rice Cooker	Flatbed Technology - Costly	From three side	Central Control Panel	Different function at different side	Automotive influenced, smooth transition of form	Unconventional interesting form	Grey with bright contrast colour	Metallic finish	Sharp looking, small radius fillet treatment to the edges	Balanced but bit crazy form, will not go with all type of kitchen	5

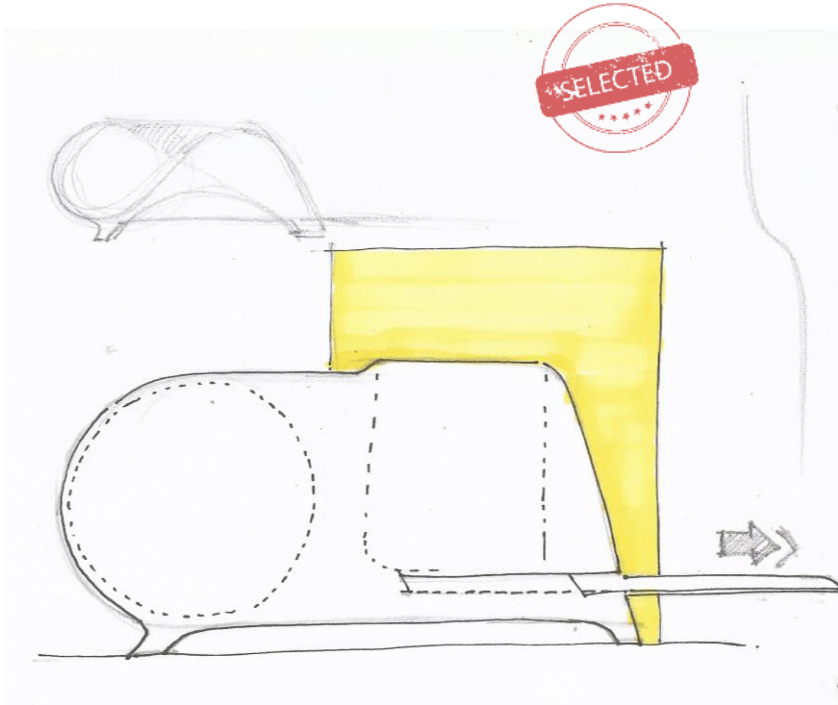
13

Final Concept

User Feedback

Preferred Criteria suggested by the Users

1. New but Simple & Clean Form, Visually balanced
2. Easy to understand different functions
3. Try to put basic function at its own position
4. Easy to clean or maintain
5. Smart User interface
6. Remote Control through specific Application via Smartphone
7. Graphic Design preferably minimal floral pattern
8. Should go with kitchen ambience
9. Feel proud to show others, main attraction point of kitchen
10. Well thought User Experience



Final Concept

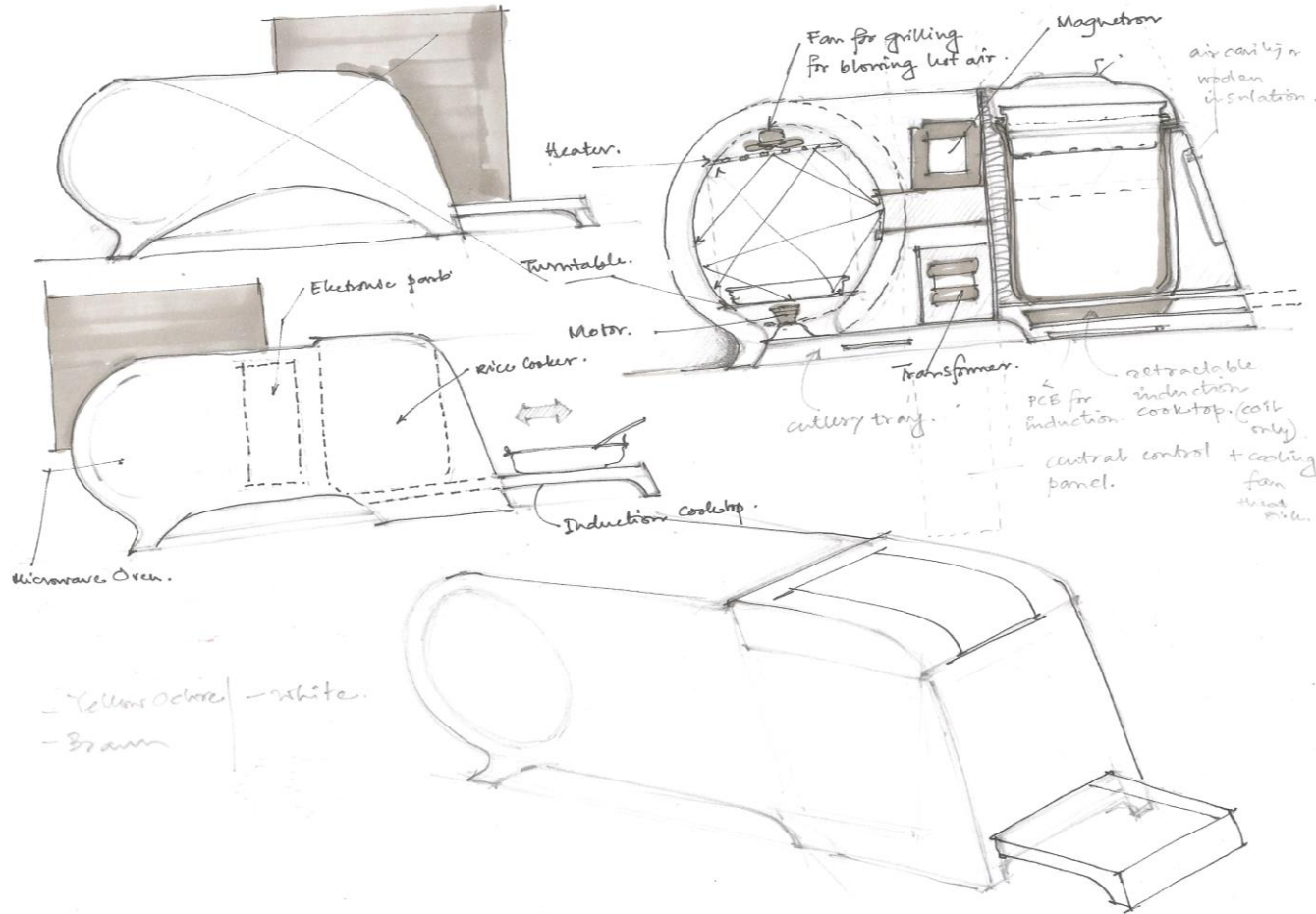
Good Design Principles from Dieter Rams



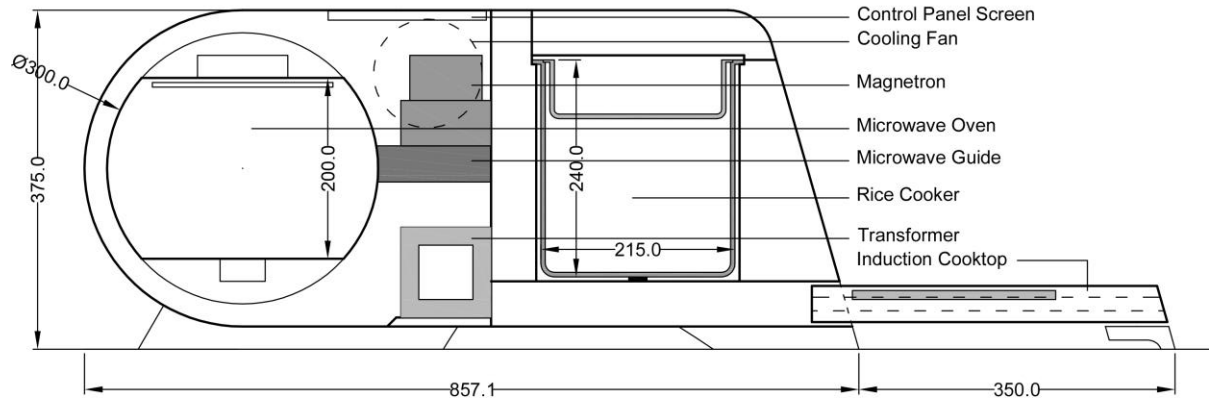
Good Design is

1. Is Innovative
2. Makes a product useful
3. Is Aesthetics
4. Makes a product understandable
5. Is Unobtrusive
6. Is Honest
7. Is Long-lasting
8. Is thorough down to the last detail
9. Is environmentally friendly
10. Is as little design as possible

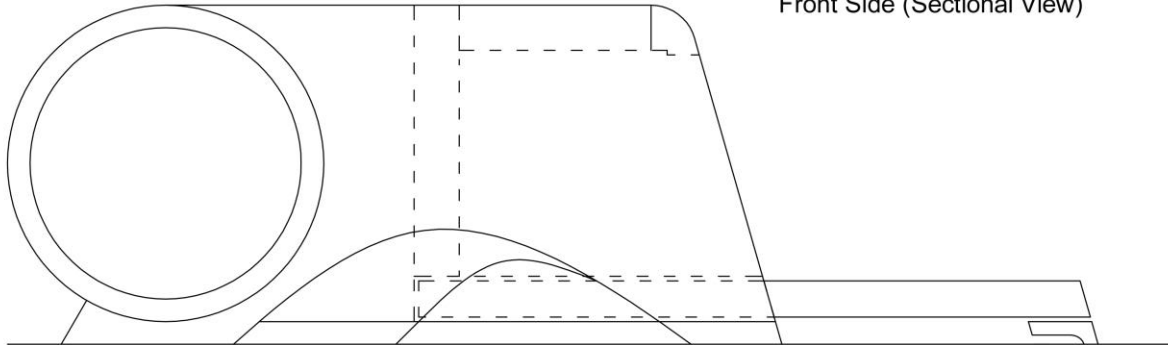
Concept Sketch



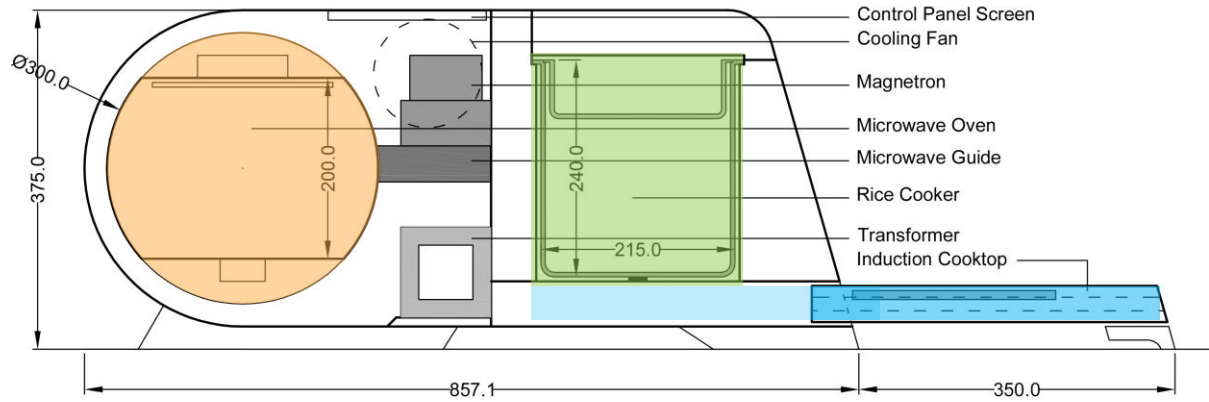
Concept Drawing



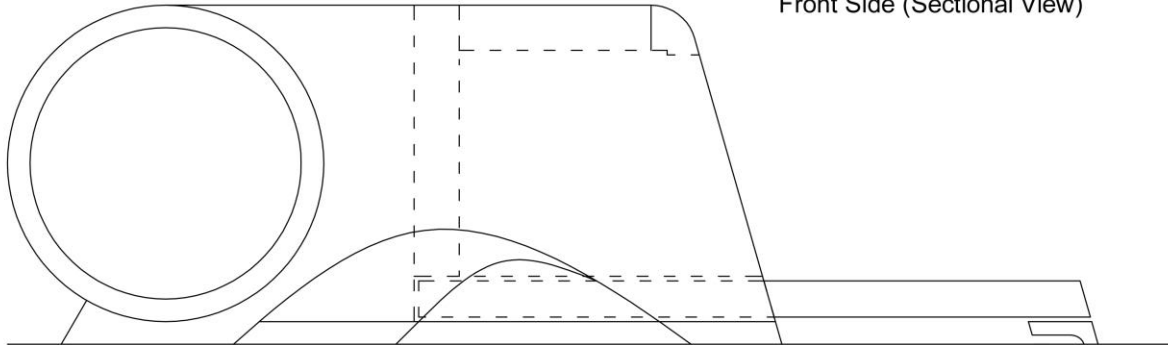
Front Side (Sectional View)



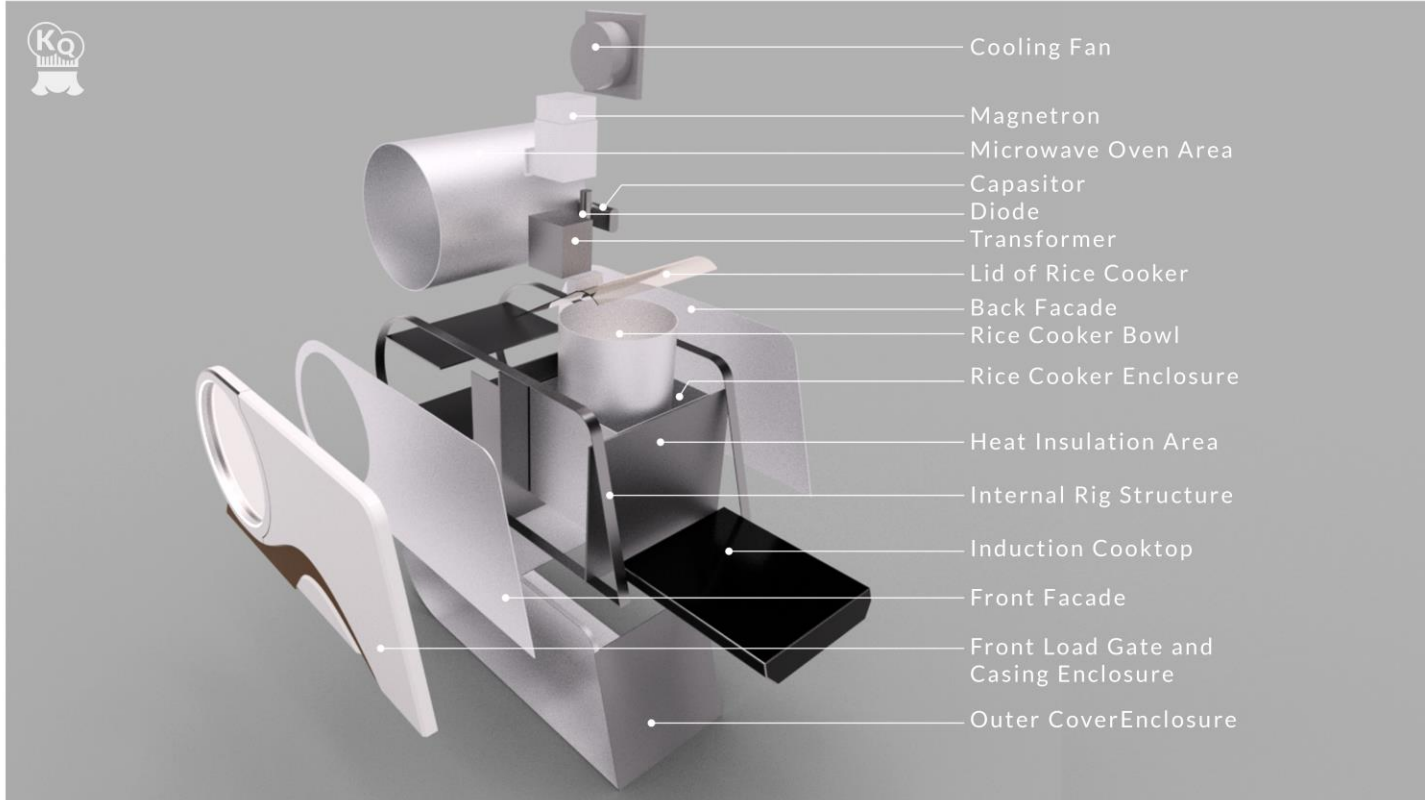
Concept Drawing

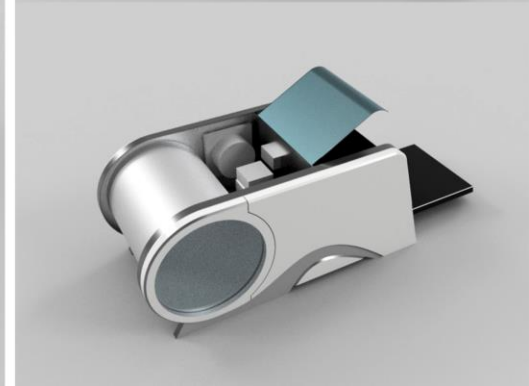
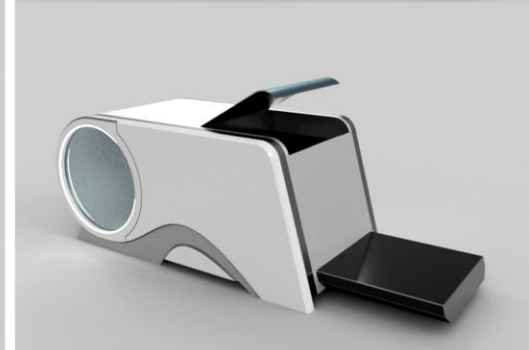
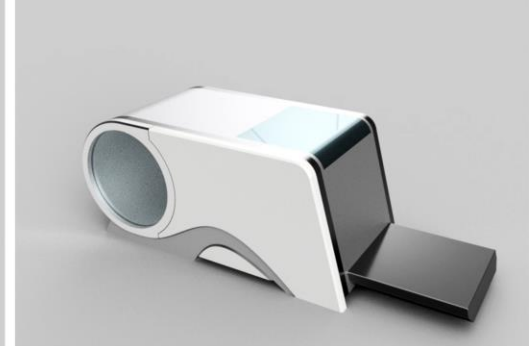
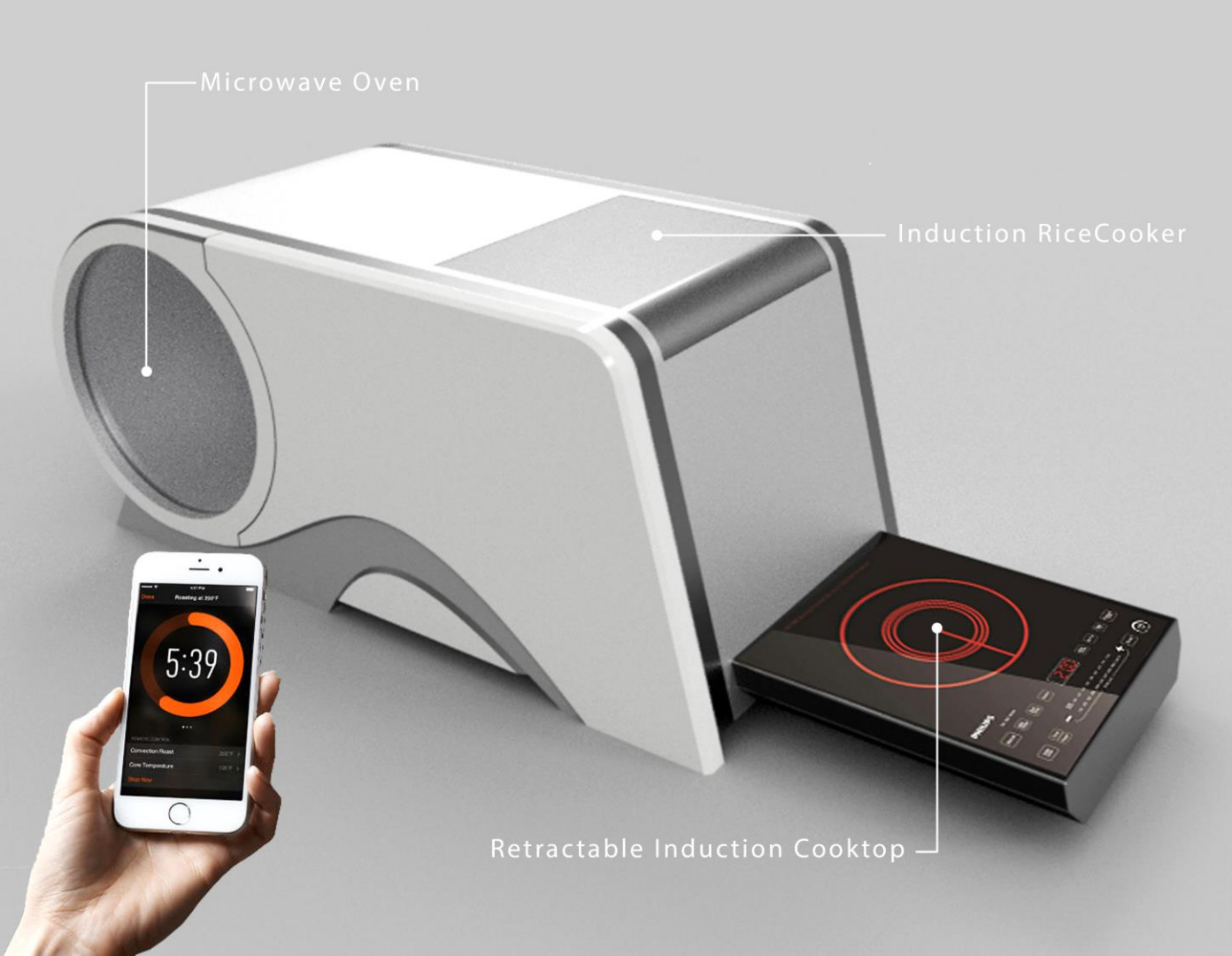


Front Side (Sectional View)

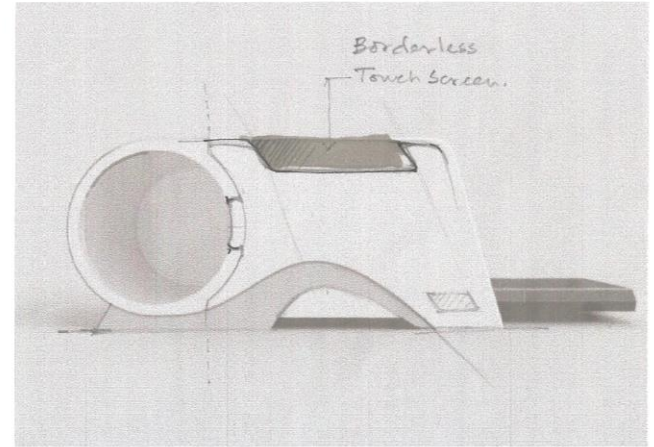
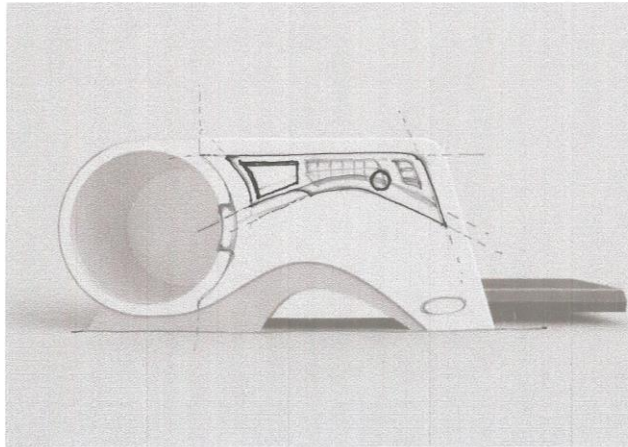
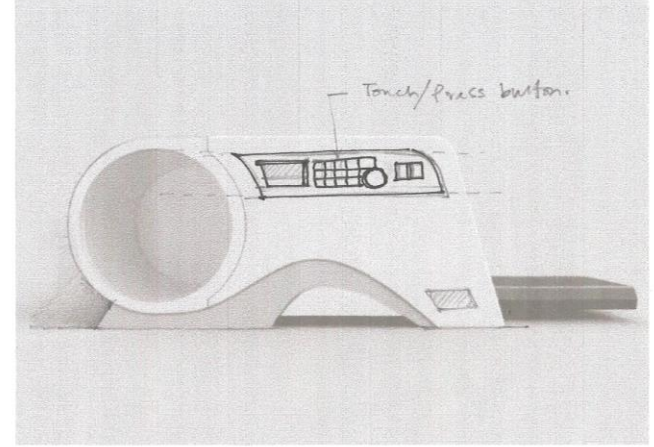
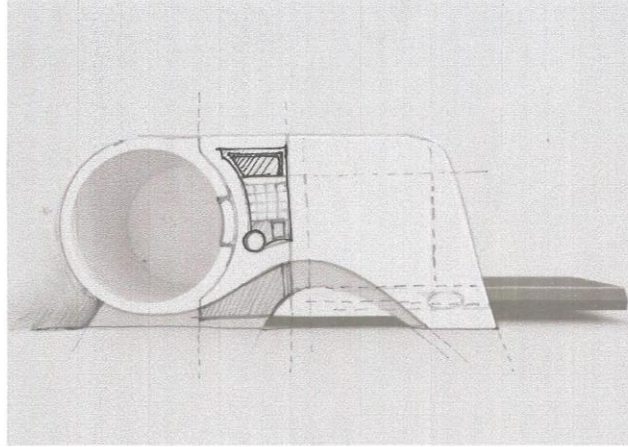


Exploded View





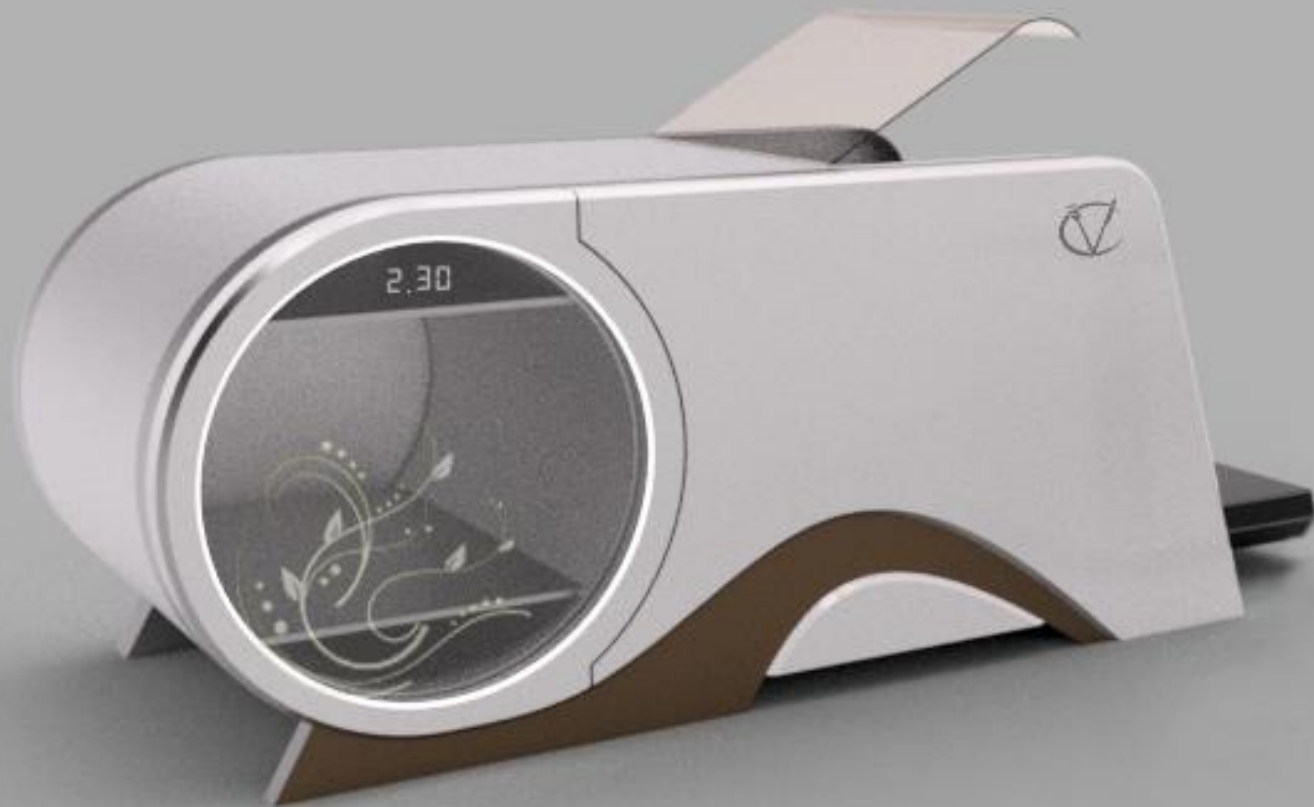
Different options for Control Panel



Control Panel



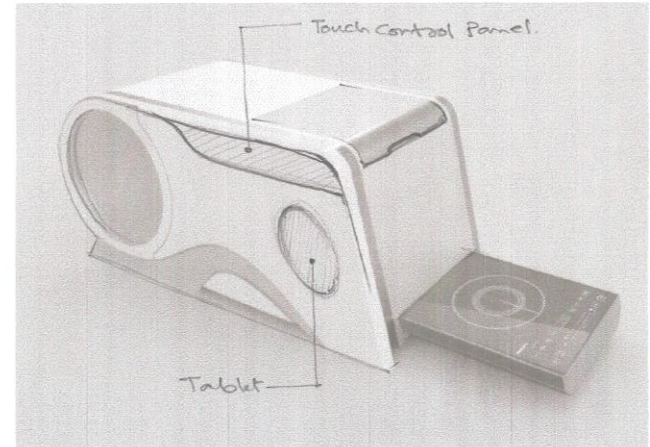
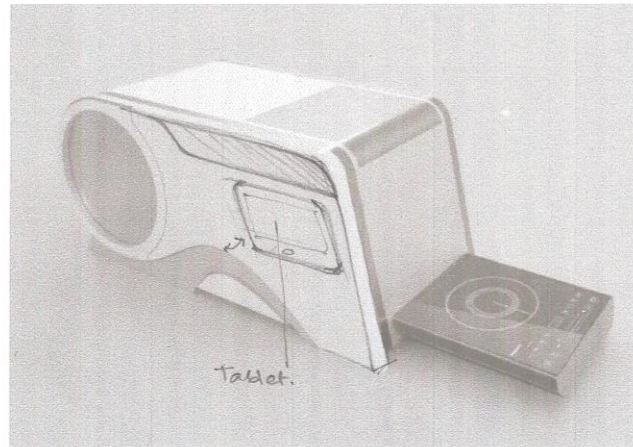
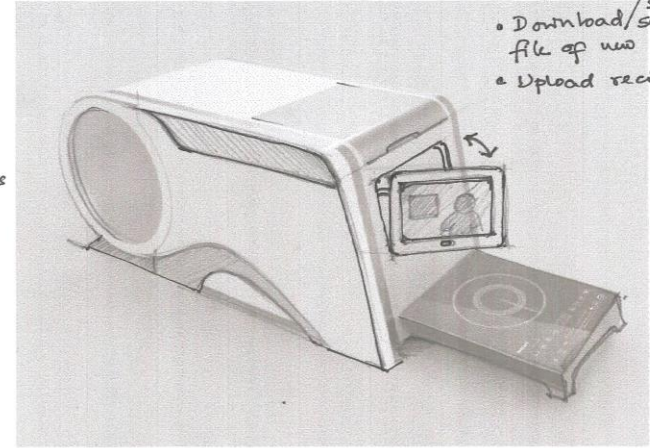
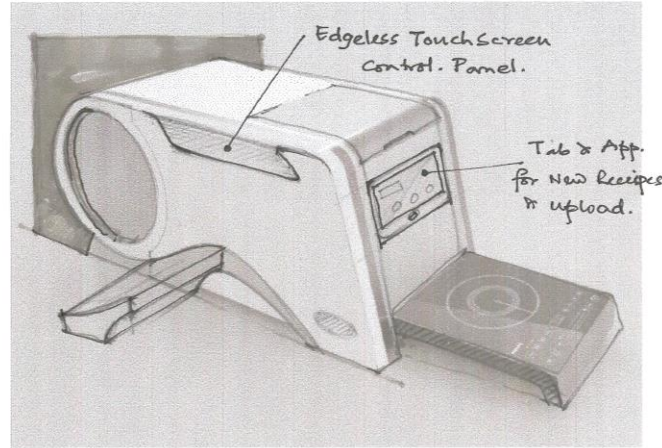
3D Visualisation

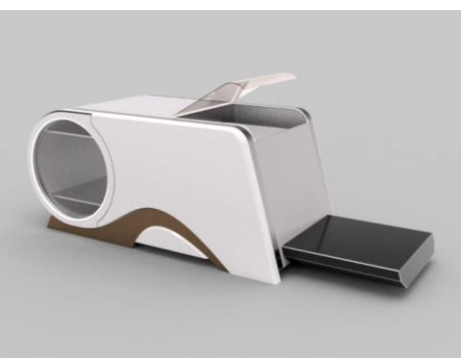
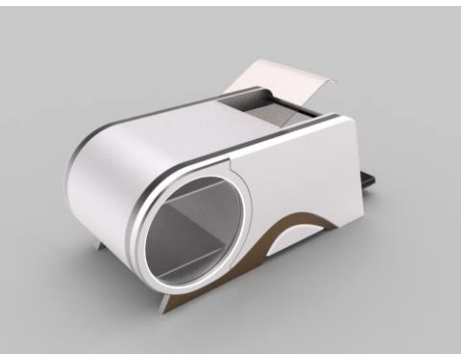
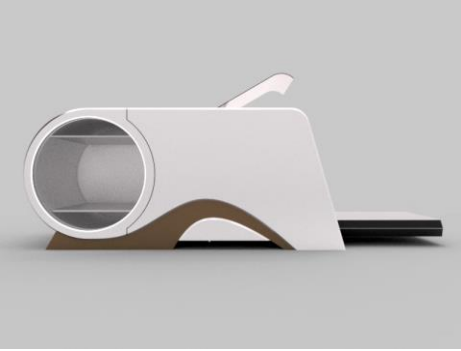




Control Panel + Social involvement

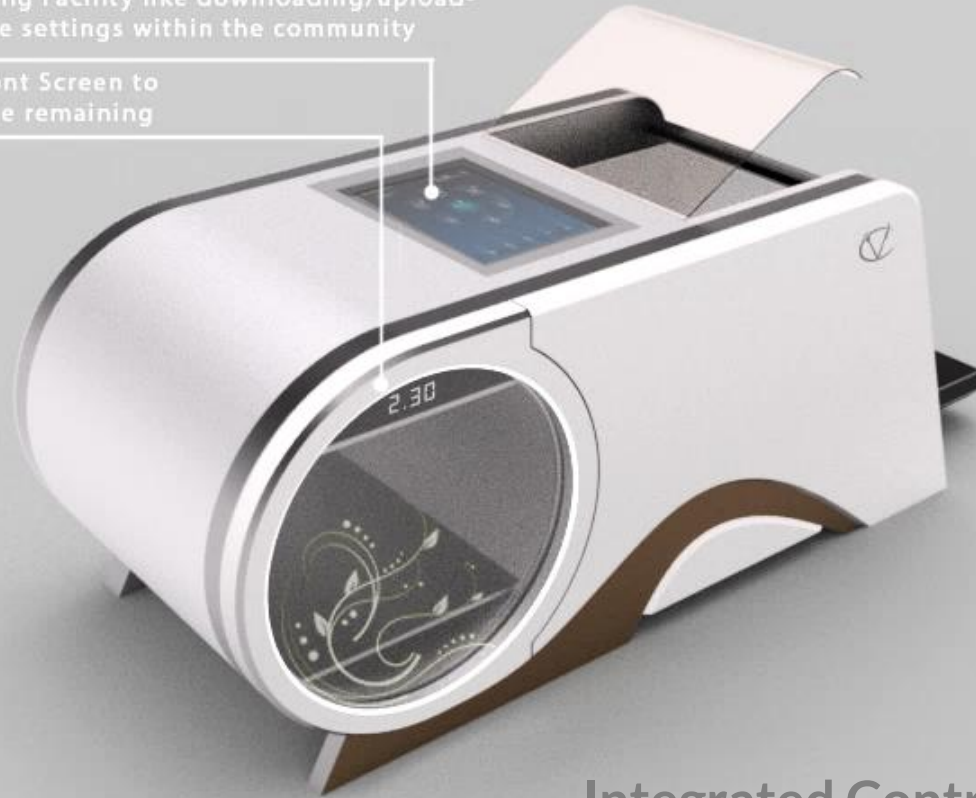
Introducing
integrated tablet
with application



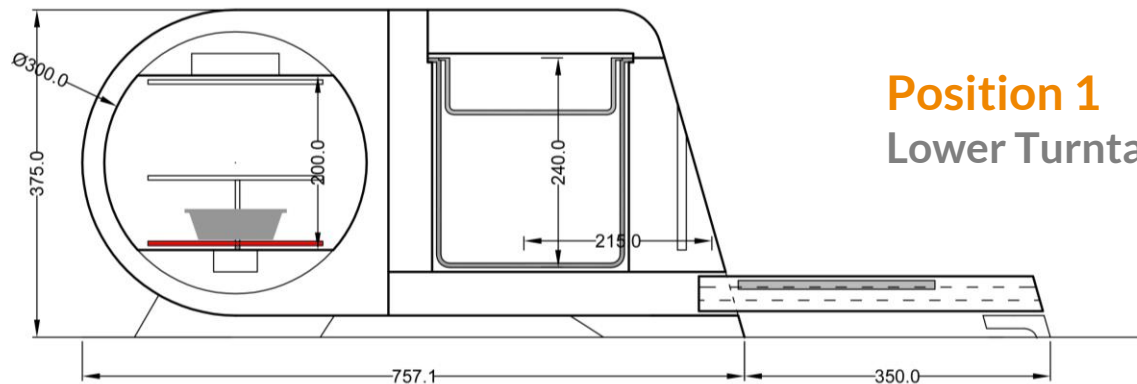


Integrated Control Panel
for Microwave Oven & Rice Cooker and Social
Networking Facility like downloading/upload-
ing recipe settings within the community

Small Front Screen to
show time remaining

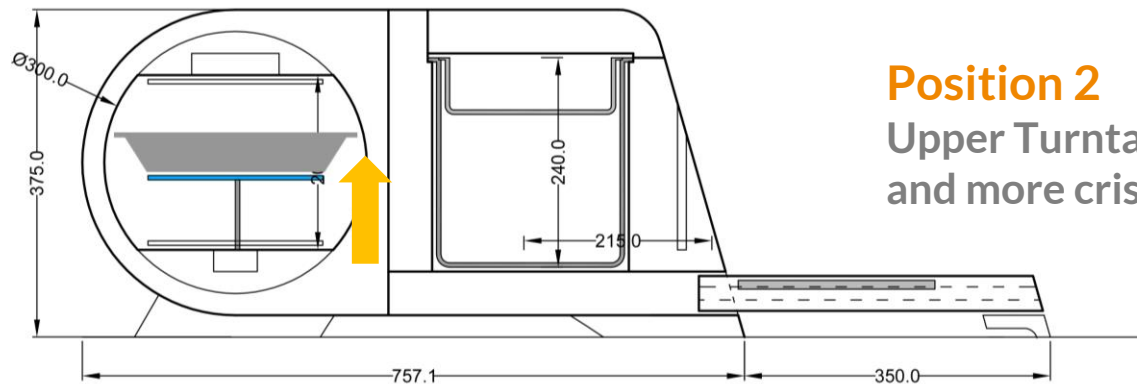


Integrated Control Panel



Position 1

Lower Turntable position for small bowls



Position 2

Upper Turntable position for bigger dishes and more crispy recipes

Different position of turntable



Accessible from two sides

14

Product Planning and Management



Branding

Before launching the product in the market, it is very important to do branding the product and position it properly to appropriate market segment to catch the focused group of users.



Kitchen Queen

Smart Kitchen | Smart Appliance

Branding



Corporate Office
 11th Floor, Tech Bhawan, 102, Takandas Kataria Marg,
 Near Hinduja Hospital, Matunga (W), Shivaji Park,
 Mumbai, Maharashtra 400016
 Contact No.- 022-2366-2545-50
 Fax - 022-2366-2544

Factory
 Kitchen Queen Industry Estate, Ghatkopar East,
 Mumbai, Maharashtra - 400076
 Contact No. - 022-2654-2484-87



an ISO 9001:2008 certified company
www.kitchenqueen.com

Kitchen Queen

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on Microwave and Cooktop

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Have Good Food without a Kitchen...

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Business Canvas Model

The Business Model Canvas

Designed for: **Smart Kitchen Appliance**

Designed by: **Anirban Maiti**

On: 17 Nov 2024

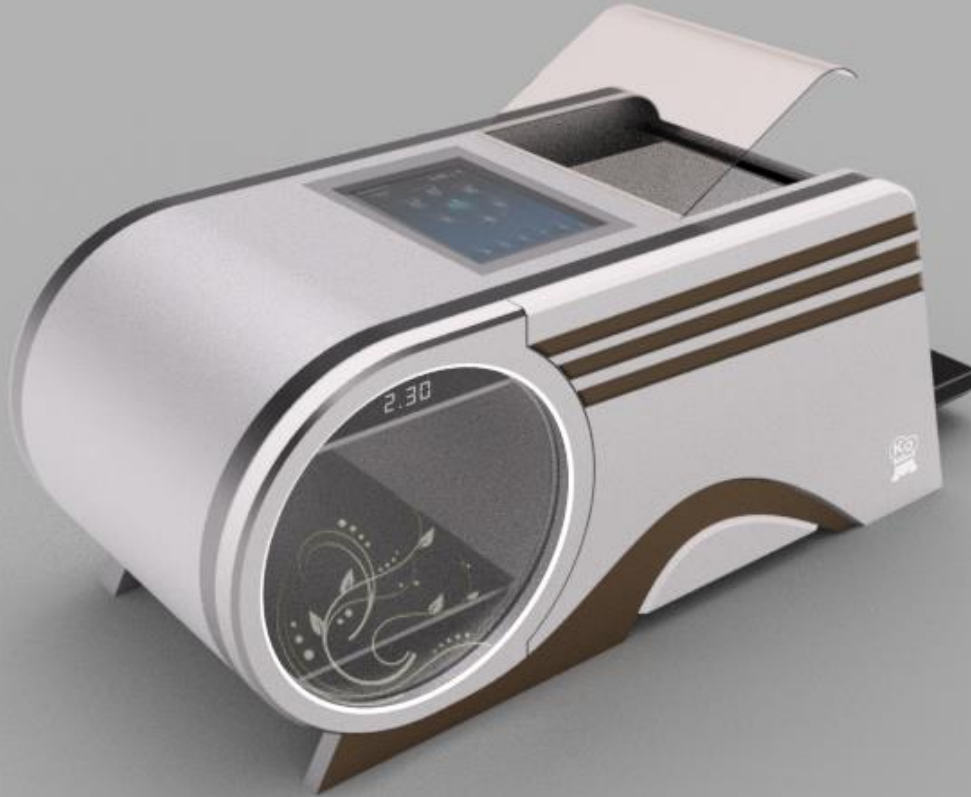
Iteration: 1

Key Partners  Who are our Key Partners? Who are our key suppliers? Which Key Resources are we acquiring from partners? Which Key Activities do partners perform? Partners - collaborating with top notch technical institution and research laboratories to be at par with latest technologies and good relation with govt. sector for financial helps Suppliers - in-house manufacturing facilities and vendors for quick and continuous flow of supply of parts and assembling (the JIT Concept) Selling - Besides direct sell from company outlet, there can be authorised franchise to promote more and expanding business Supporting - 24x7 support system online and telephonic system directly with the vendors from the company platform and get the repair done easily and quickly in the home E-wallet - Besides financial help from all the online payment gateways for smooth transaction, buyers can open profile in the company website and register their product for quick services and get offer in the wallet system to buy/exchange new appliances at festive sessions	Key Activities  What Key Activities do our Value Proposition require? Our Distribution Channels? Customer Relationship? Revenue stream? Manufacturing - in-house manufacturing facilities and vendors to lower the cost and increase profits Selling - Direct sell from company outlet to have minimum price and offers at the festive sessions Supporting - 24x7 support system on online and telephonic system Key Resources  What Key Resources do our Value Proposition require? Our Distribution Channels? Customer Relationship? Revenue Stream? Human - loaded with inhouse Designers, Engineers and Management persons loaded with first hand experience and full of enthusiasm Physical - Head Office and branch Offices in all metropolitan cities and major location to cater al the users through over the country, even abroad Intellectual - tie up with Intel for faster processors & system and IPs Financial - continuous help from banks	Value Propositions  What value do we deliver to the customer? Which one of our customer's problems are we helping to solve? What bundles of products and services are we offering to each Customer Segment? Which customer needs are we satisfying? Convenience - very easy to load and cook food, quickly, energy efficient, easy to clean and maintain, Pollution free, multifunctional, time saving by simultaneous cooking, uploading/downloading recipes for easy cooking, social networking within closed group of users Price - below Rs.10000(preferred by users) Design - very simple, clean form and minimalist design, functions are easily communicated to users, goes with any kitchen ambience and layout, accessibility from two sides Brand or Status - new startup with tons of knowledge and team of extremely talented, experienced and enthusiastic designers. Cost Reduction - easily available parts from supporting enterprises for easy maintenance Risk Reduction - Safe for Cooking	Customer Relationships  What type of relationship does each of our Customer Segments expect us to establish and maintain with them? Which ones have we established? How are they integrated with the rest of our business model? How costly are they? Automated Service - if some parts get damages it will inform the concern company immediately through online application for quick and customised servicing Dedicated Personal Assistance Self Service Community help (for new recipes) Channels  Through which Channels do our Customer Segments want to be reached? How are we reaching them now? How are our Channels integrated? Which ones work best? Which ones are most cost-efficient? How are we integrating them with customer routines? In-person or telephone On-site or in-store Physical delivery The Internet (social media, blogs, e-mail, etc.) Traditional media (television, radio, newspapers, etc.)	Customer Segments  For whom are we creating value? Who are our most important customers? Primary Users Housewife (majorly) of upper-middle class and upper class family of varied age range of 25-35, not for aged people but can adapt easily if someone want to Single Family member - like working man/woman in urban metropolitan scenario, Students Small scale food stalls and restaurants Secondary Users Manufacturing/Assembling people Tertiary Users Sales person at store Demo person at door-to-door service
Cost Structure  What are the most important costs inherent in our business model? Which Key Resources are most expensive? Which Key Activities are most expensive? Acquiring Key Resources, performing Key Activities, and working with Key Partnerships all incur Costs. But bulk resource acquiring and inhouse facilities of desining and manufacturing will surely reduce manufacturing cost of the appliances. Very good collaboration with the partner companies will give immense support through over the time and will reduce probability of loss. At the end, focusing user needs and come up with new useful product will maintain company brand.		Revenue Streams  For what value are our customers really willing to pay? For what do they currently pay? How are they currently paying? How would they prefer to pay? How much does each Revenue Stream contribute to overall revenue? Out-right sells from huge numbers of company's own store/showroom throughout the India (as the product od for Indians)- it will also give the user maximum offers as no third party sellers are involved. Free Online Application Purchase - The respective application can be sold free of cost and later revenue can be generated from downloading recipe files, nominal amount for downloading new recipes but offer can be availed at the time of sharing those among the groups		

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Final Visualisation & Prototype

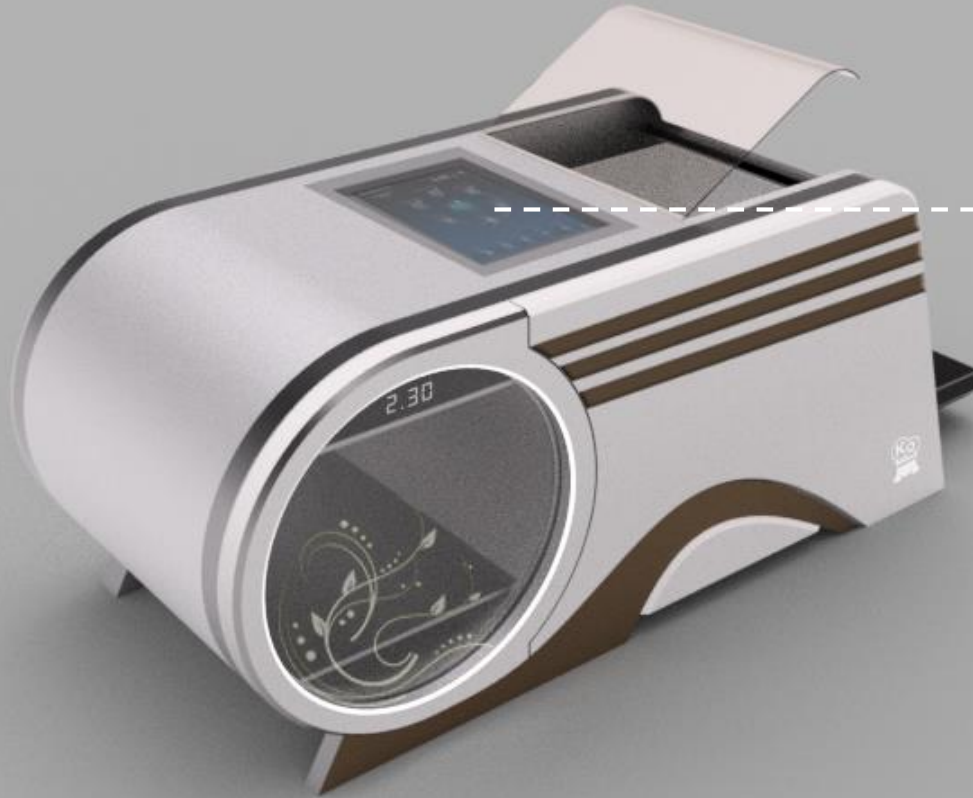
Final Visualisation



Salient Features

- Microwave Oven, Induction Cooktop and Rice Cooker in one single appliance
- Can prepare all major Indian recipes
- Clean, Simple and Communicative Form
- Integrated Control Panel with social networking for uploading and downloading recipes settings for quick preparing new tasty foods
- Remote control from Smartphone through app
- Ergonomic dimension with the standard kitchen top
- Minimal floral pattern graphics according to traditional Indian preference

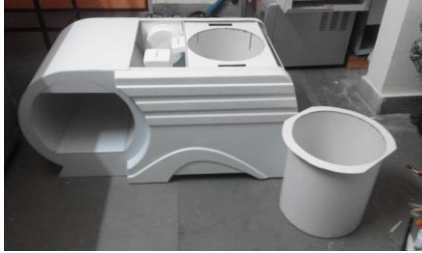
User Interface



Prototyping in progress



Final Prototype





Thank you!