

Smart Kitchen Appliance

Design Project II (IDP-602)

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3rd Semester | Master of Design (ID)

Industrial Design Centre

Indian Institute of Technology, Bombay, IN

SMART KITCHEN APPLIANCE

INDUSTRIAL DESIGN PROJECT – II

MPR – 452

SUBMITTED BY

ANIRBAN MAITI

156130003

GUIDE: PROF. P. KUMARESAN



INDUSTRIAL DESIGN CENTRE

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

2017

Approval Sheet

This project titled “Smart Kitchen Device” is prepared and submitted by Anirban Maiti in partial fulfilment of the requirement for the degree of ‘Masters in Design’ in Industrial Design. It has been examined and is recommend for approval and acceptance.

Guide:

Chairman:

Internal Examiner:

External Examiner

Declaration

The work done as a part of the written submission under this report “Smart Kitchen Appliance” as project two for post graduate program in Industrial Design Centre, IIT Bombay, India under the guidance of Prof. P. Kumaresan.

I hereby declare all the content of this project is an original work with appropriate reference information or links provided wherever due.

Any violation of the above will be cause for disciplinary action by the institute.

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Acknowledgement

I am heartily thankful to my project guide Prof. P. Kumaresan for teaching me work ethics and setting an example of discipline at workspace, for encouraging me at every level to take decisions for my project and believing in me when I chose one option over the other.

I am also obliged to the staffs at studios who were always ready to back up with knowledge and guidance while working in workshops making ideations, mockups and prototypes.

I am highly grateful to my friends, fellow classmates and parents for encouraging me when I felt lost and constructively adding to my project with their valuable feedback in every possible way.

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01

Introduction

Introduction

In the coming days, spaces will be very much costly. For that reason, size(area) for homes will be lesser and lesser day by day. From this point of view, people will start reducing spaces in toilet, bathroom, kitchen, balcony and other secondary spaces after having the minimum primary spaces for bedroom, living rooms etc. and that is how Open Kitchen evolved.

And if we see any kitchen of modern house, there will be lots of electronic gadgets for saving time & space and further maintenance cost.

But as the space in kitchen area is reducing day by day people will need some smart and multipurpose kitchen devices which will act more efficiently and save the spaces and keep the kitchen clean.

Background Study

People generally uses Microwave Oven, Steamer, Rice Cooker, Induction Cooker, Bread Toaster etc. with traditional gas oven in their kitchen which actually takes a lot of space and that's why people can't use them all at a time due to lack of space in their kitchen. So people keep those gadgets out of the kitchen and they only use when those are required. And this scenario needs again an extra storage space for keeping all those gadgets. But in the coming days people will not have much spaces in their home!

So what is the solution?



02

Target Users and Goals

Target Users

The major target customers will be Upper middle class and Upper class. But it will be also a need for the whole middle class also.

So making the new product affordable to everyone will be a challenge.



Image Source - www.google.co.in

Objectives & Goals

**MULTI-PURPOSE
ENERGY EFFICIENT
AFFORDABLE
SPACE SAVING
EASY MAINTENANCE**

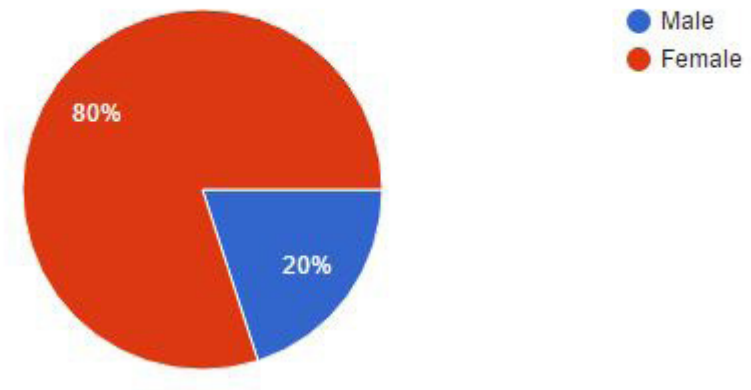
03

Data Collection by User Study

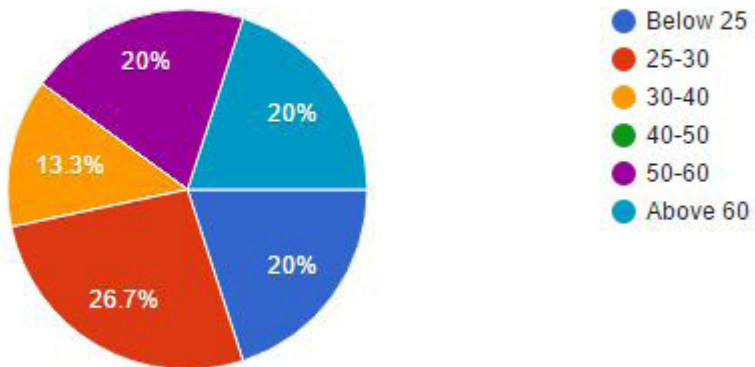
User Study

User Study is one of the crucial thing to do before starting and design project to know existing problem from the user's point of view, to know current need and assume future need.

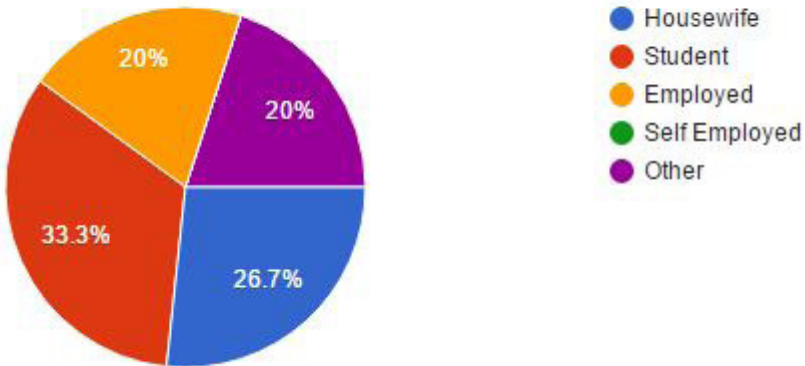
Gender (15 responses)



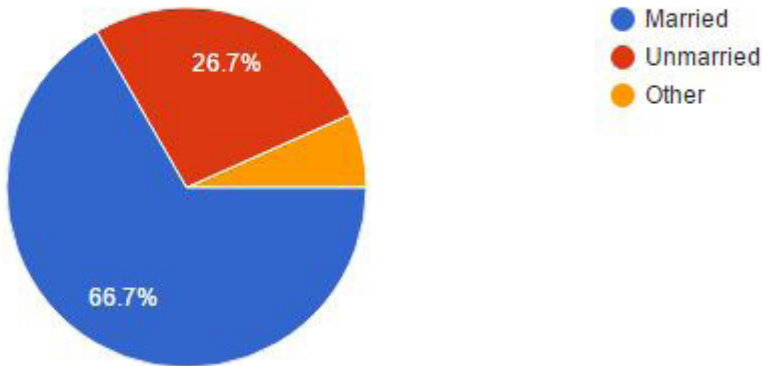
Age (15 responses)



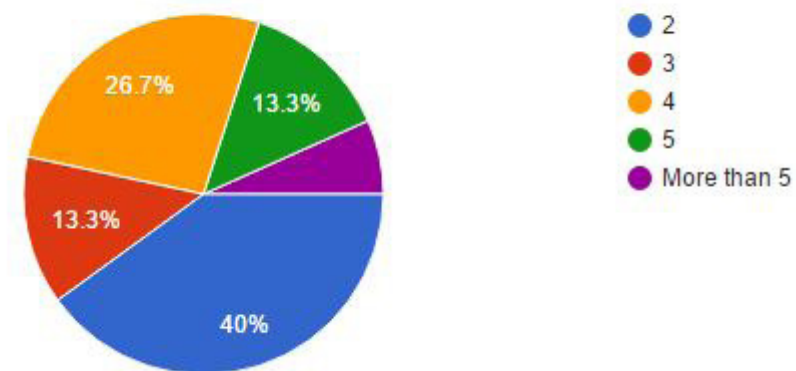
Occupation (15 responses)



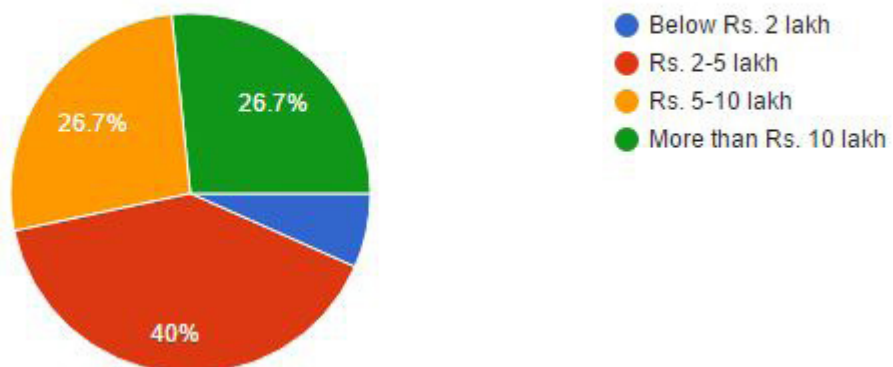
Marital Status (15 responses)



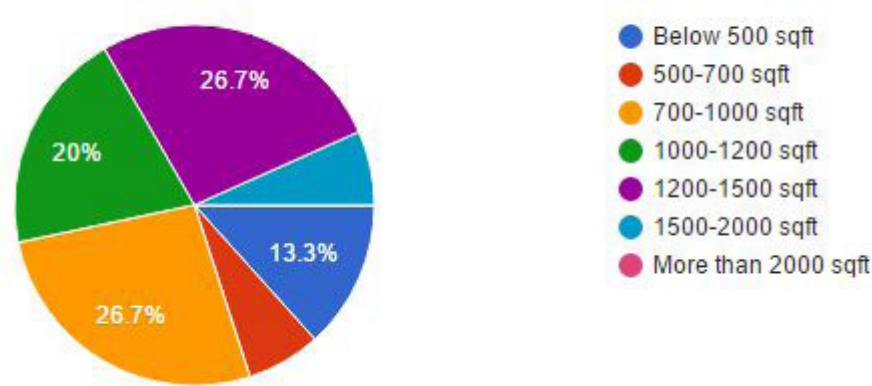
Number of Family Members (15 responses)



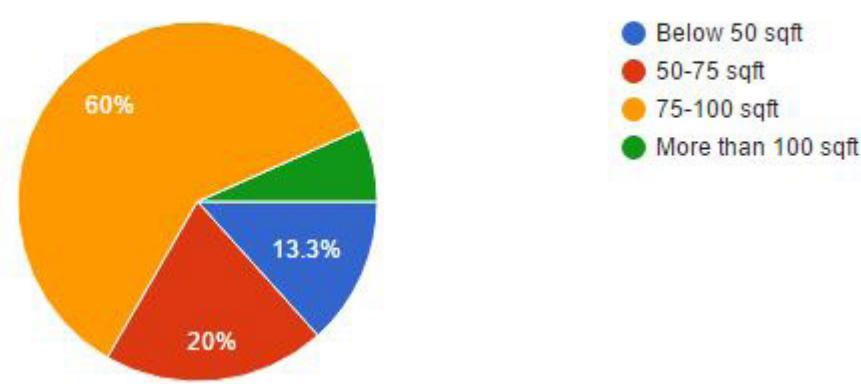
Annual Family Income (15 responses)



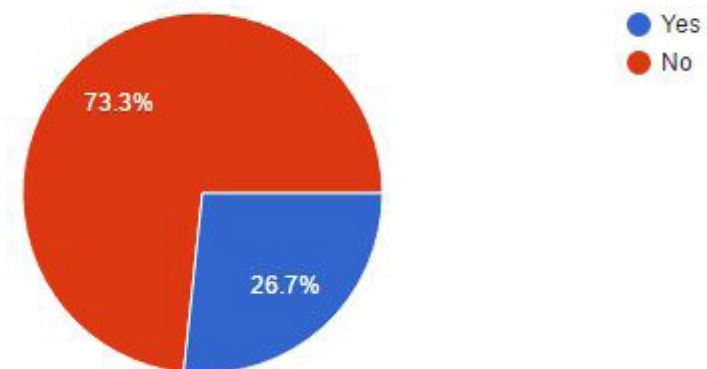
Floor Area of the house (15 responses)



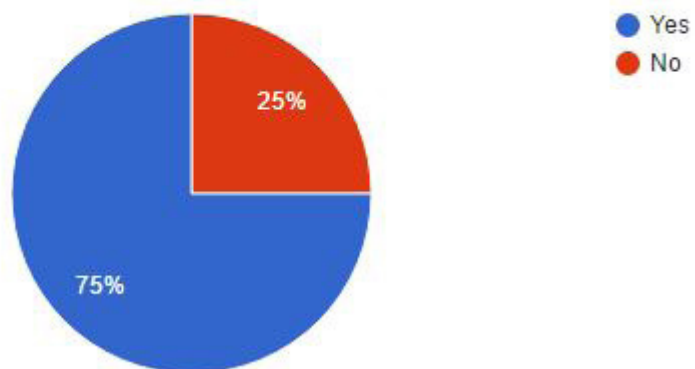
Floor Area of the Kitchen (15 responses)



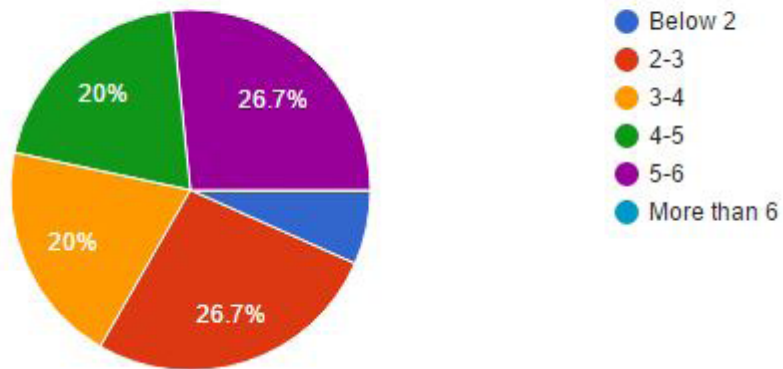
Is there any Open Kitchen (15 responses)



Smartphone User (12 responses)



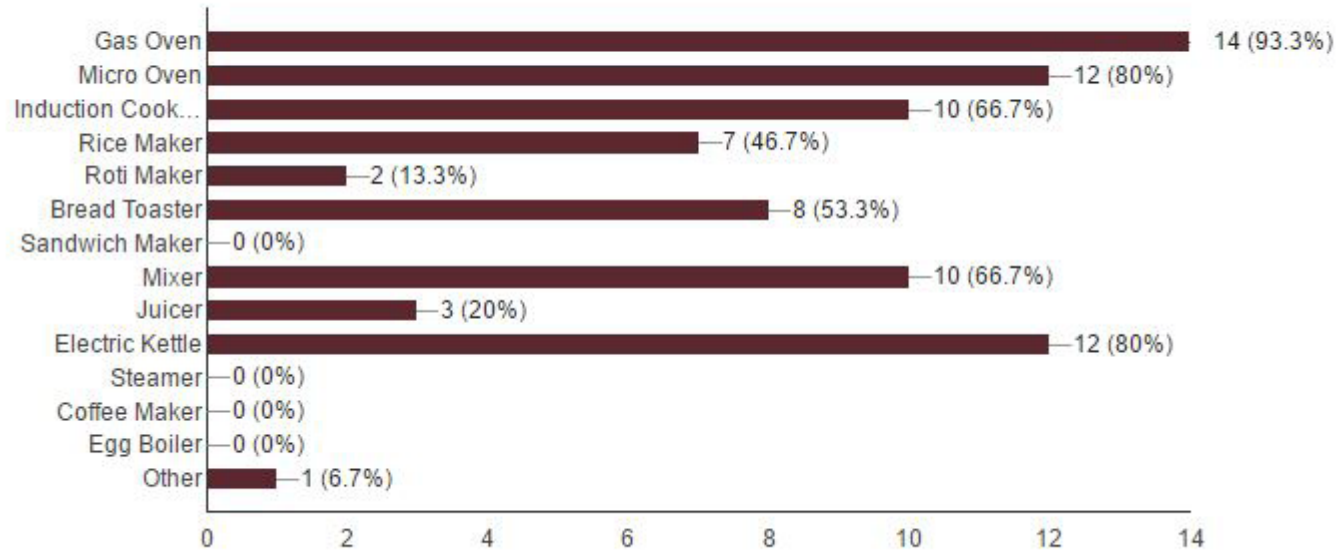
How many hours generally spend in kitchen in a day (15 responses)



Do you prefer Electronic Kitchen Gadgets (15 responses)



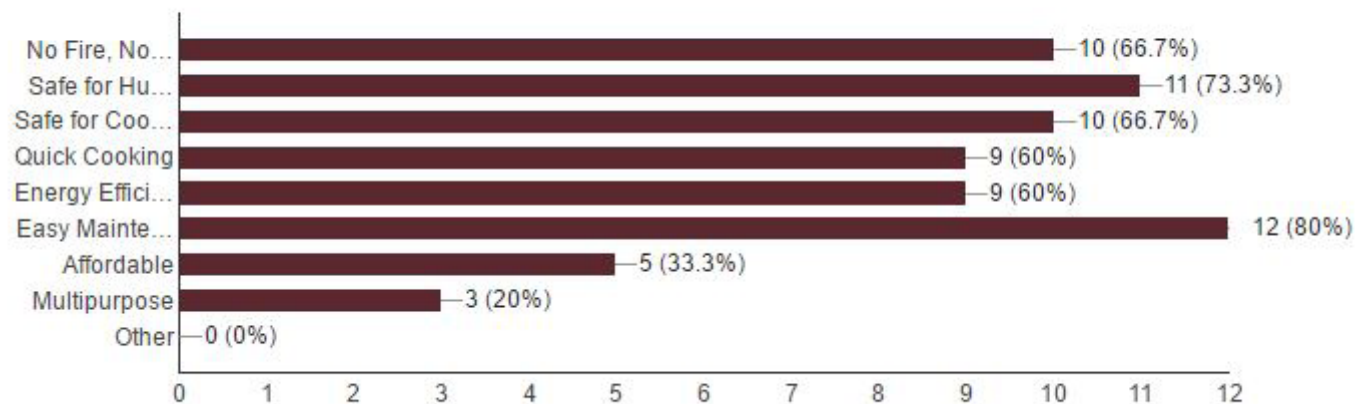
What are the cooking gadgets in your kitchen (15 responses)



Present Cooking Gadget after Gas Oven

Microwave Oven
 Electric Kettle
 Induction Cooktop
 Mixer
 Bread Toaster
 Rice Cooker
 Juicer
 Roti Maker
 Sandwich maker

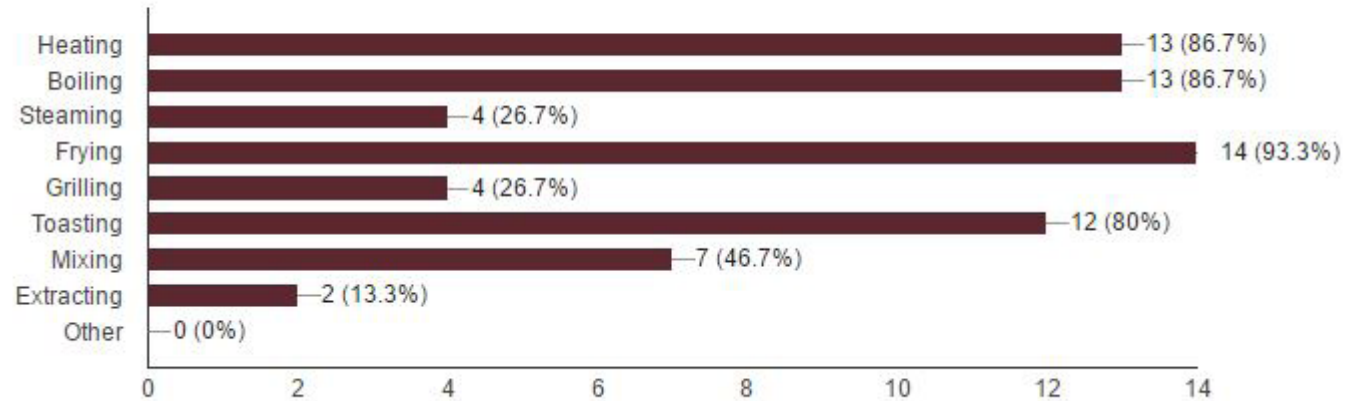
Reason for preferring Electronic Kitchen Gadgets (15 responses)



Preferred features

- Easy maintenance
- Safe for Human
- No fire, No Pollution
- Safe for cooking
- Quick cooking
- Energy efficiency
- Affordable
- Multipurpose

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



List of Cooking option preferences

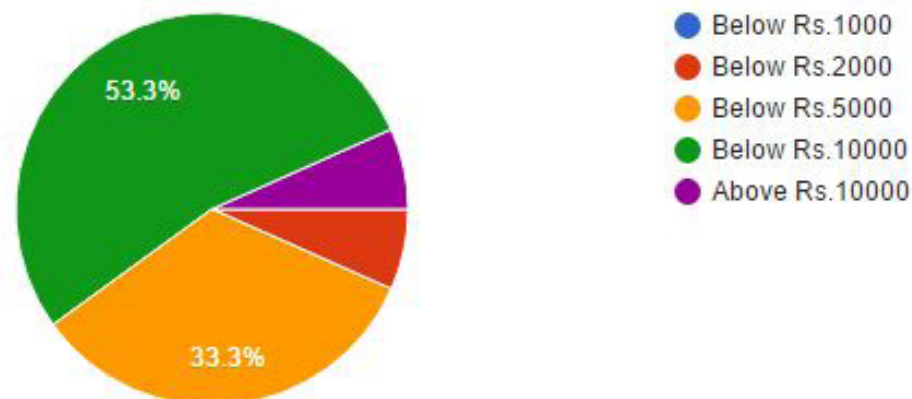
Frying
 Boiling
 Heating
 Toasting
 Mixing
 Steaming
 Grilling
 Extracting

What are the appliances you wish to be combined for better food making

(15 responses)

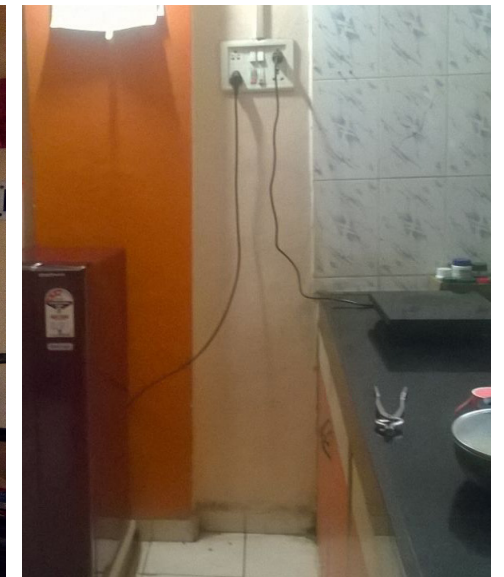
MICROWAVE OVEN -INDUCTION COOKER -TOASTER-ELECTRIC KETTLE
Gas oven, micro oven, electric kettle, induction cook top
Microwave Oven
Gas oven, Micro oven, Toaster, Mixie
Gas oven, Micro oven, Induction cooker
Gas oven, Micro oven, Induction
induction cooktop, toaster, rice cooker
induction, microwave oven,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

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



Kitchen photos of the users

Actual context scenario from real life photos



A modern kitchen interior featuring dark wood cabinetry, a stainless steel range hood, and a large island with a gas cooktop. The background shows a dining area with a large round mirror and potted plants.

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Analysis of Collected Data

Most demanding appliances to be combined

Microwave Oven
Induction Cooktop
Rice Cooker

Roti Maker
Bread Toaster
Electric Kettle
Mixer

Observations from User feedbacks

Microwave Oven

- (i) Sideway open front door of microwave oven reduces accessibility
- (ii) Load distribution of microwave oven is not uniform, concentrated at one side
- (iii) Turntable reduces the area of cooking, though there are lots of space inside which is totally unutilised
- (iv) 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
- (iv) People prefer smooth mechanical knob over press buttons
- (v) Non-uniform cooking and wastage of energy

Induction Cooktop

- (i) Press button is not preferred, because quick reducing of temperature is not possible
- (ii) Only one oven, slower cooking speed

Rice Cooker

- (i) The inner pan can be with non-stick coating
- (ii) The heating mechanism can be induction method to heat more effectively

Roti maker

- (i) Chapati become very hard after sometime, taste is not good



05

Persona

Persona

Persona is making representative of the focused group of users to be served. It is very essential to map their background to know touchpoints and accordingly it should reflect in the design process to come up with the desired solution, which can be easily accepted to the users.

Persona I



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

Type of people

Upper Middle Class

Urban context

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



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

Type of people

Upper Class

Urban context

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



06

SWOT analysis of this project

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

Weakness

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

Threats

Other competitive product after first launch of this type of product

Low cost solution by other company irrespective of product quality



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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

Design Brief

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.

Design Brief

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.

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.



Scope of Work

To assemble all the electronic kitchen devices into a single platform or device which will cater most of the necessary functions to fulfill maximum user needs.

For that the process should be followed is given below:

- (i) Detail study of the mechanism of each device
- (ii) Detail study of the parts and assembly process
- (iii) Abstracting common & optional parts
- (iv) Research for new technologies and materials
- (v) Repositioning different items
- (vi) Assembling in a single device with accessories
- (vii) Incorporating User Experience Factors & Safety issues
- (viii) Concept generating for the Product Form
- (ix) Making (& Testing) the actual product considering aesthetics according current market trend
- (x) Further addition of values through different attributes

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, in India much more – Rs.6000+

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

Elite
BY MAXI-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

■

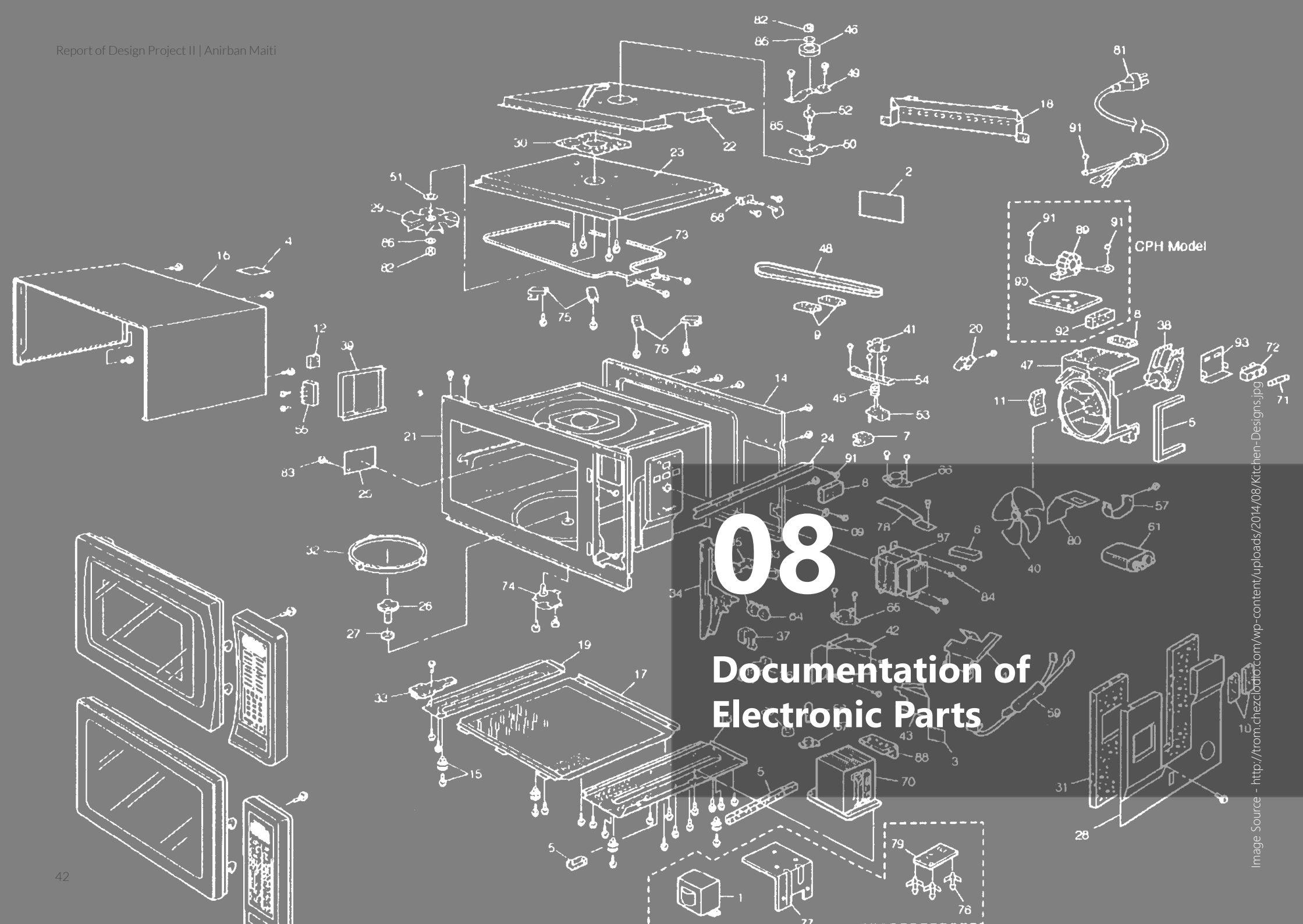
Griddle
6-inch diameter frying griddle
Uses energy and heat
from toaster oven

Perfect for frying eggs and
other breakfast foods



Timings	Food Items	Device needed	
		Primary	Secondary (optional)
Breakfast Tiffin	Bread Toast	Toaster	Microwave Oven
	Pao Bhaji	Induction Cooktop	
	Egg Toast	Induction Cooktop	
	Sandwich (grilled)	Sandwich maker	Microwave Oven
	Boiled Egg	Egg Boiler	Electric Kettle, Induction Cooktop
	Omlet, Anda bhurji	Induction Cooktop	
	Chapati/Roti	Roti maker	Induction Cooktop
	Plain paratha/ Aloo paratha	Steamer, Induction Cooktop	
	Puri bhaji	Induction Cooktop	
	Egg/Chicken/Mutton Roll	Induction Cooktop	
	Maggi/Noodles	Induction Cooktop, Steamer	
	Dosa	Mixer/Grinder, Induction Cooktop	
	Idli	Idli maker, Mixer/Grinder	Steamer (with mould)
	Dal vada	Mixer/Grinder, Induction Cooktop	
	Momos	Steamer	
	Coffee	Coffee maker	Induction Cooktop
	Tea	Electric Kettle	Induction Cooktop
	Cake	Microwave Oven	
	Pop corn		Induction Cooktop
	Fruit Juice	Juicer	
Lunch Dinner	Rice	Rice maker	Induction Cooktop
	Fried Rice	Rice maker	Induction Cooktop
	Biryani	Rice maker	Induction Cooktop
	French fries	Induction Cooktop	
	Dal	Induction Cooktop	
	Vegetables	Steamer	Induction Cooktop
	Egg Curry	Microwave Oven	Induction Cooktop
	Fish Fry/Curry	Induction Cooktop	Microwave Oven
	Chicken items	Microwave Oven	Induction Cooktop
	Mutton items	Microwave Oven	Induction Cooktop
	Pizza	Microwave Oven	Induction Cooktop

Commonly used Electronic Kitchen Appliances for Indian Foods



List of Electronic Parts

Parts from Microwave Oven & space needed

- (i) Magnetron – 75mmx75mmx40mm
- (ii) Capacitor – 100mmx 50mmx25mm
- (iii) Diode – 20 dia x 100mm
- (iv) Transformer – 100mmx80mmx100mm
- (v) Cooling Fan – 125mm diax25mm
- (vi) Microwave antenna & waveguide
- (vii) Turntable and metal shield box
- (viii) Electric Circuit – 75mmx75mmx125mm
- (ix) Control panel

Parts from Induction Cooktop with dimensions

- (i) Insulated Gate Bipolar Transistor (IGBT)-150x75 mm
- (ii) Central Processing Unit – 150mm x 75mm
- (iii) Inductors(coil with heat sensor) - 150mm dia
- (iv) Cookware sensor – 35mm dia
- (v) Cooling Fan – 120mm dia
- (vi) Electric Circuit & control panel – 210x45mm

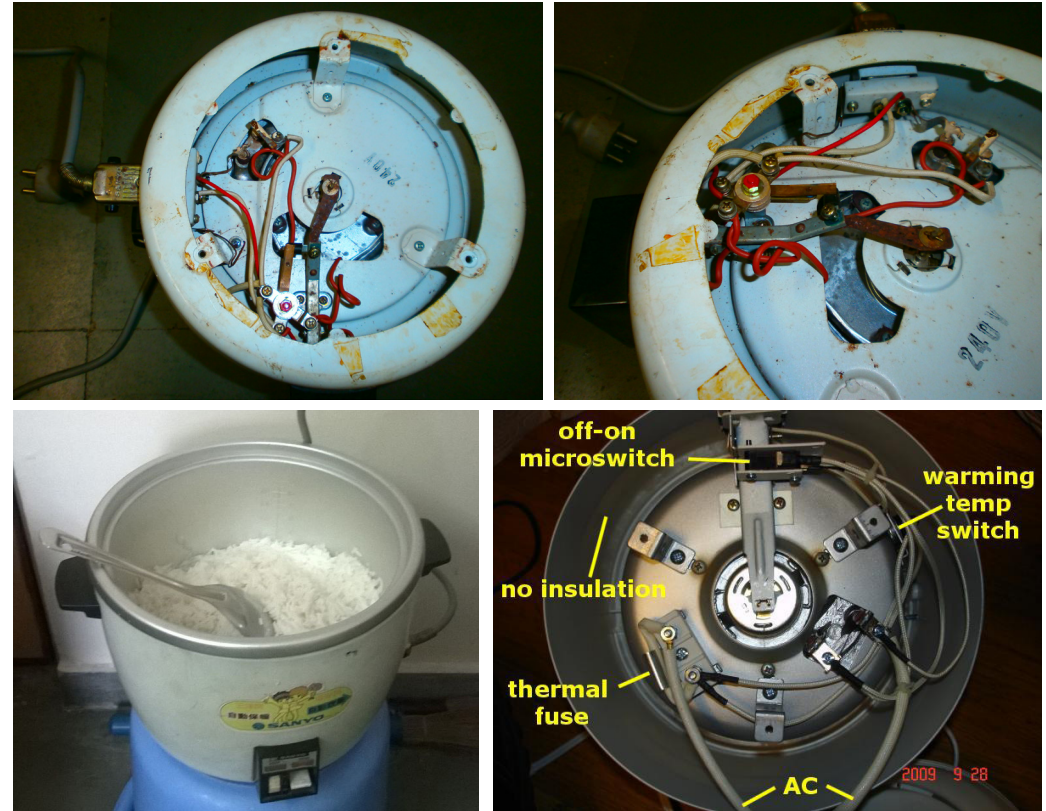


List of Electronic Parts

Parts from Rice Cooker

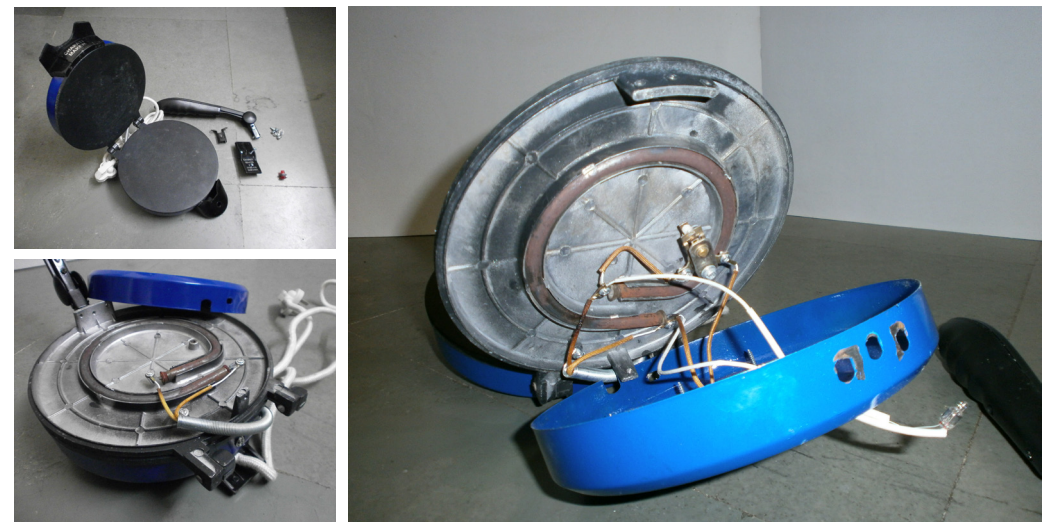
- (i) Thermocouple – thermal sensing device
- (ii) Electric Heating plate
- (iii) Inner Cooking Pan
- (iv) Electric Circuit & control panel

for electrical parts overall space needed 75mm x dia of rice cooker

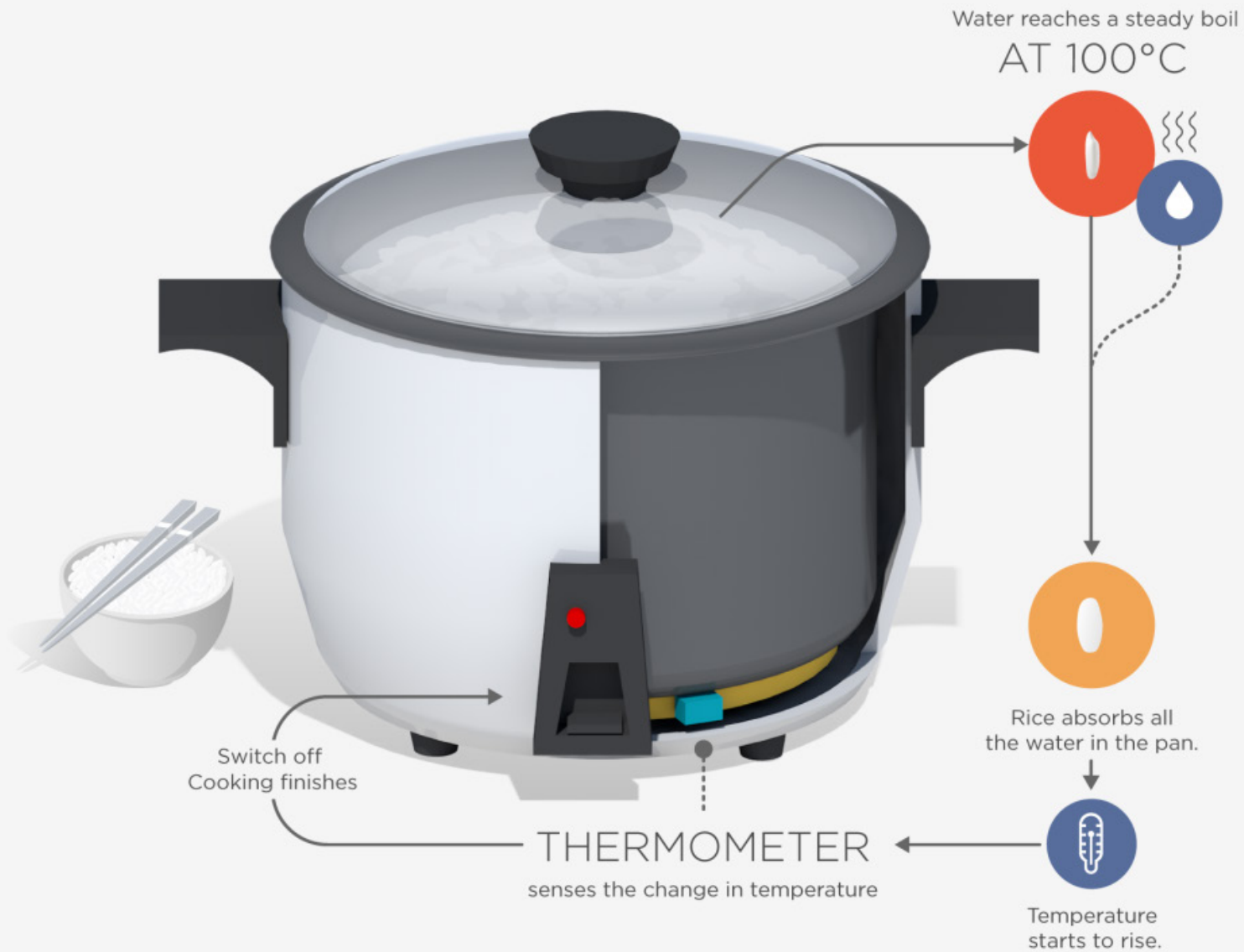


Parts from Roti Maker

- (i) 2nos. of Heater (125mm dia)
- (ii) 2nos. of Heating Plate (200mm dia)



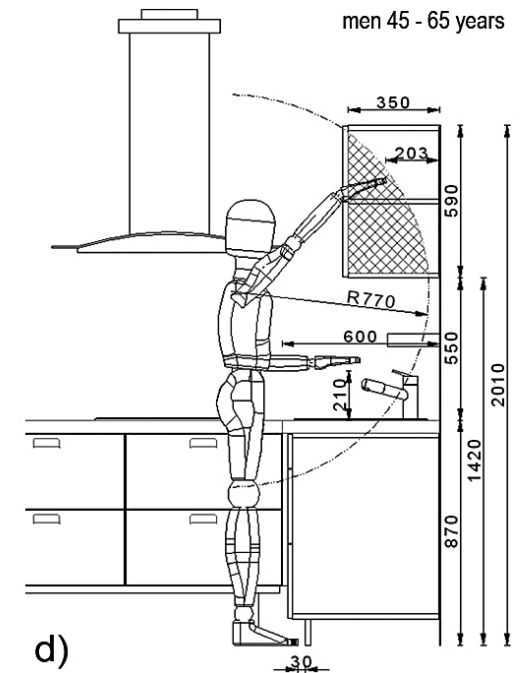
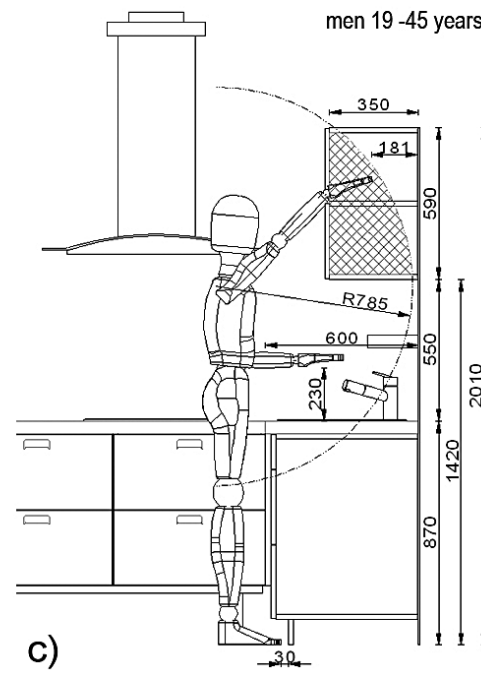
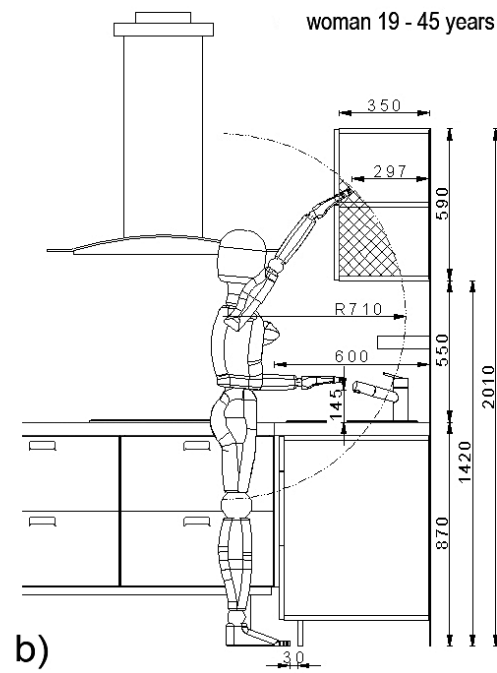
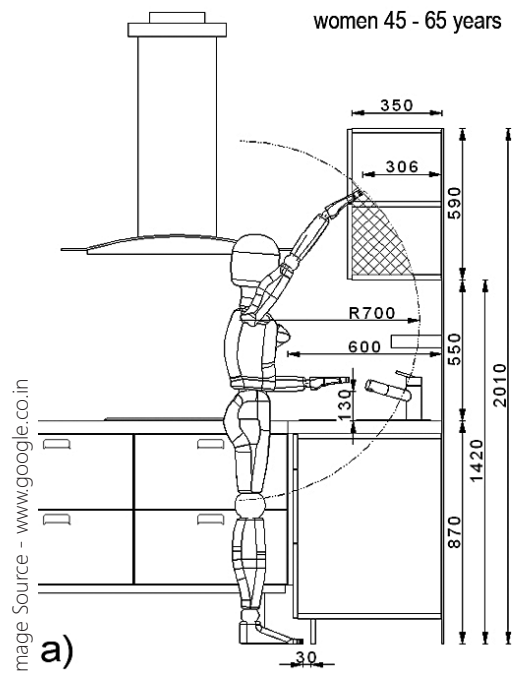
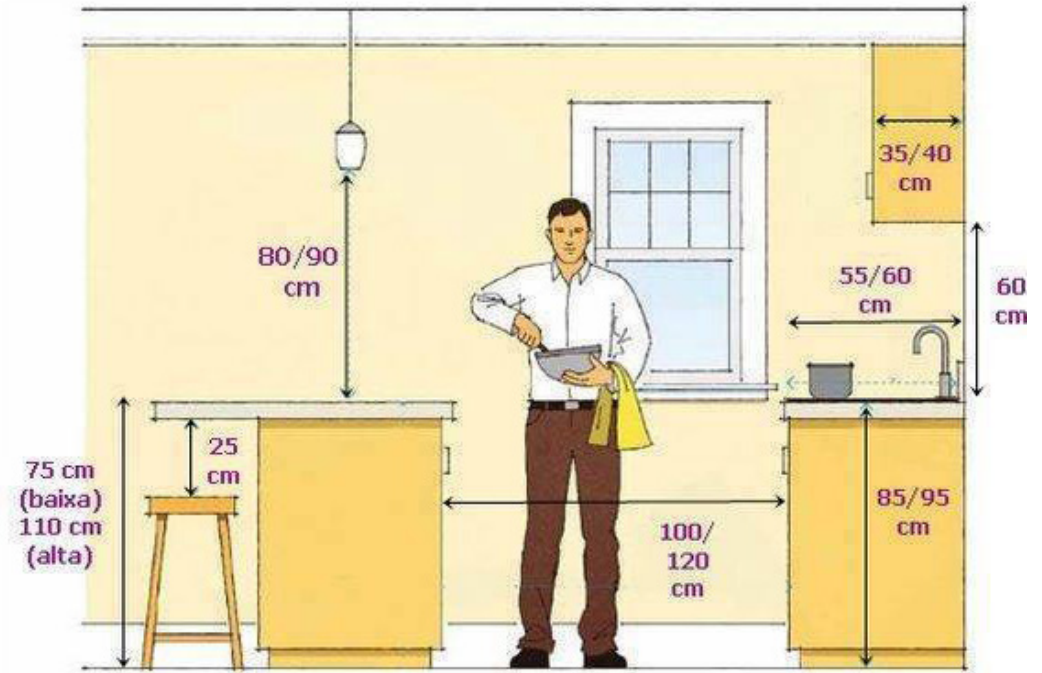
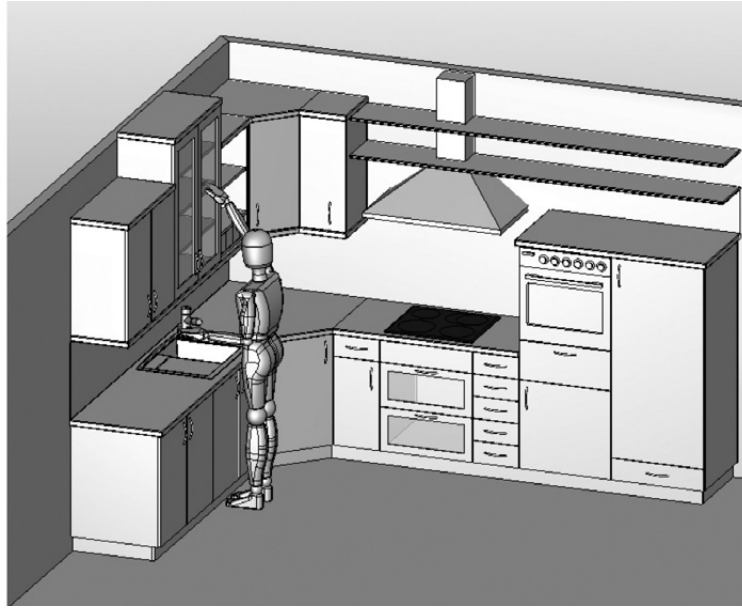
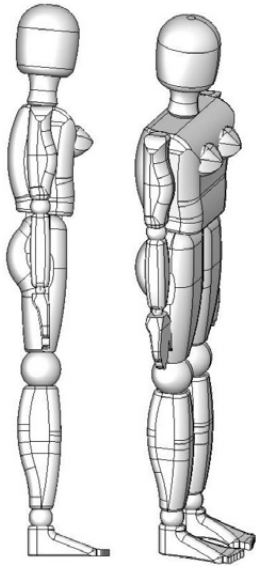
HOW A RICE COOKER WORKS

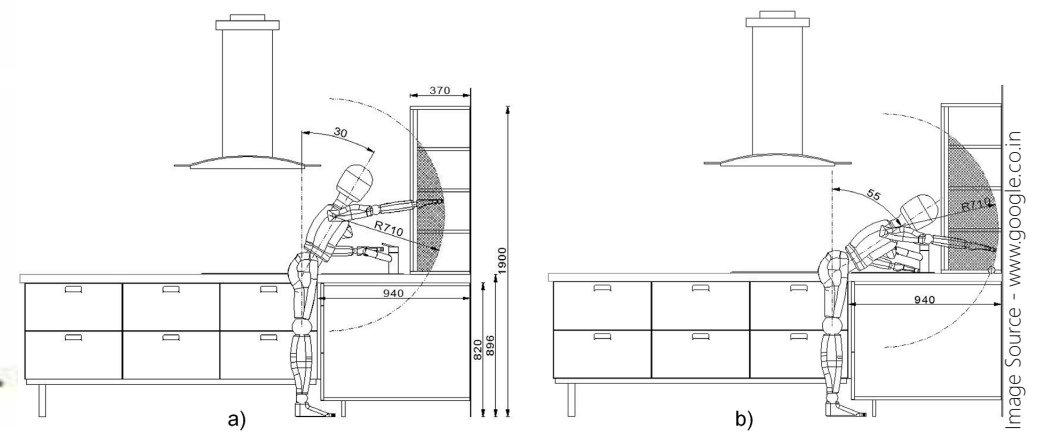
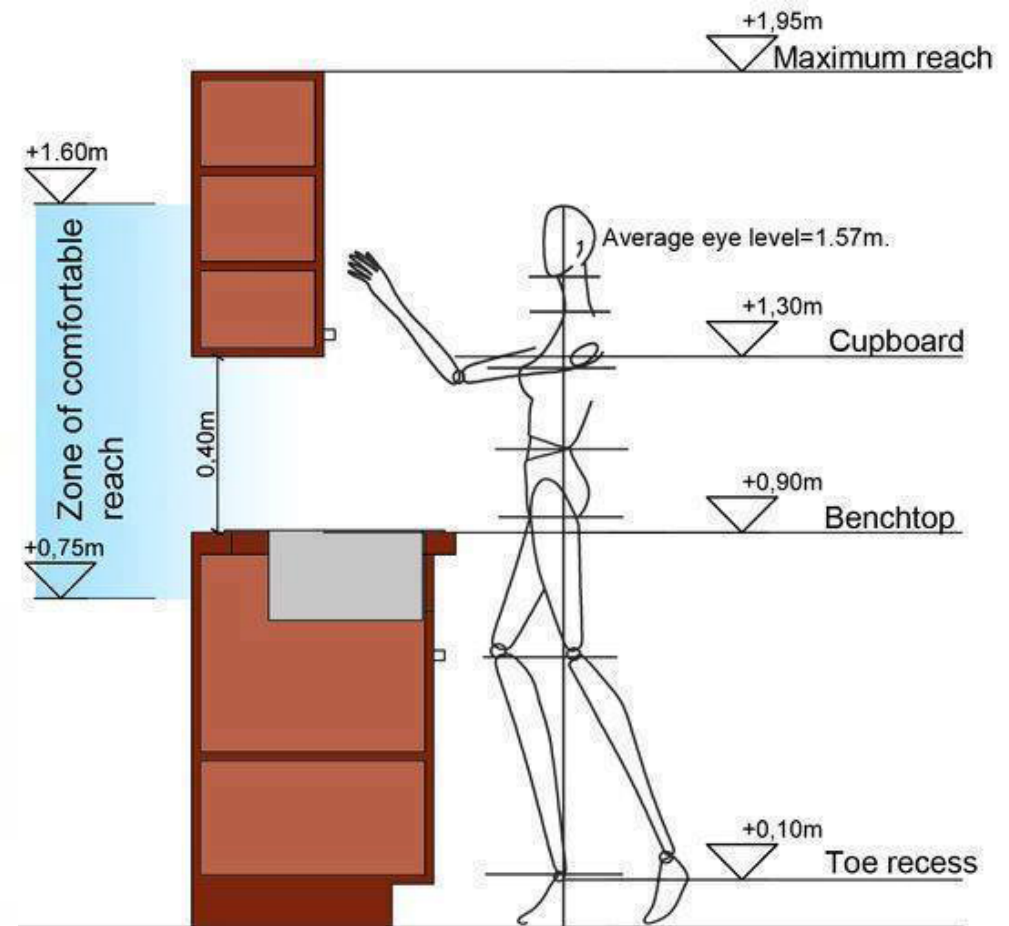
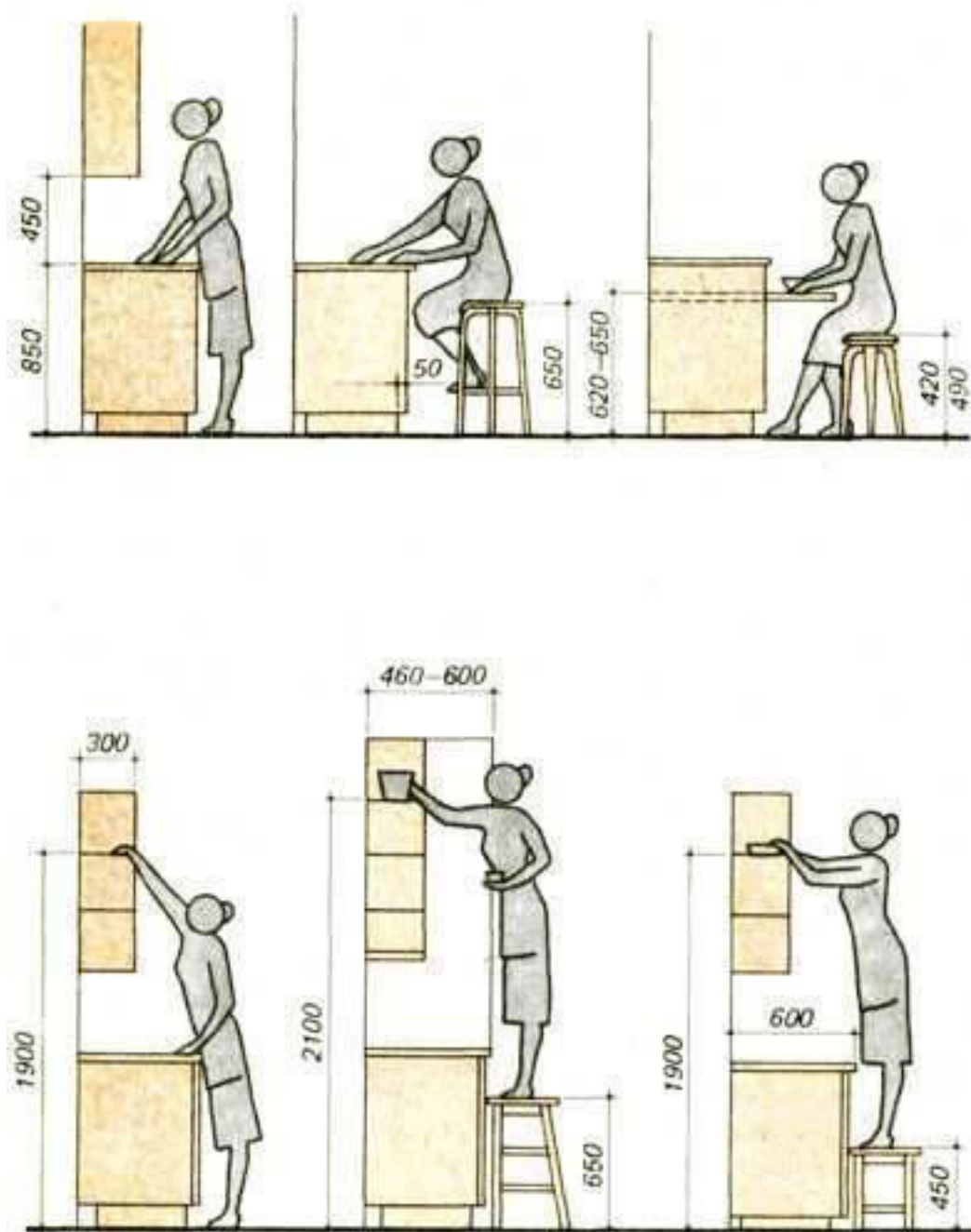




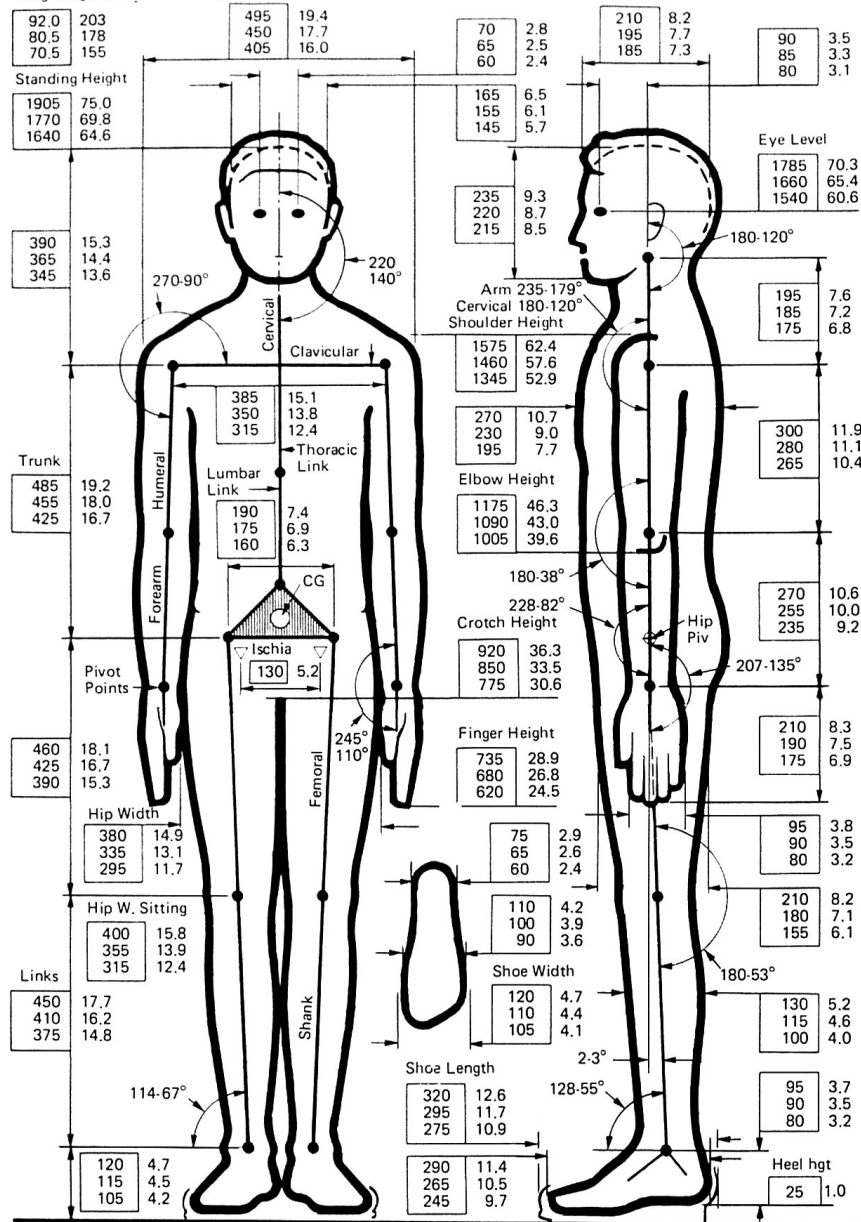
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Anthropometric Study





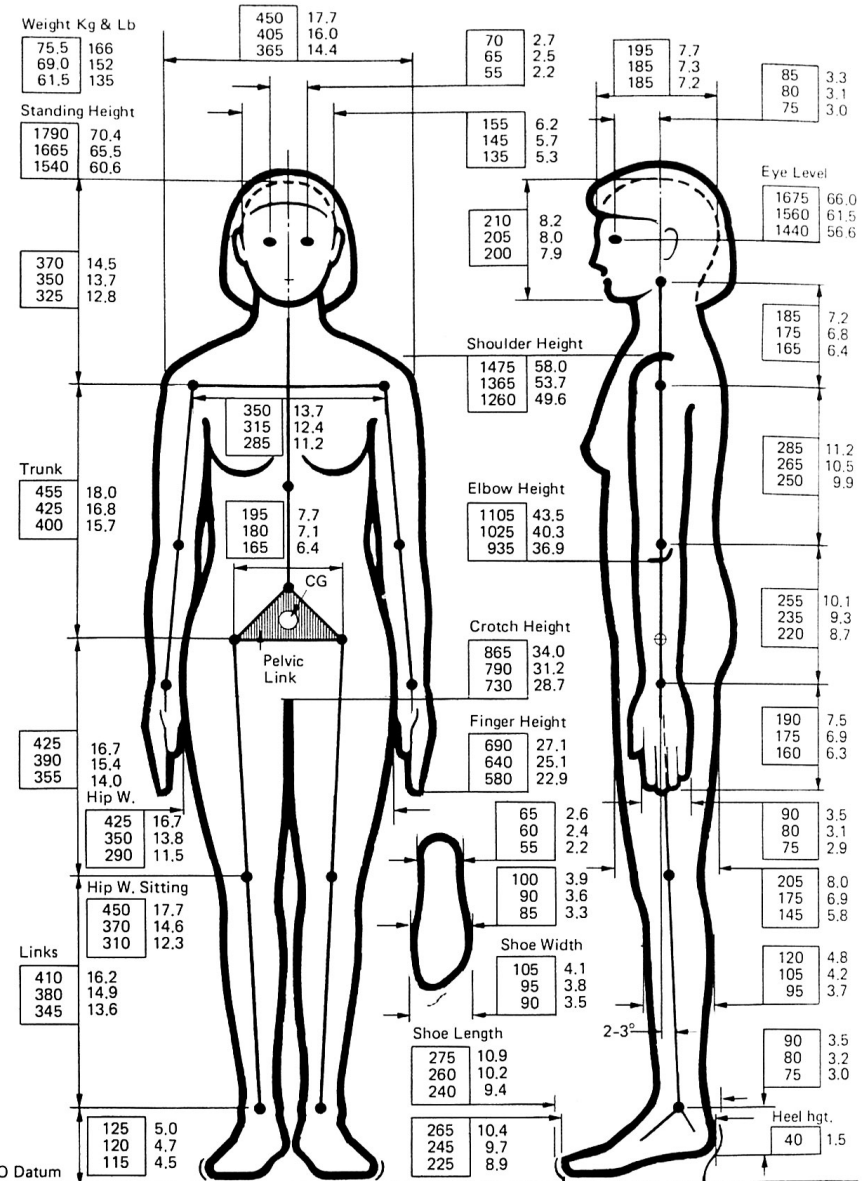
Weight Kg & Lb (Includes Avg. Clothes). Data Are For Load Computations, Not Health Purposes.



Male and female standing heights (including shoes):

1905	75.0	1790	70.4 large = 97.5 percentile	includes 95% U.S. adults.
1775	69.8	1665	65.5 average = 50 percentile	
1640	64.6	1540	60.6 small = 2.5 percentile	

Standing Slump Can Be 30 1.2 For Men Or Women. C.G. Is Within Pelvic Link.

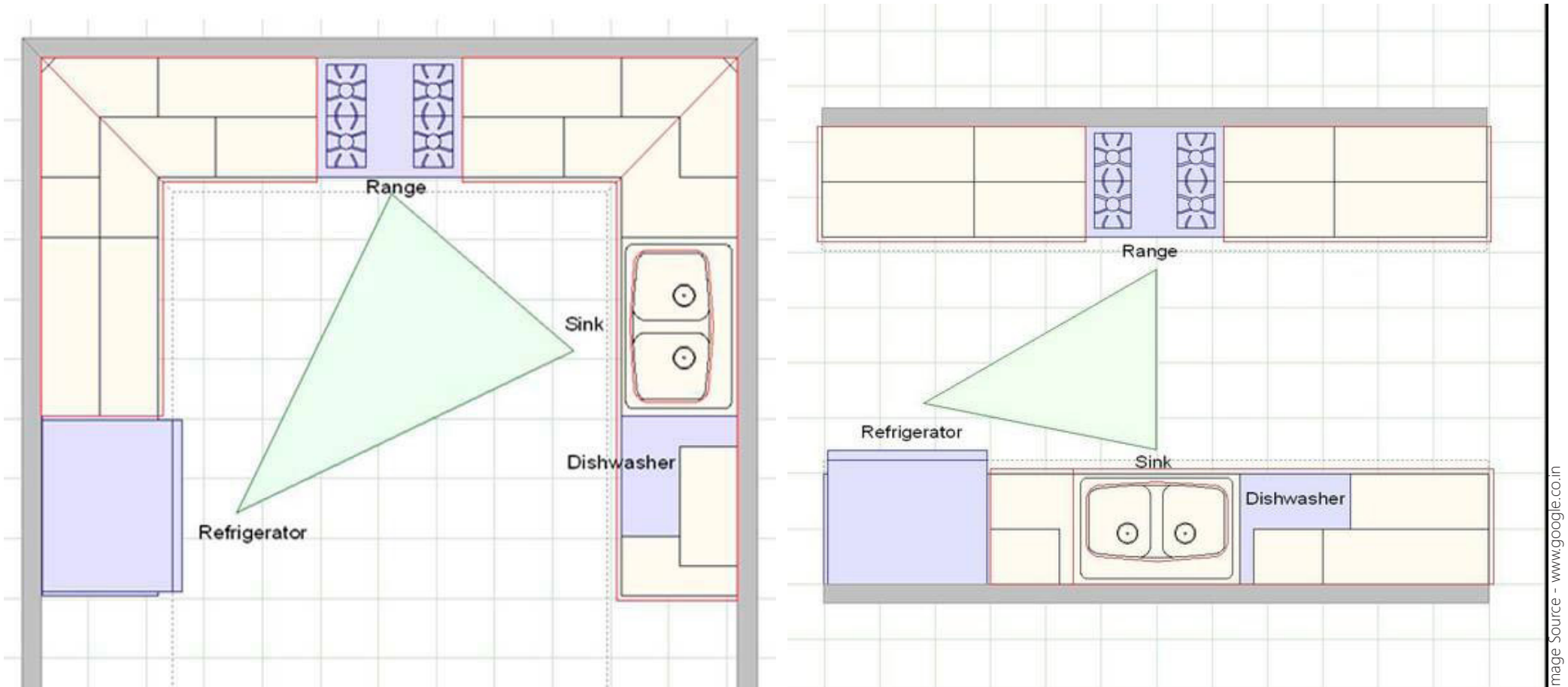


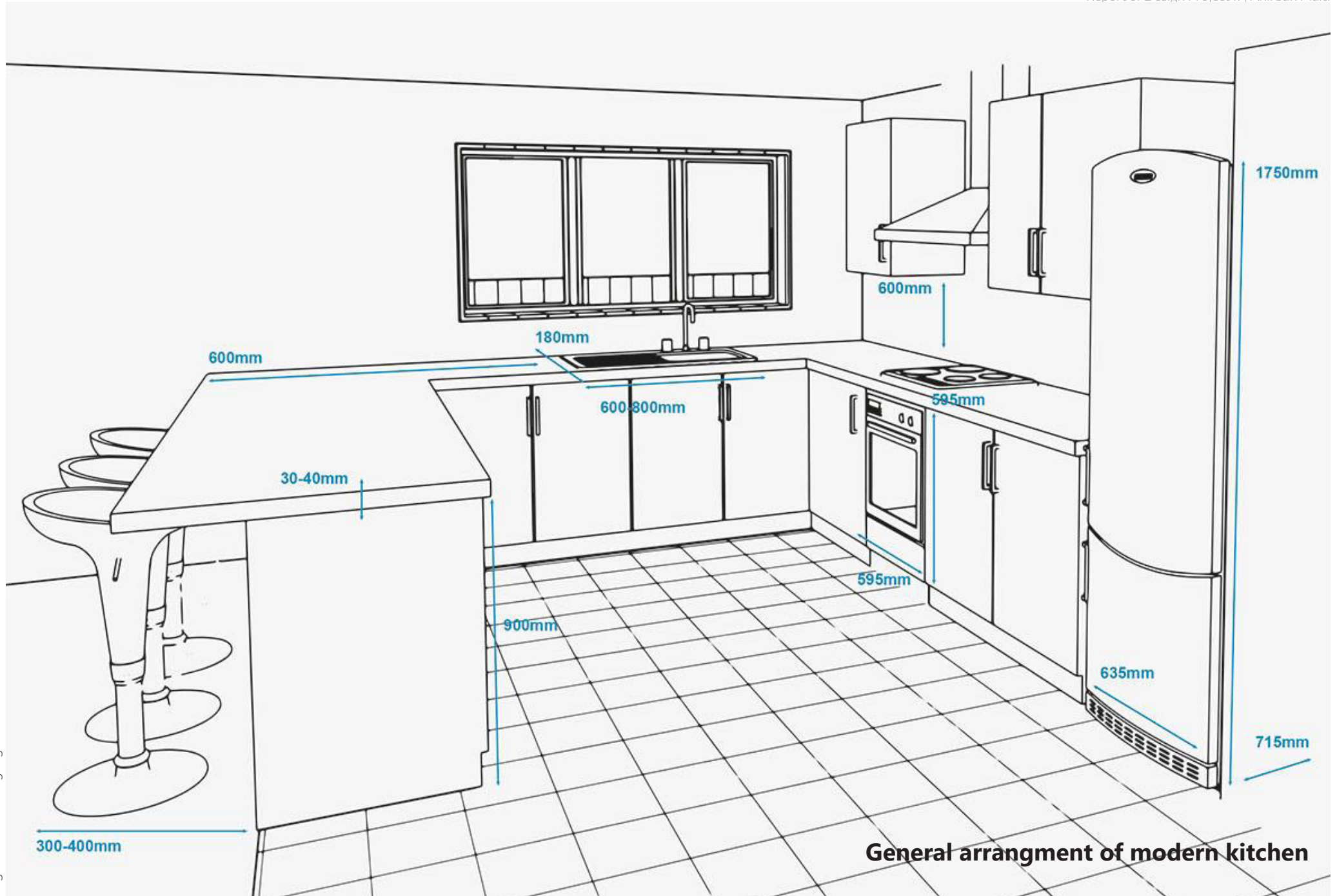
Dimensional notation system:

1000	39.3	Numbers appearing in boxes are measurements in millimeters. Numbers outside boxes are measurements in inches.
100	3.9	
25.4	1.0	

General arrangement of modern kitchen

It is very important to know modern kitchen arrangement and what is work flow of the cook, which can also be designed ergonomically to give for comfortability.





General arrangement of modern kitchen

Inferences 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.

A magnifying glass is positioned over a document, focusing on the word "patent". The word is in a large, bold, black serif font. Above it, the text "area under son" and "policeman or social we" is visible. Below it, the text "document granting the e" and "an invention protected" is visible. The magnifying glass has a black frame and a silver handle.

patent

10

Patents & Papers Study

1. Intelligent Electric Kettle

Name of the Inventor: Wing Chung Li

Patent No : US 20110259871 A1

Publication Date : 27 October 2011

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

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

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: ???

Patent No: CN201267410Y Publication Date: 08 July 2009

7. Multifunctional Kitchenware Frame

Name of the inventor: ??

Patent No: CN201469103U

Publication Date: 19 May 2010

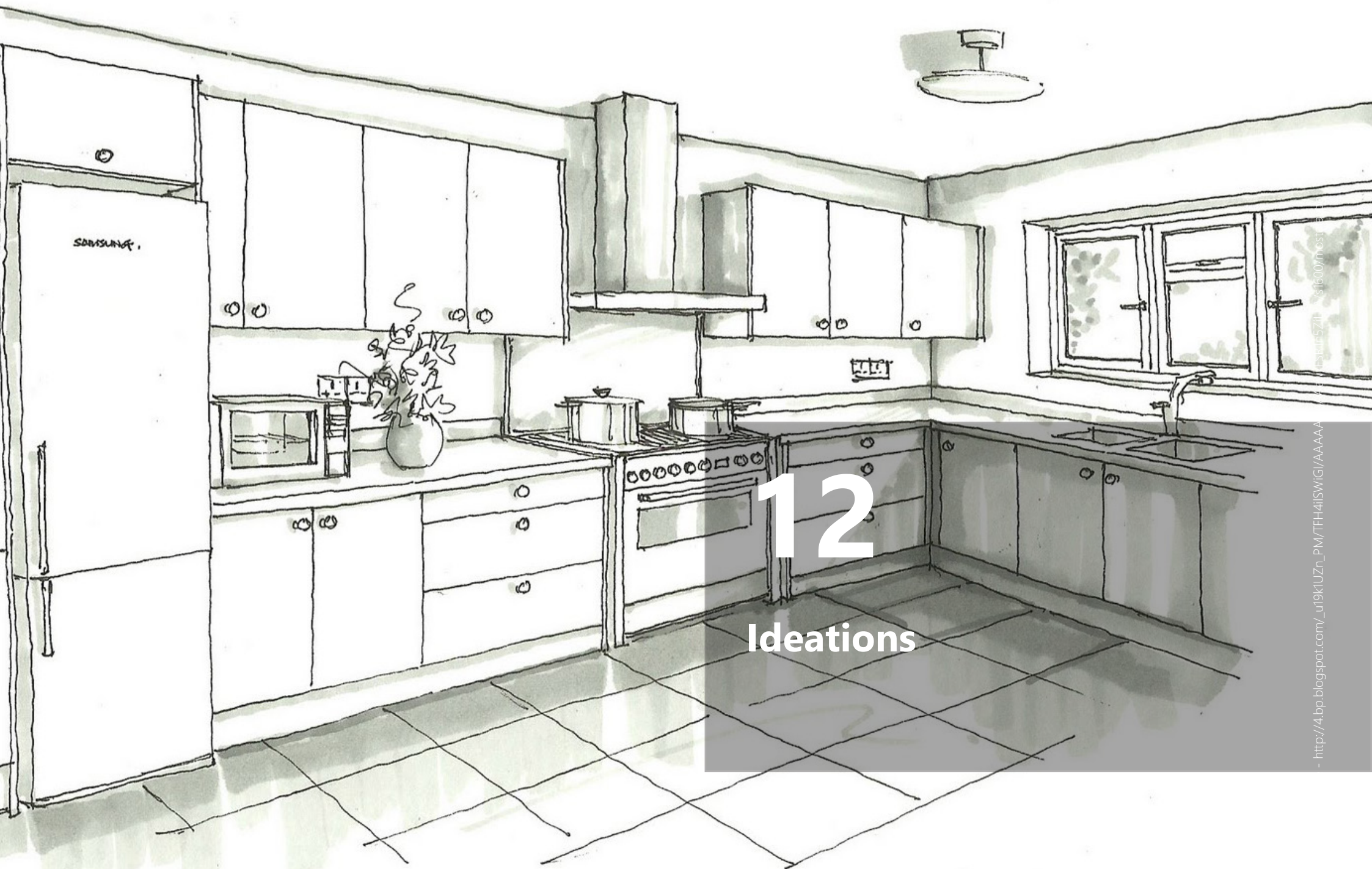


11

**Technological Interventions
for the new design**

New Technological Interventions

1. Flatbed Design with position and change in mechanism of microwave antenna to spread uniformly
2. Smart User Interface with appropriate balance between mechanical and electronics part to make it more affordable
3. Two nos of Induction Cooktop to give a feel of gas oven
4. Easy accessibility to open the door and load food inside
5. Digital Childlock System
6. Internet of Things, Remote Control from Smartphone



12

Ideations

Image Board for Microwave Oven



Image Board for Induction Cooktop

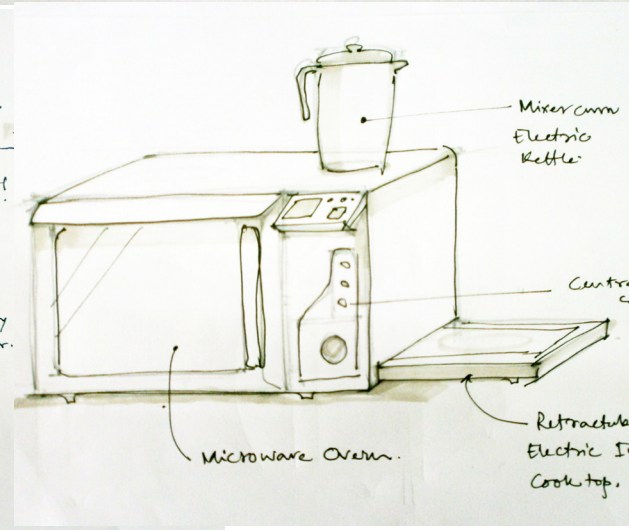
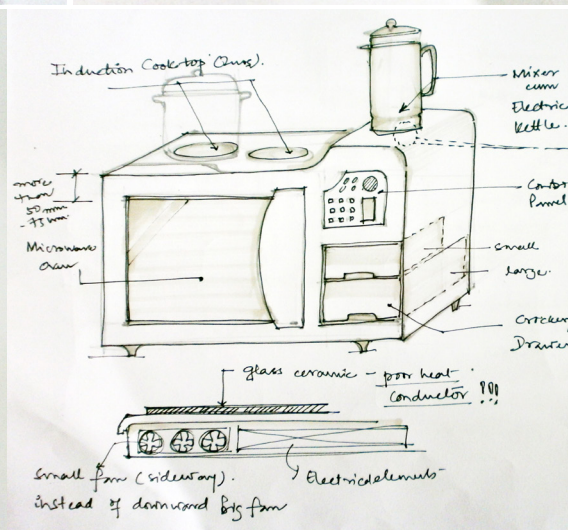
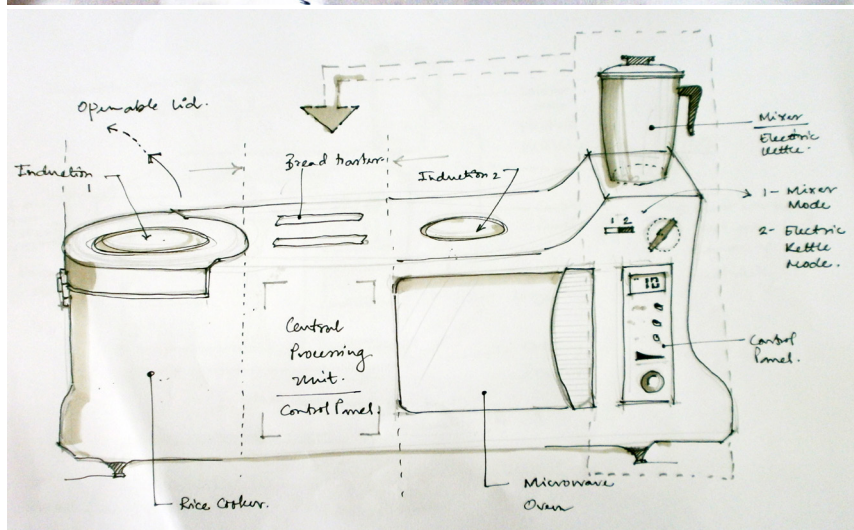
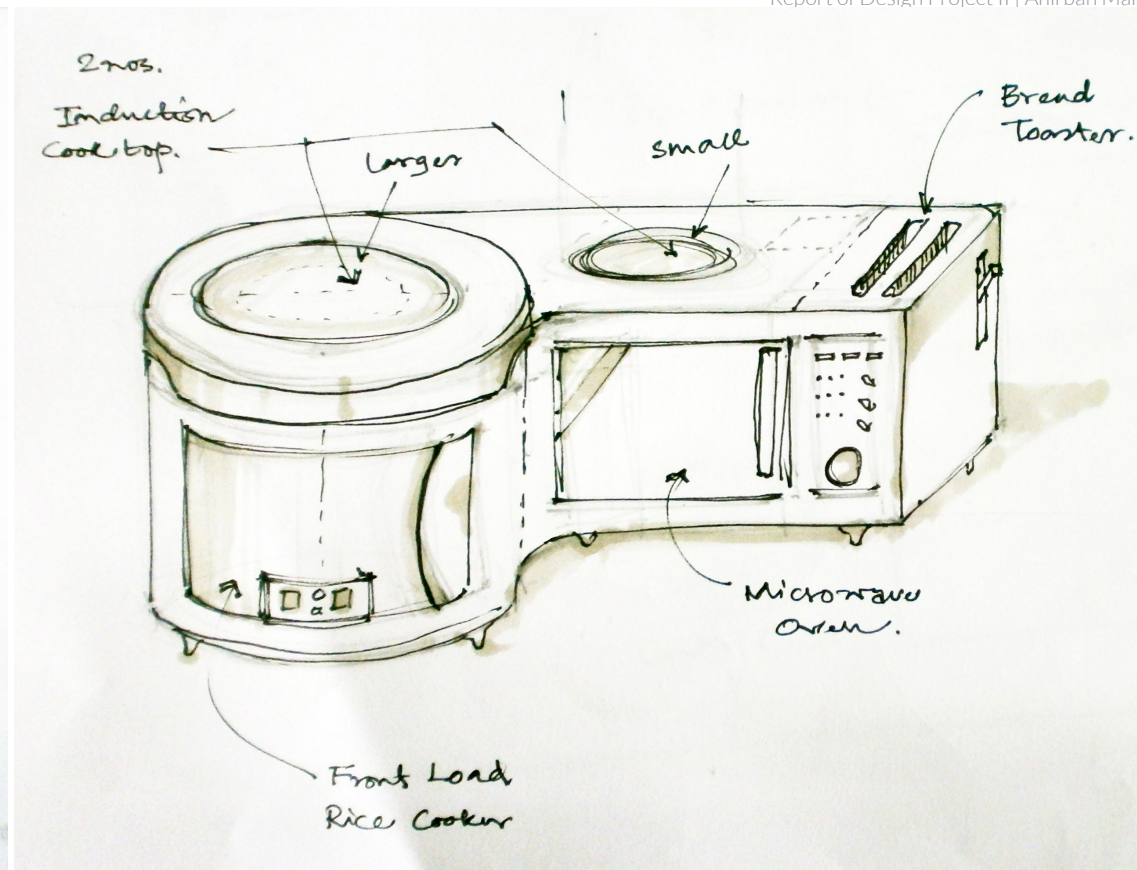
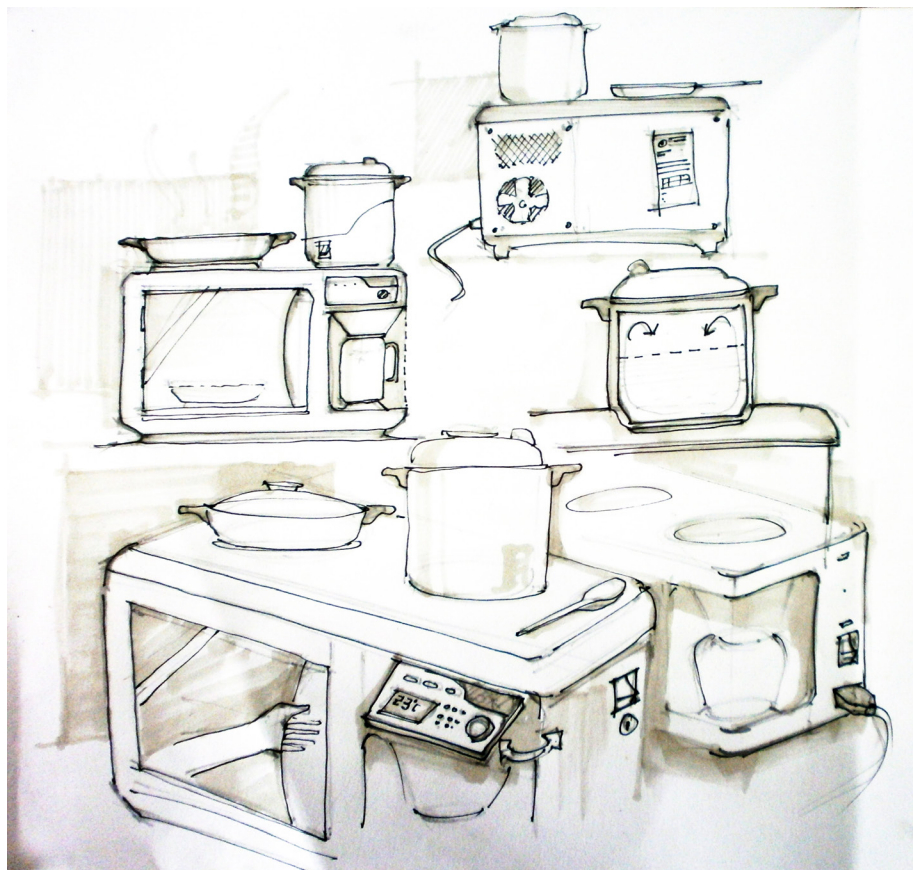


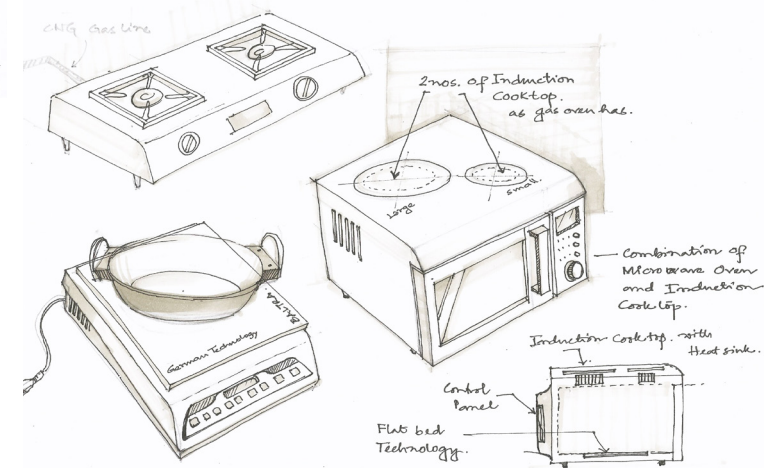
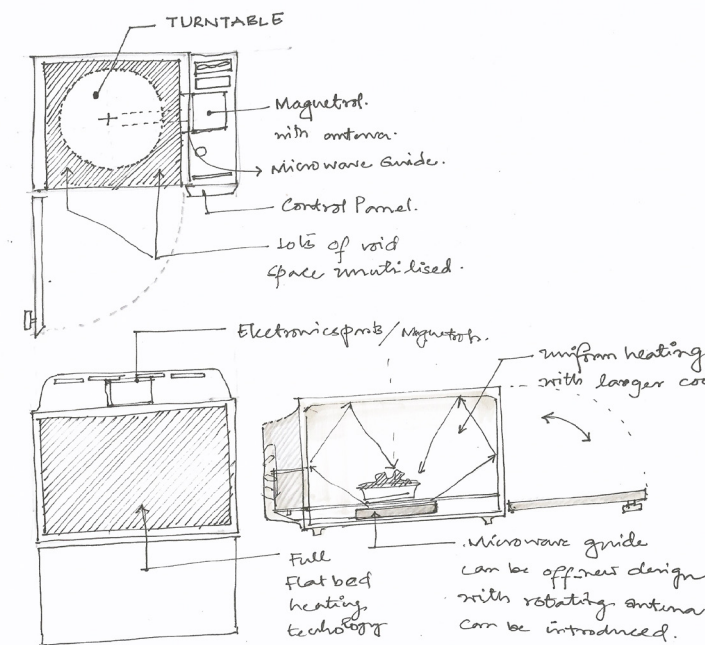
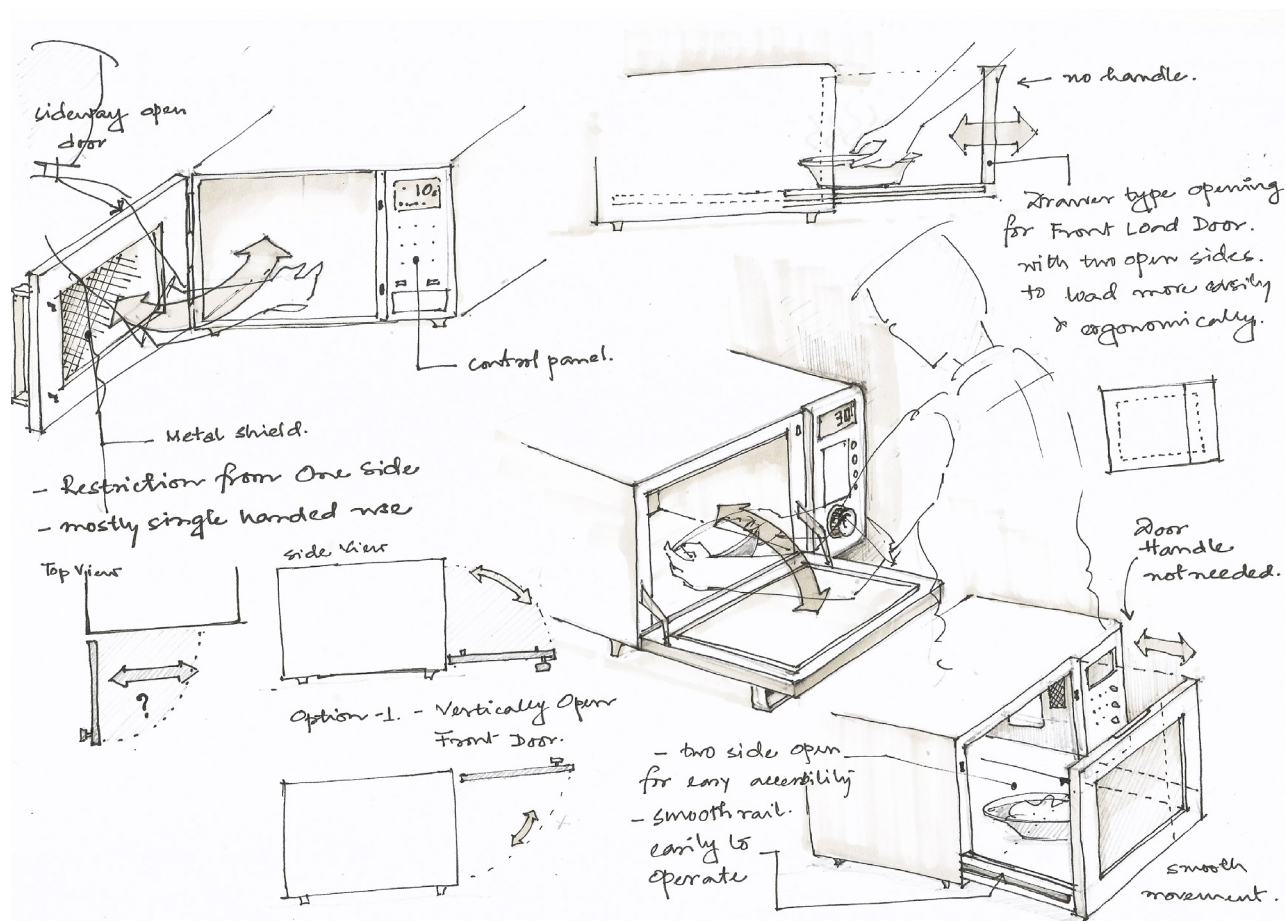
Image Board for Rice Cooker



Colour Pallate for Kitchen Interior and Kitchen Appliances

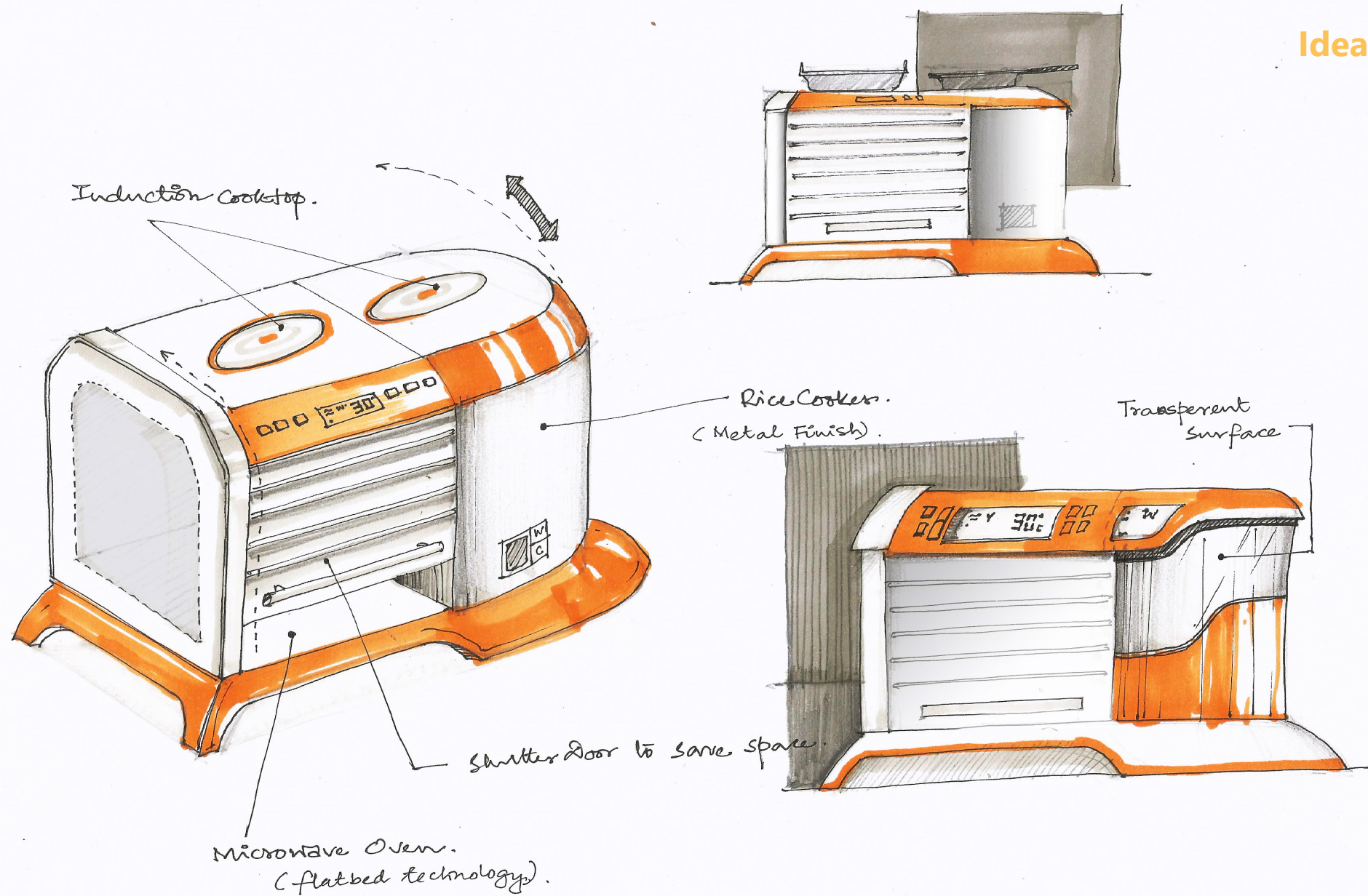




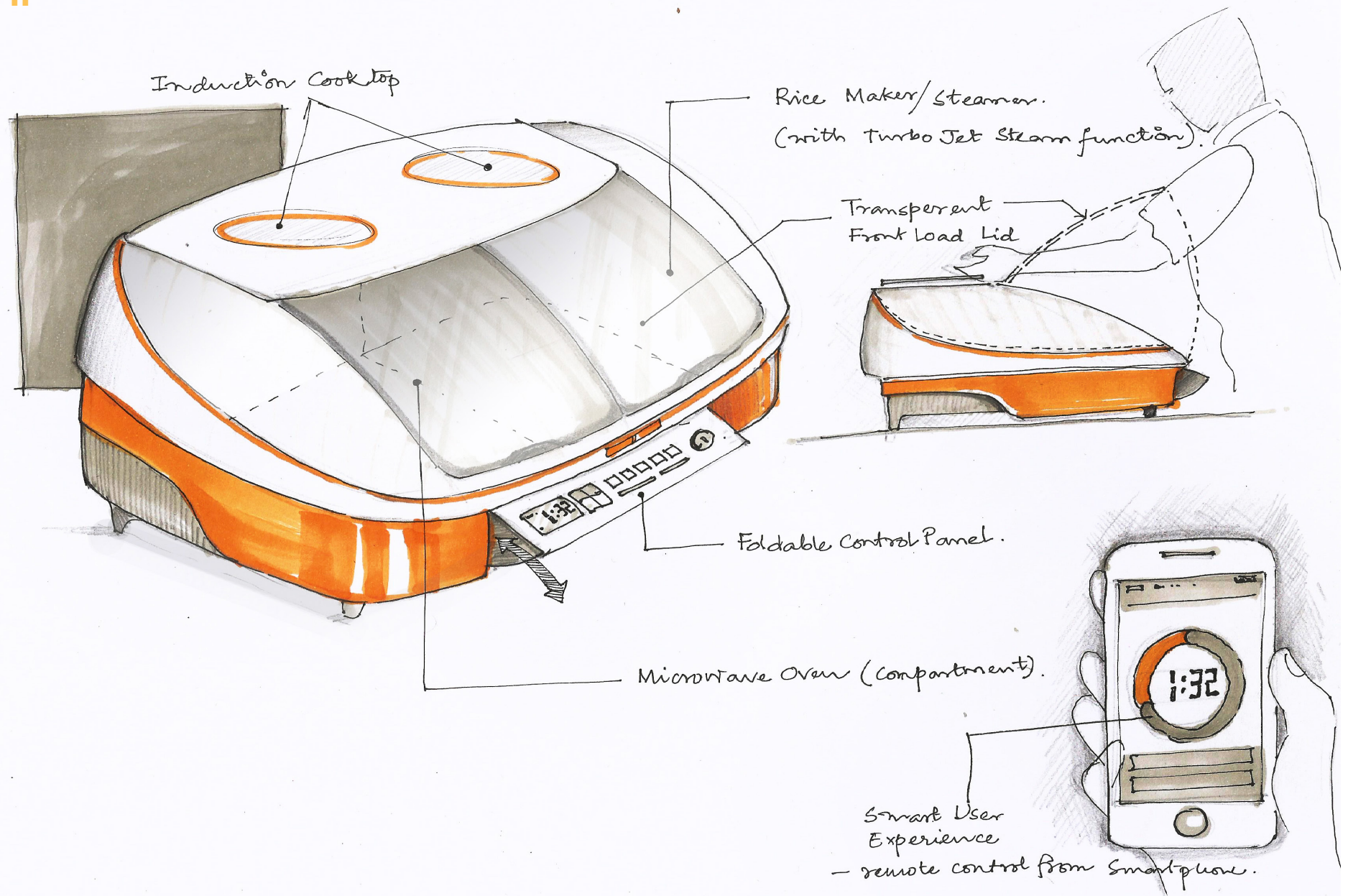


Preliminary Ideations

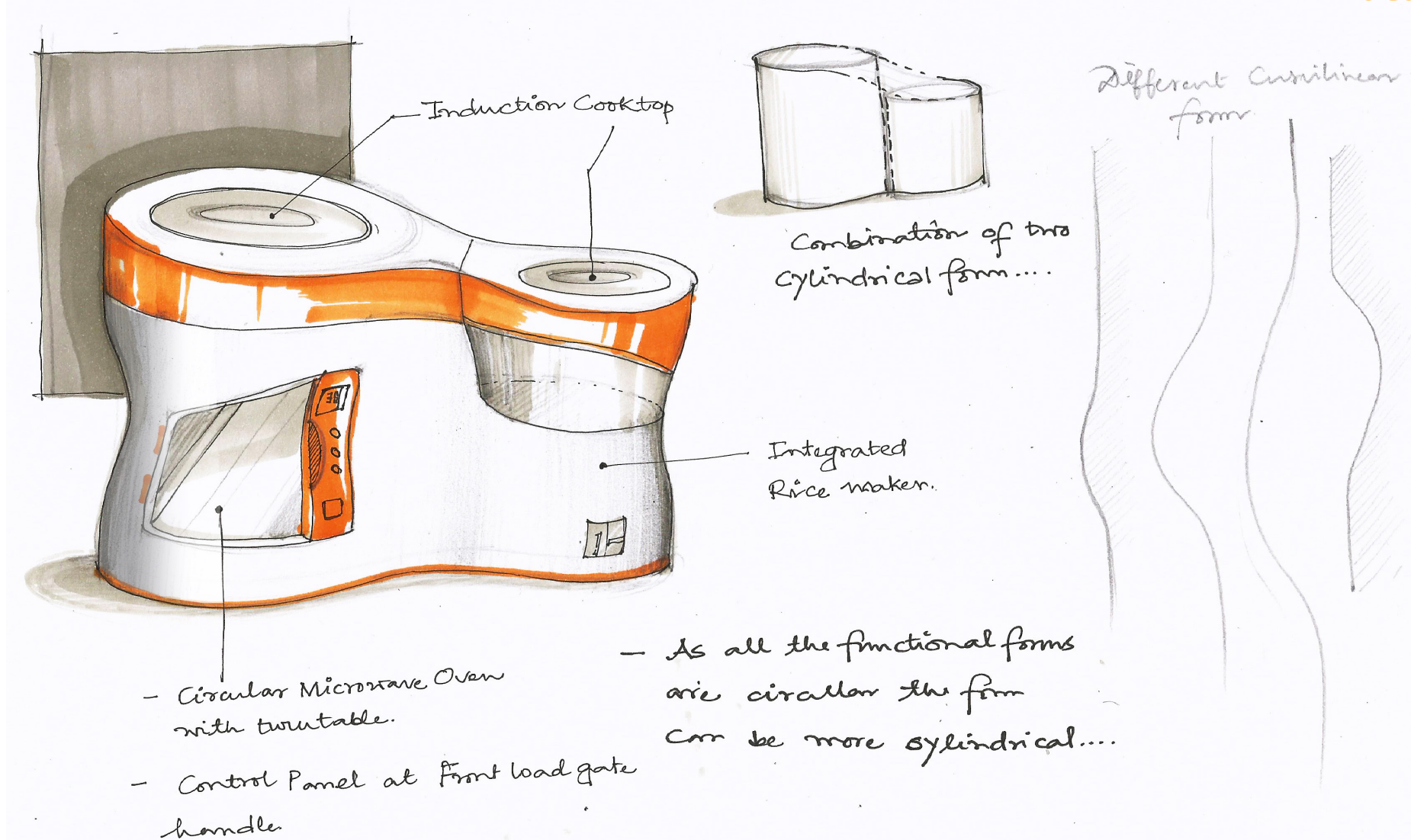
Ideation I



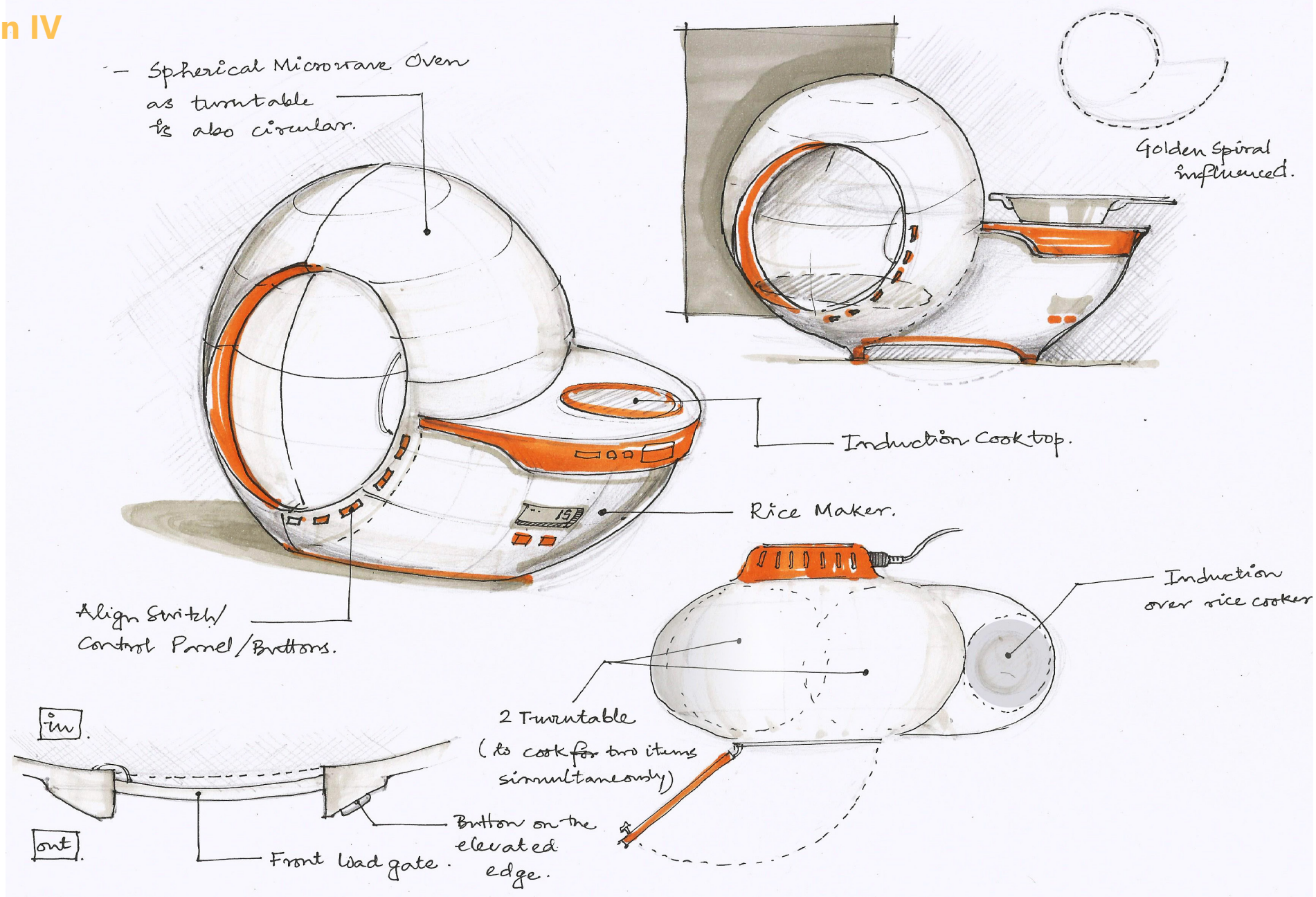
Ideation II



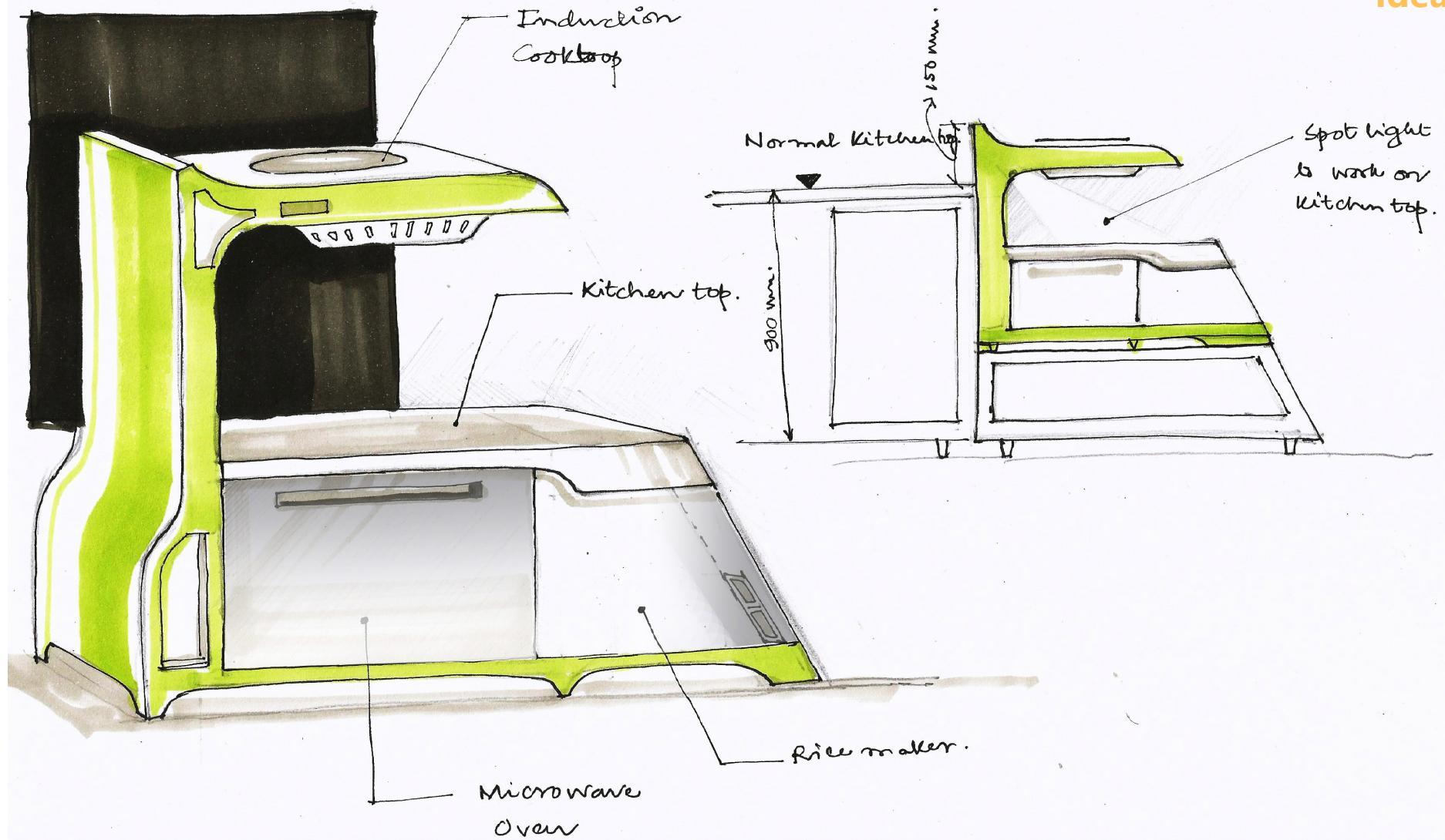
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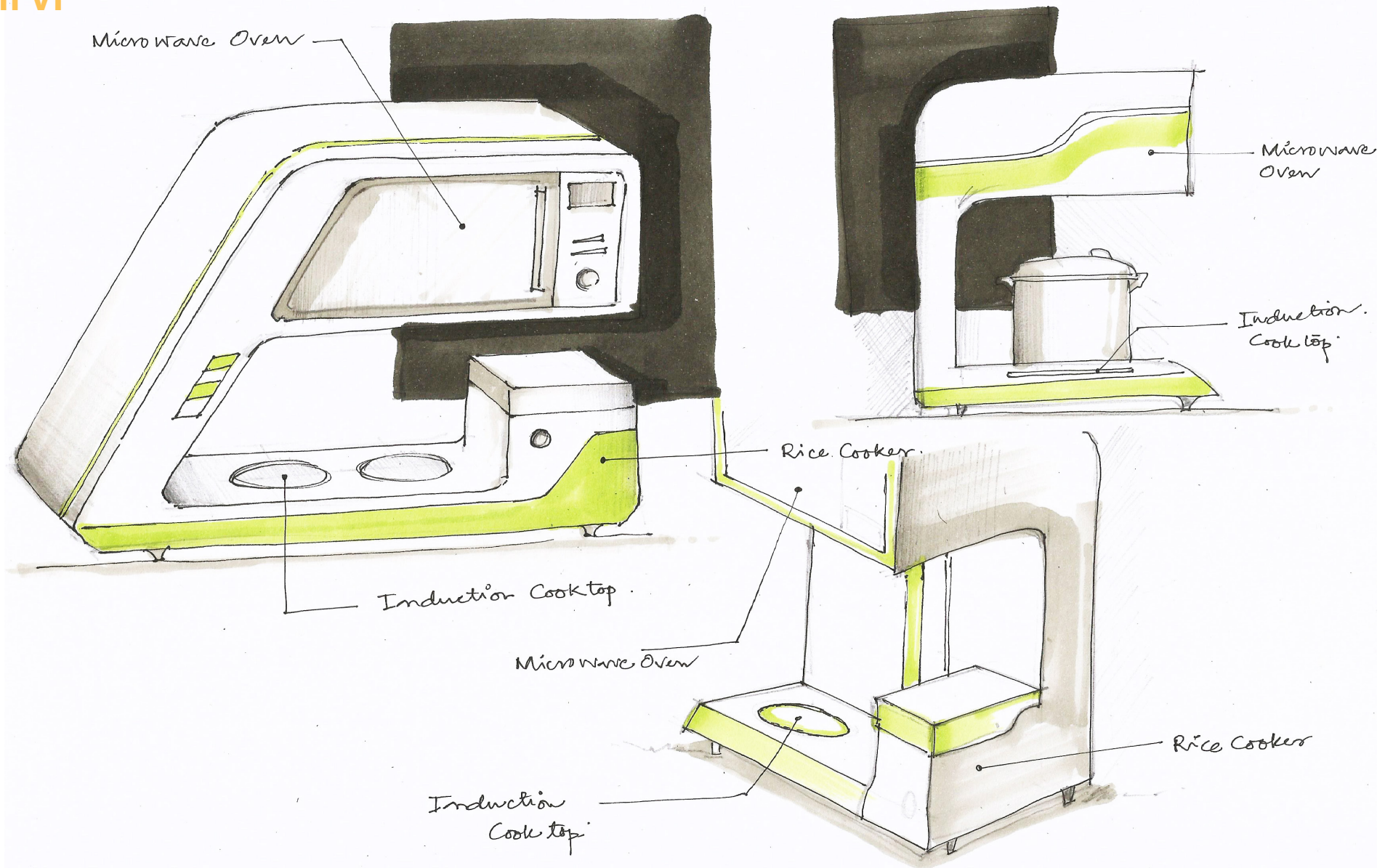
Ideation IV



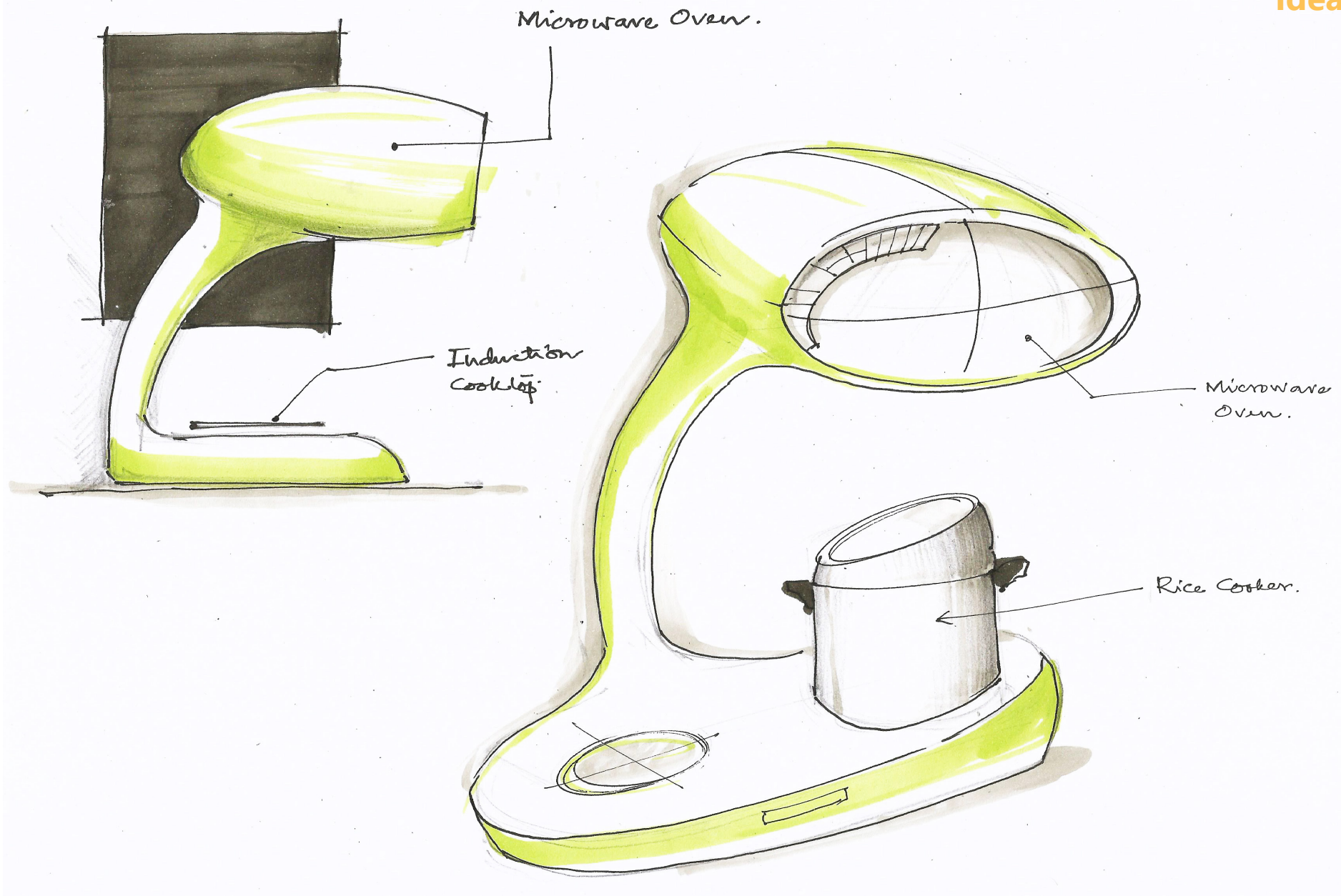
Ideation V



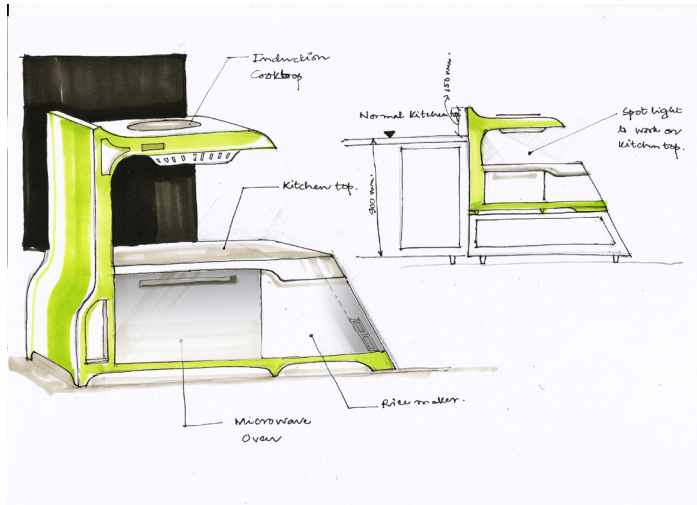
Ideation VI



Ideation VII

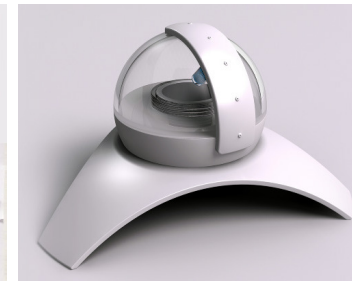


Prototypes of Preliminary Finalised Idea

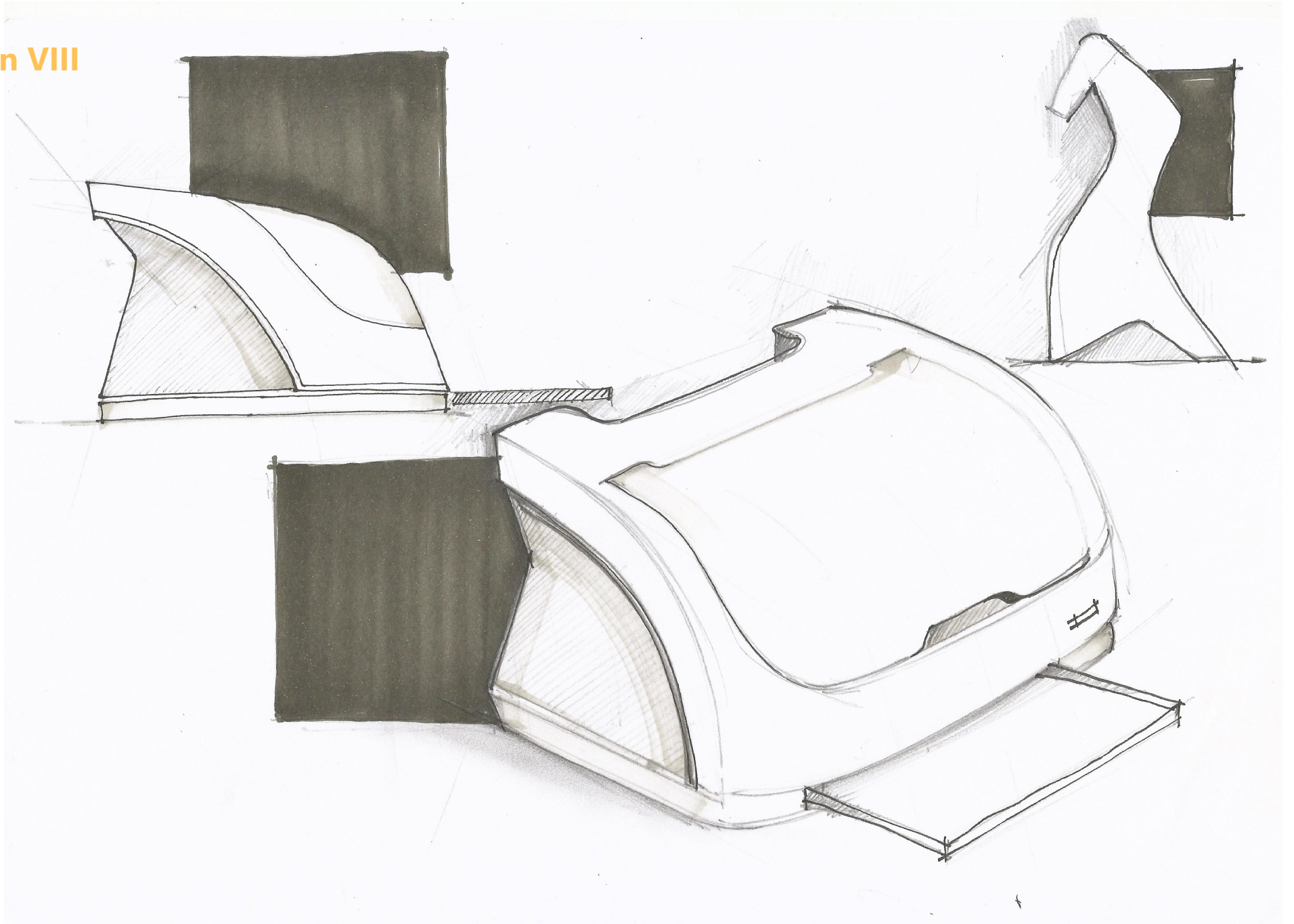


Current Trend Study through Visual Perception

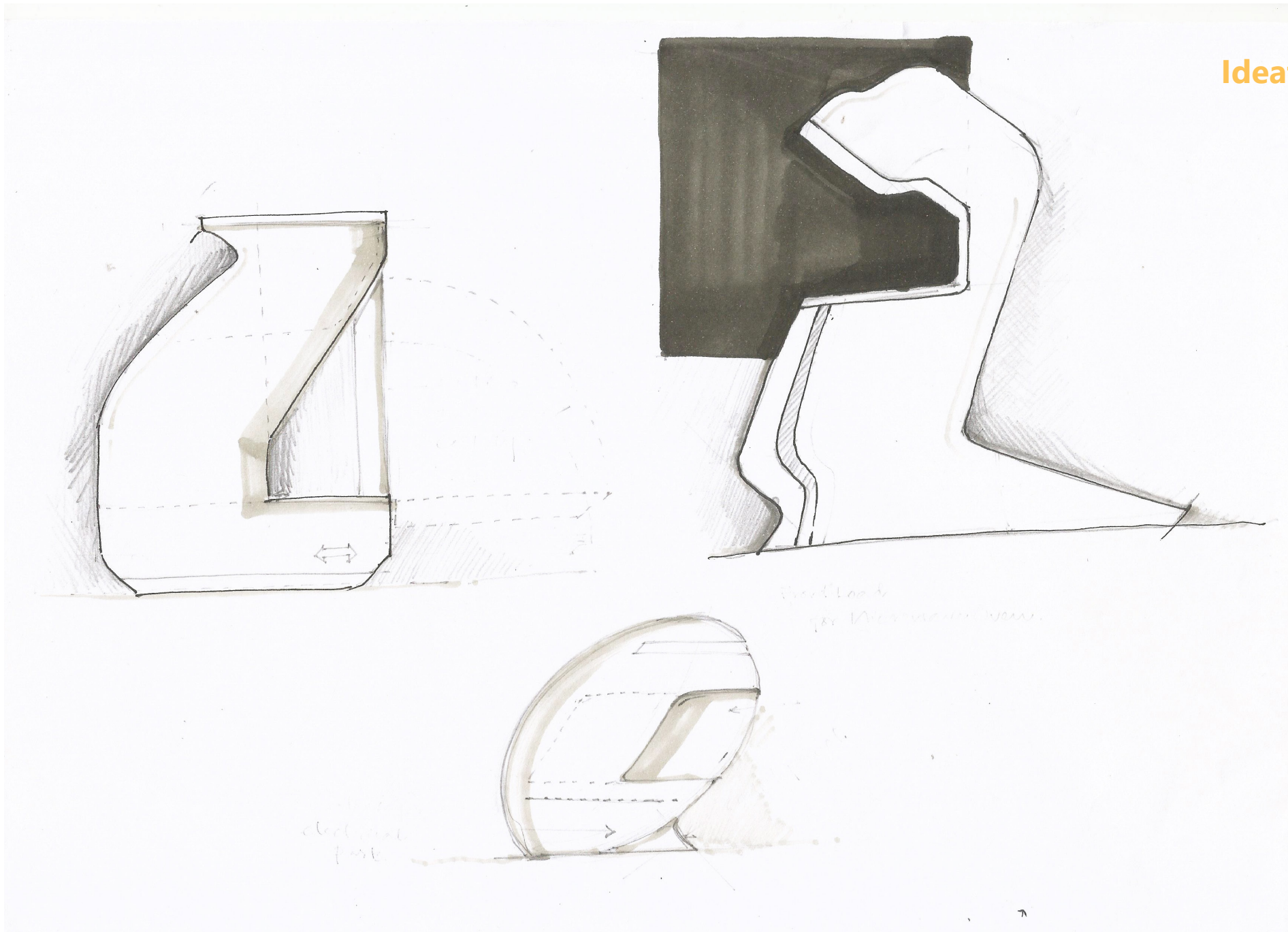
It is a tool which we can use to make trend graph to know current trend and also to focus desired domain of working. According to that product styling and design language can be pointed out and innovation new product to fit in that domain, which influenced in generating further ideations.



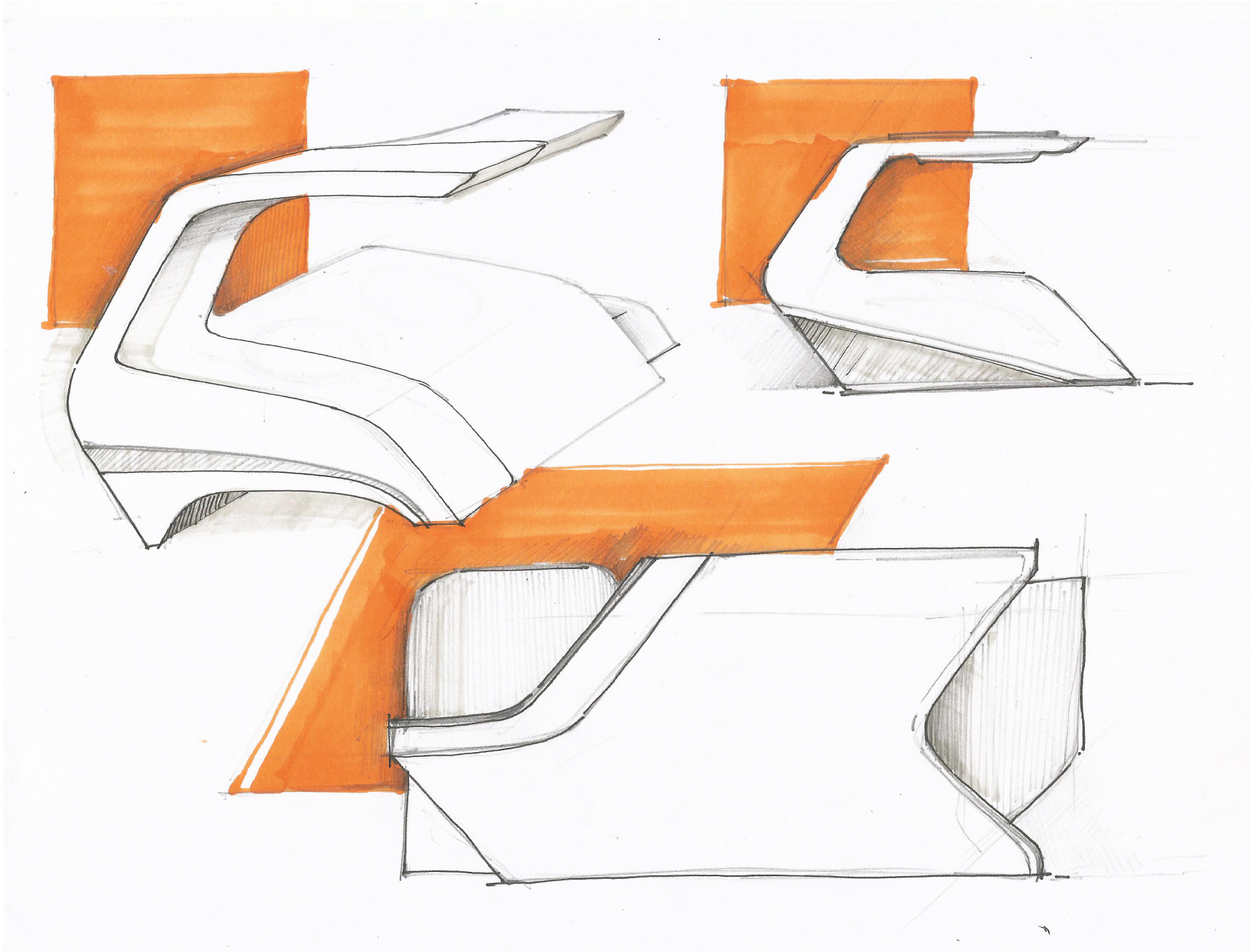
Ideation VIII



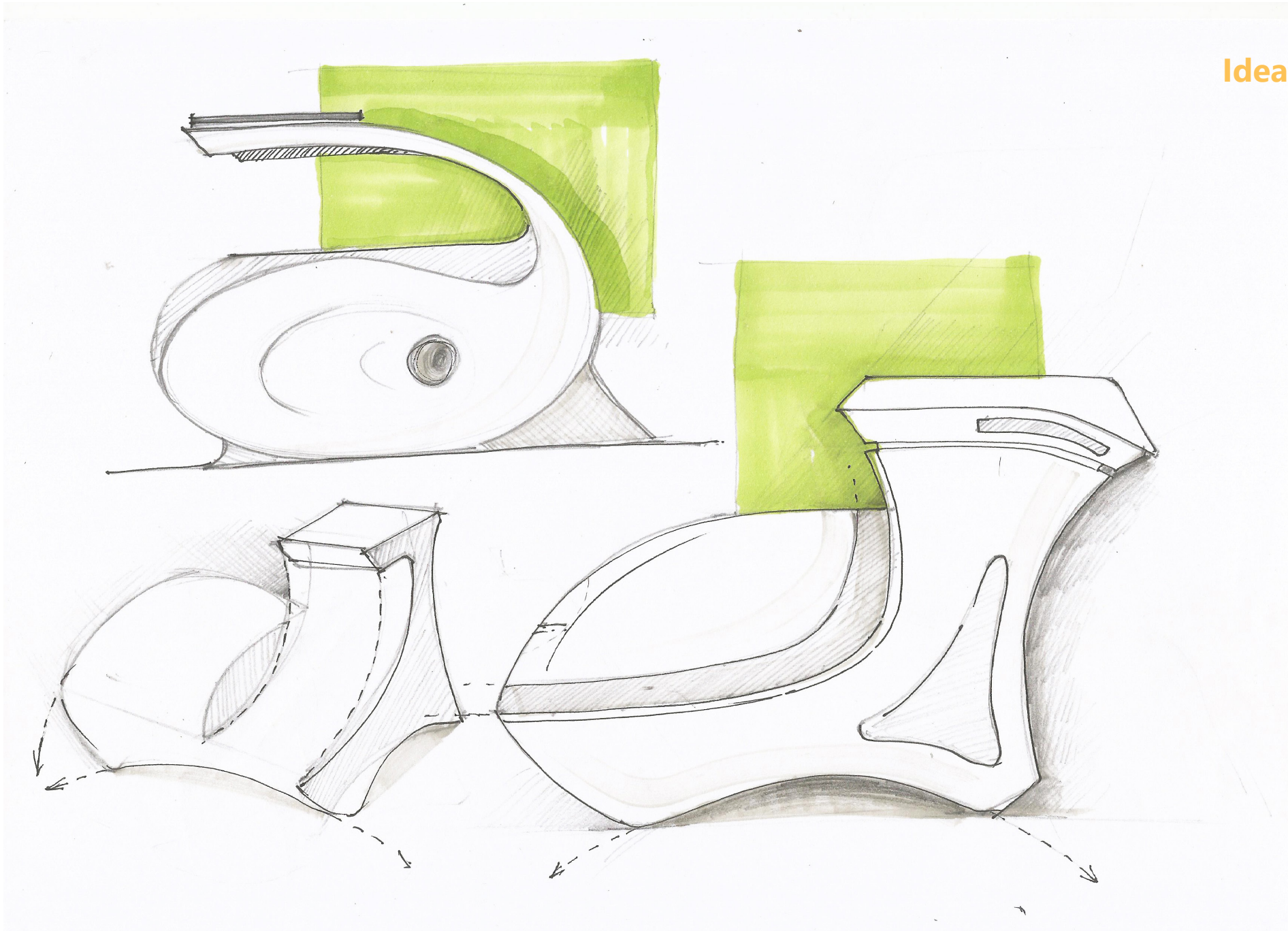
Ideation IX



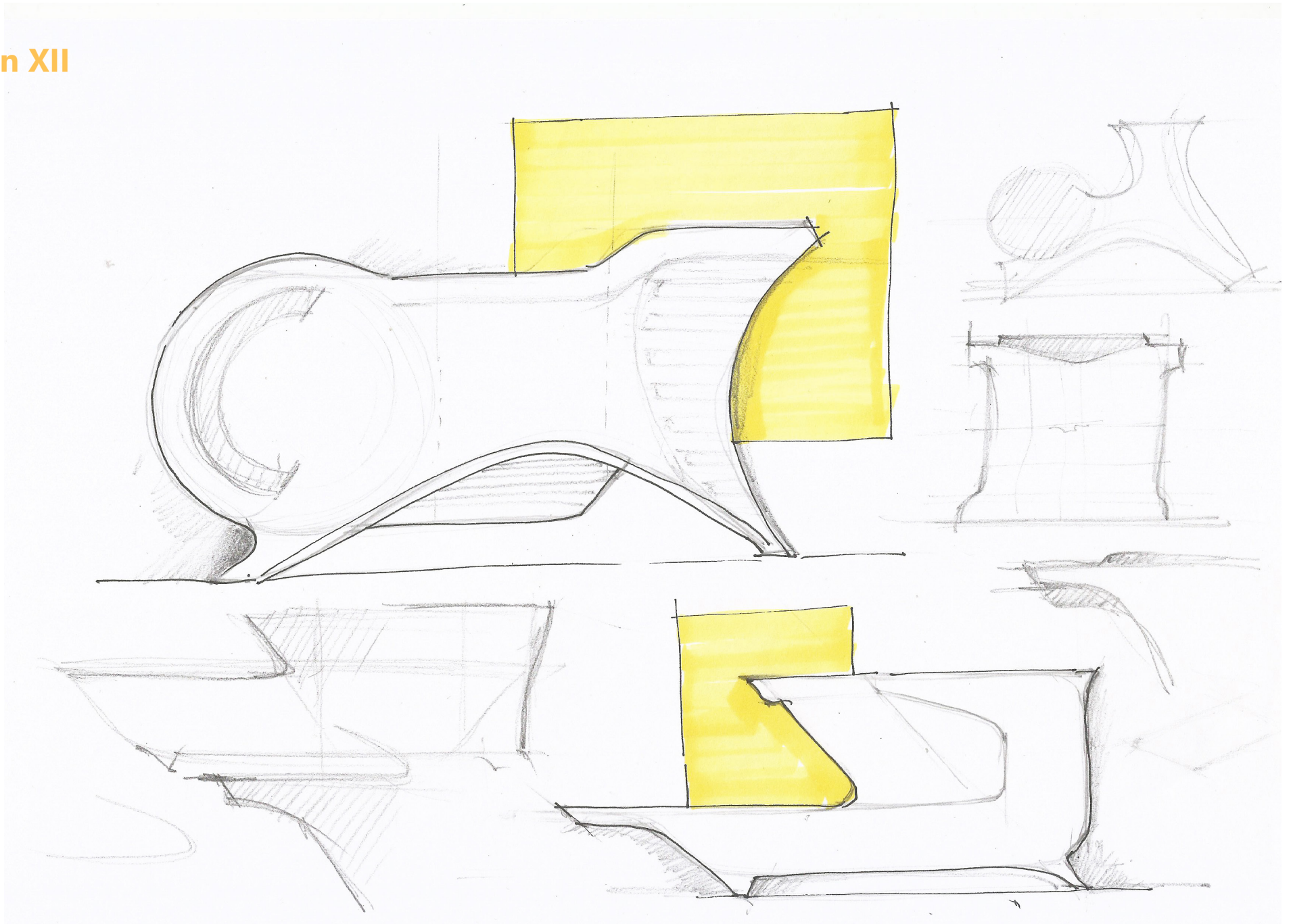
Ideation X



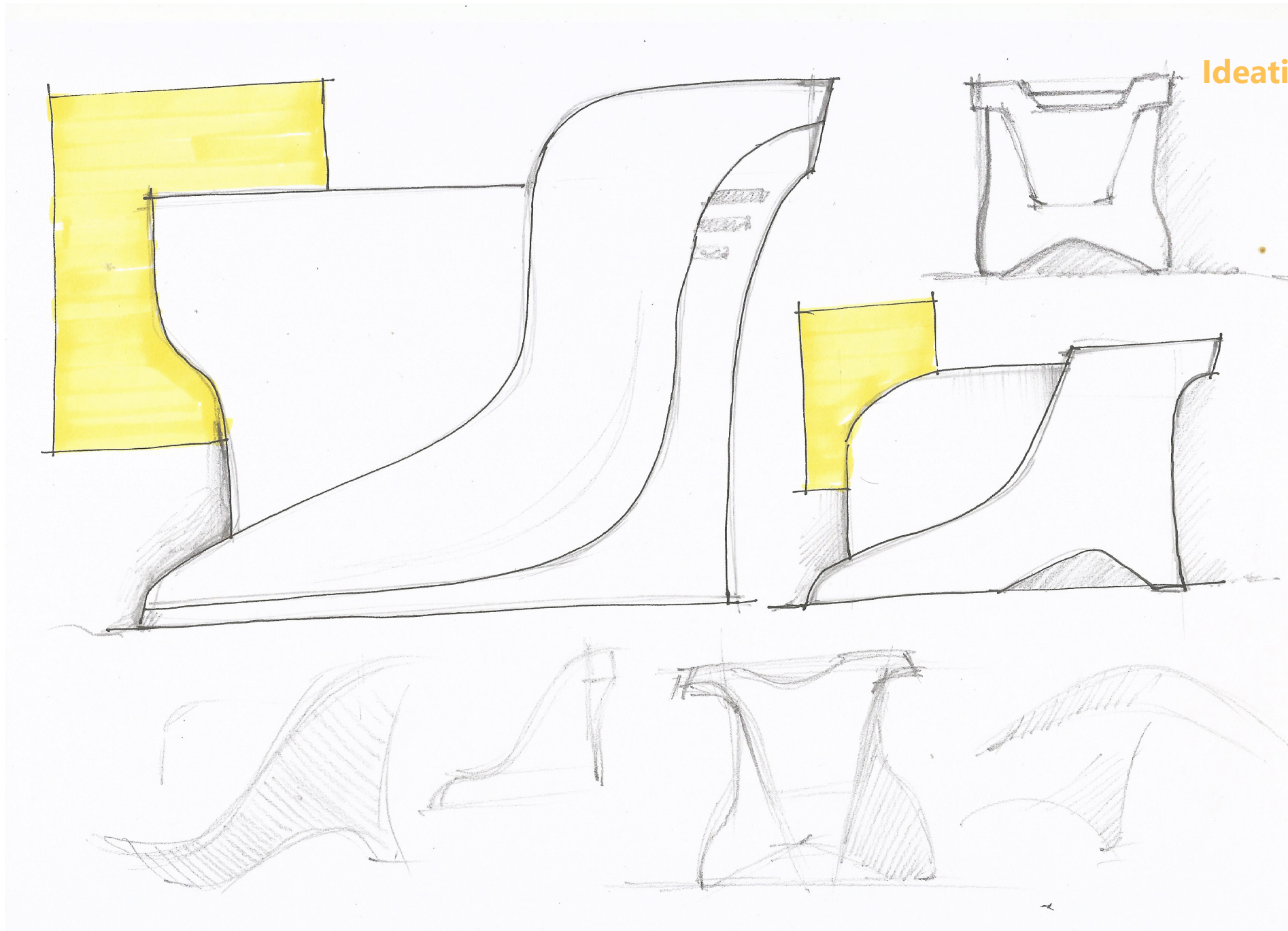
Ideation XI



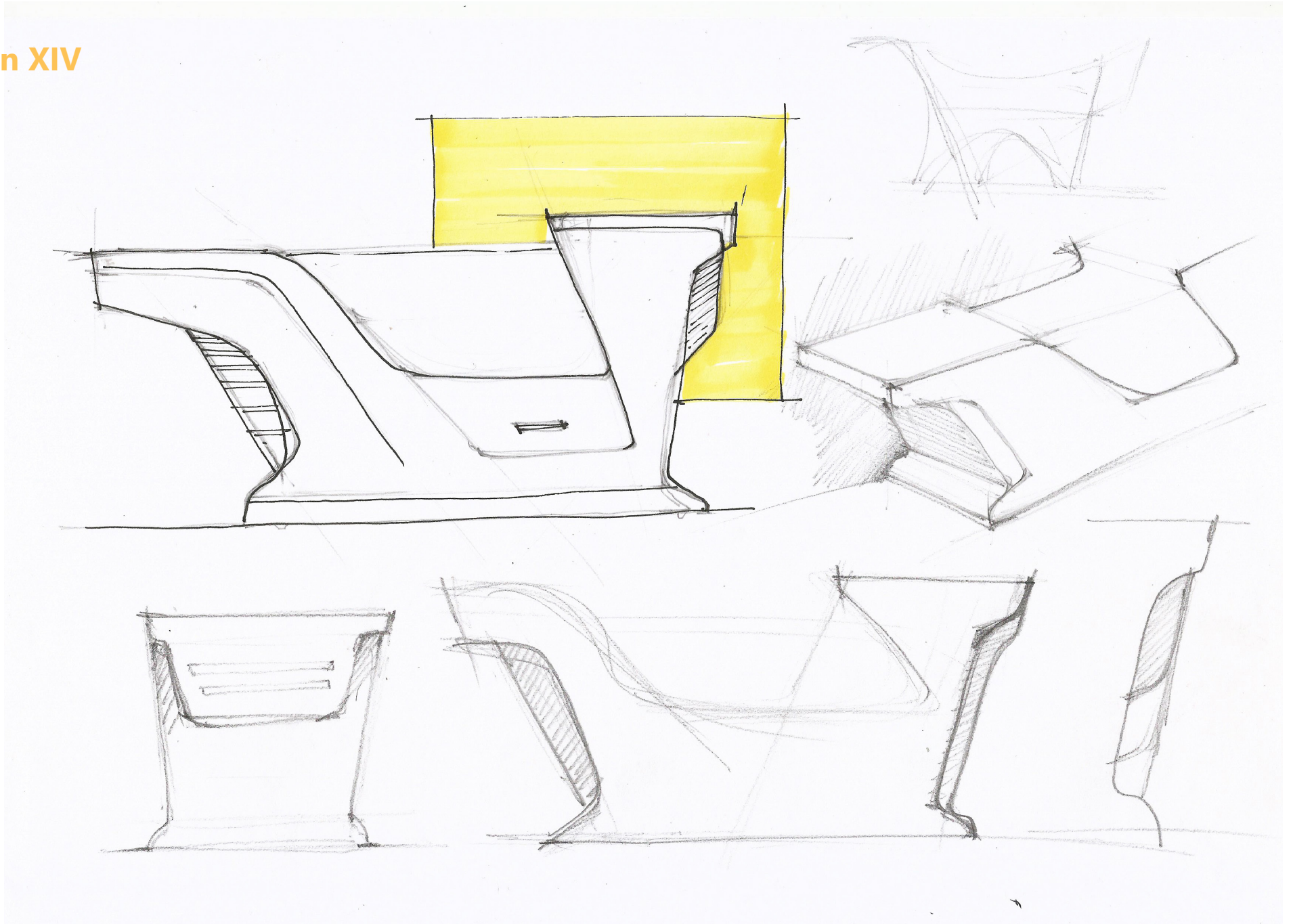
Ideation XII



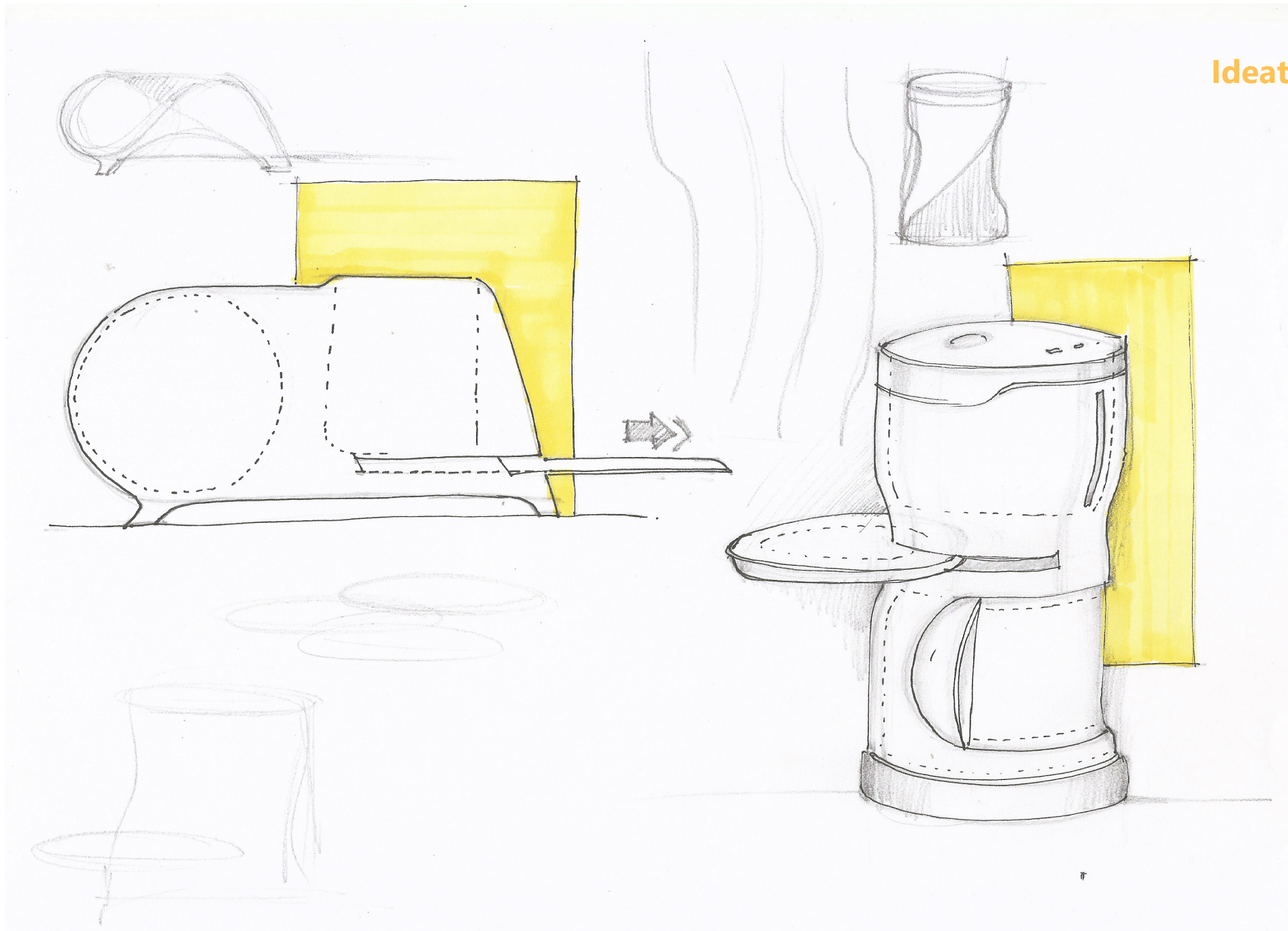
Ideation XIII



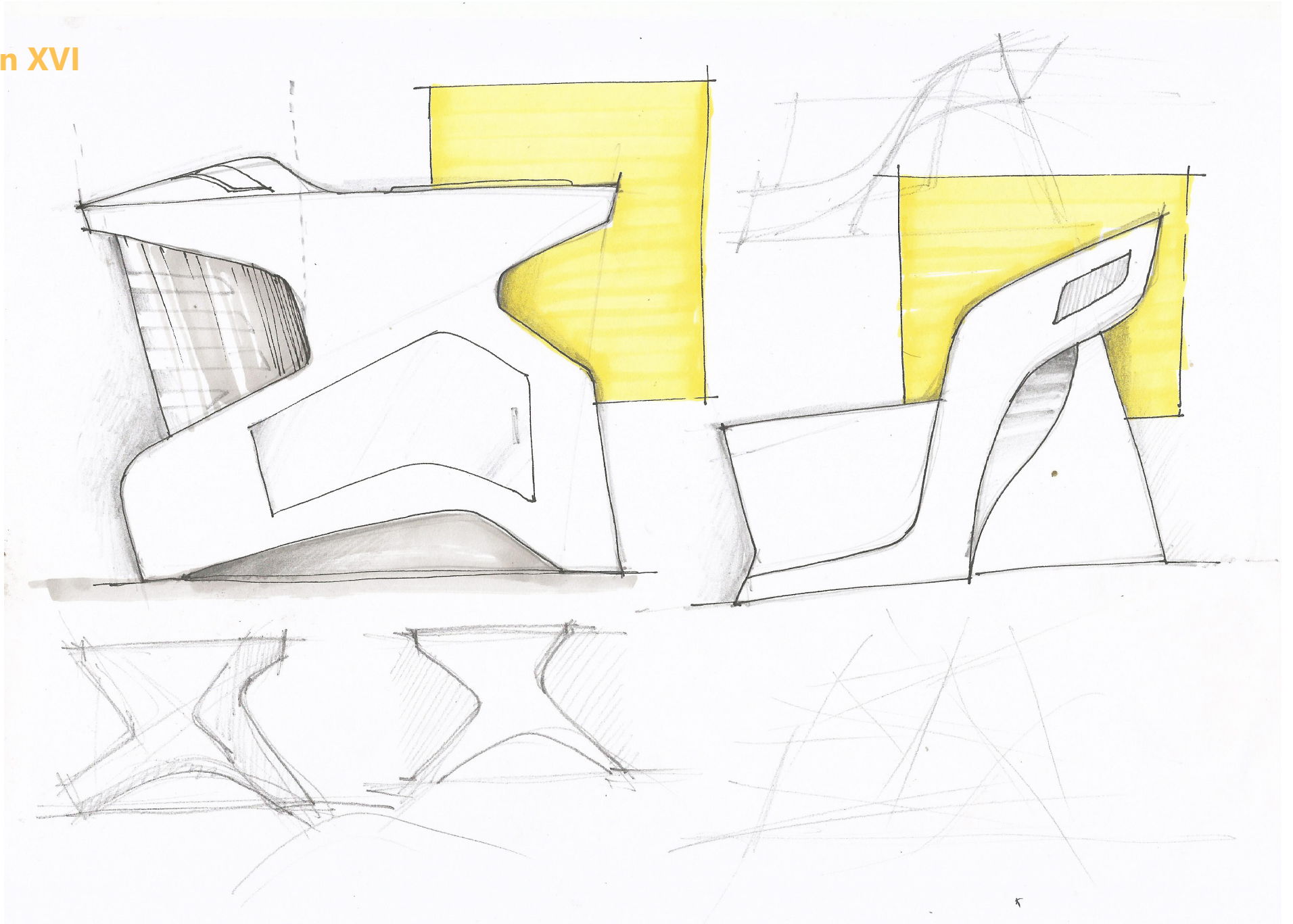
Ideation XIV



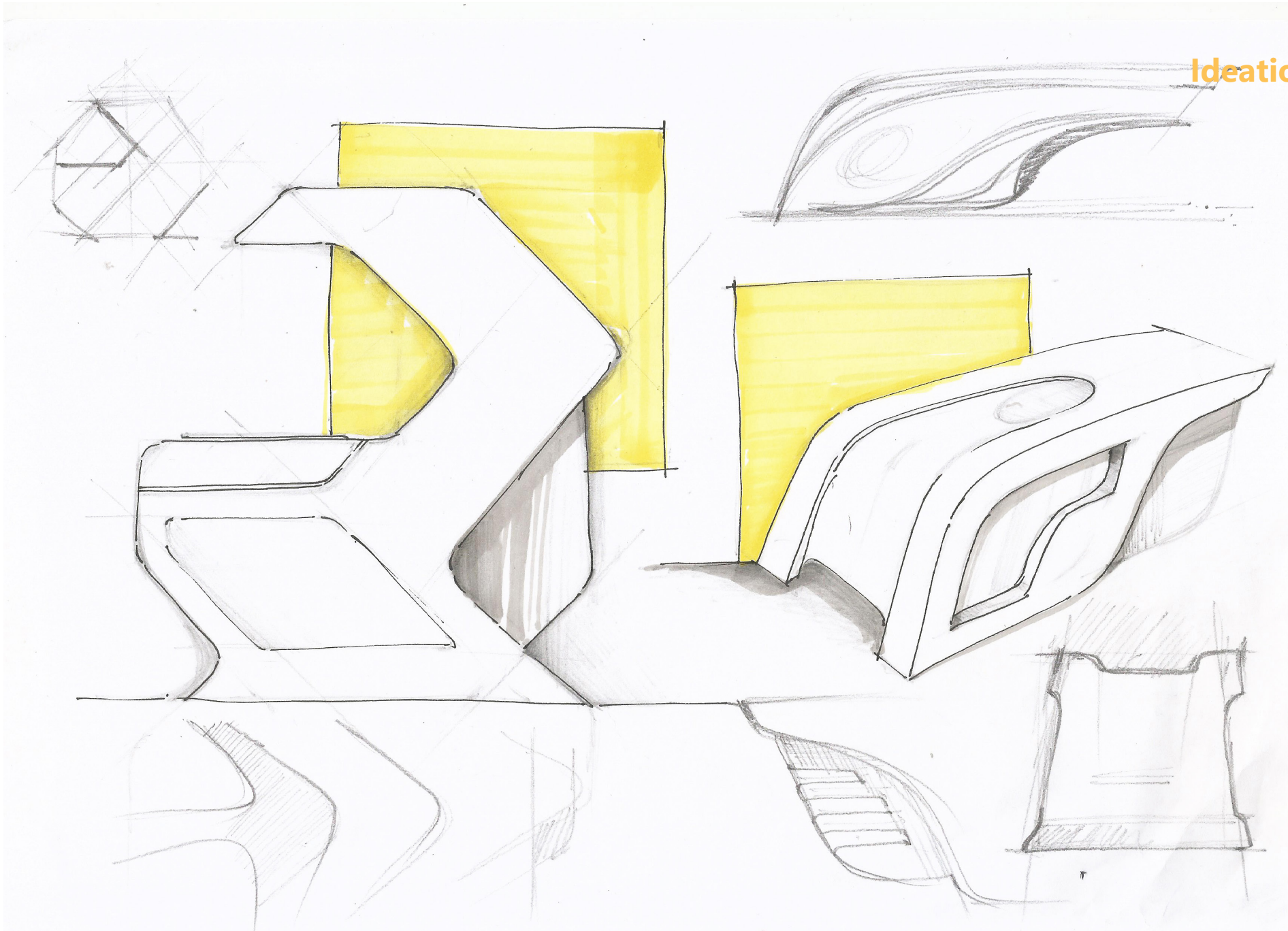
Ideation XV



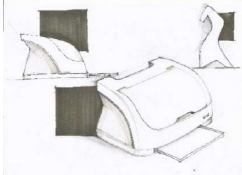
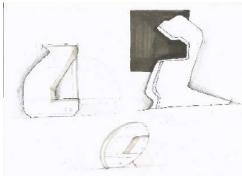
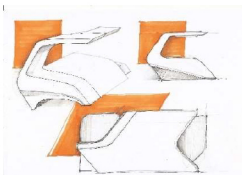
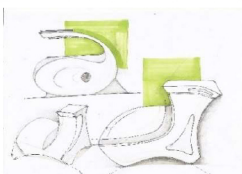
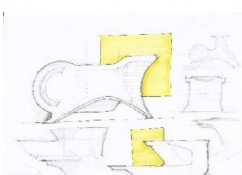
Ideation XVI



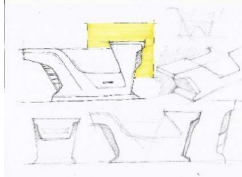
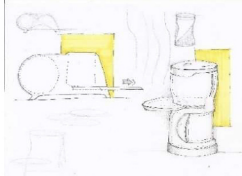
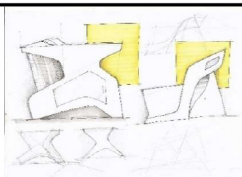
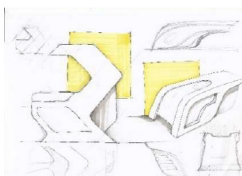
Ideation XVII



Evaluation of Ideations

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	
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	

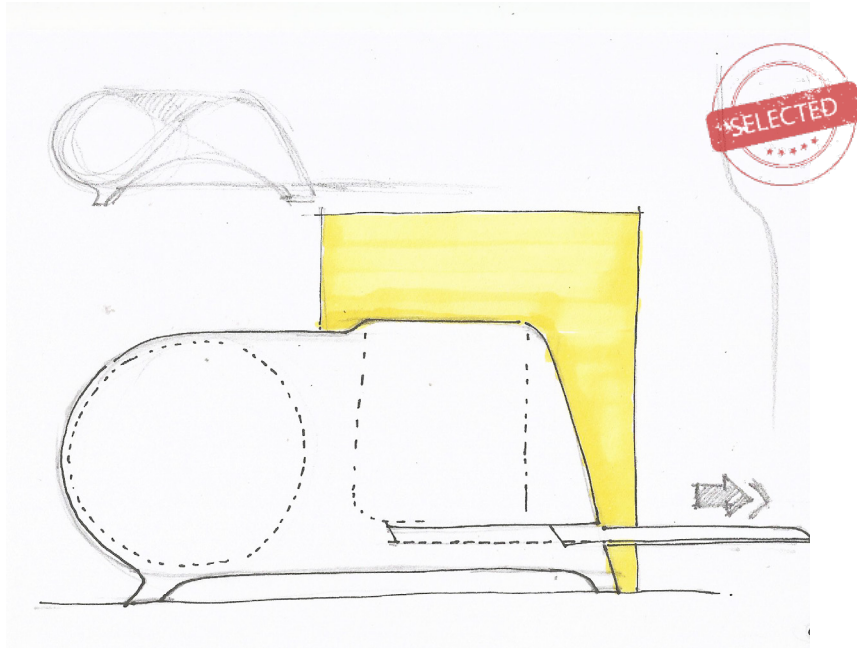
Evaluation of Ideations

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	
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 influened, 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 influened, 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



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Final Design Concepts



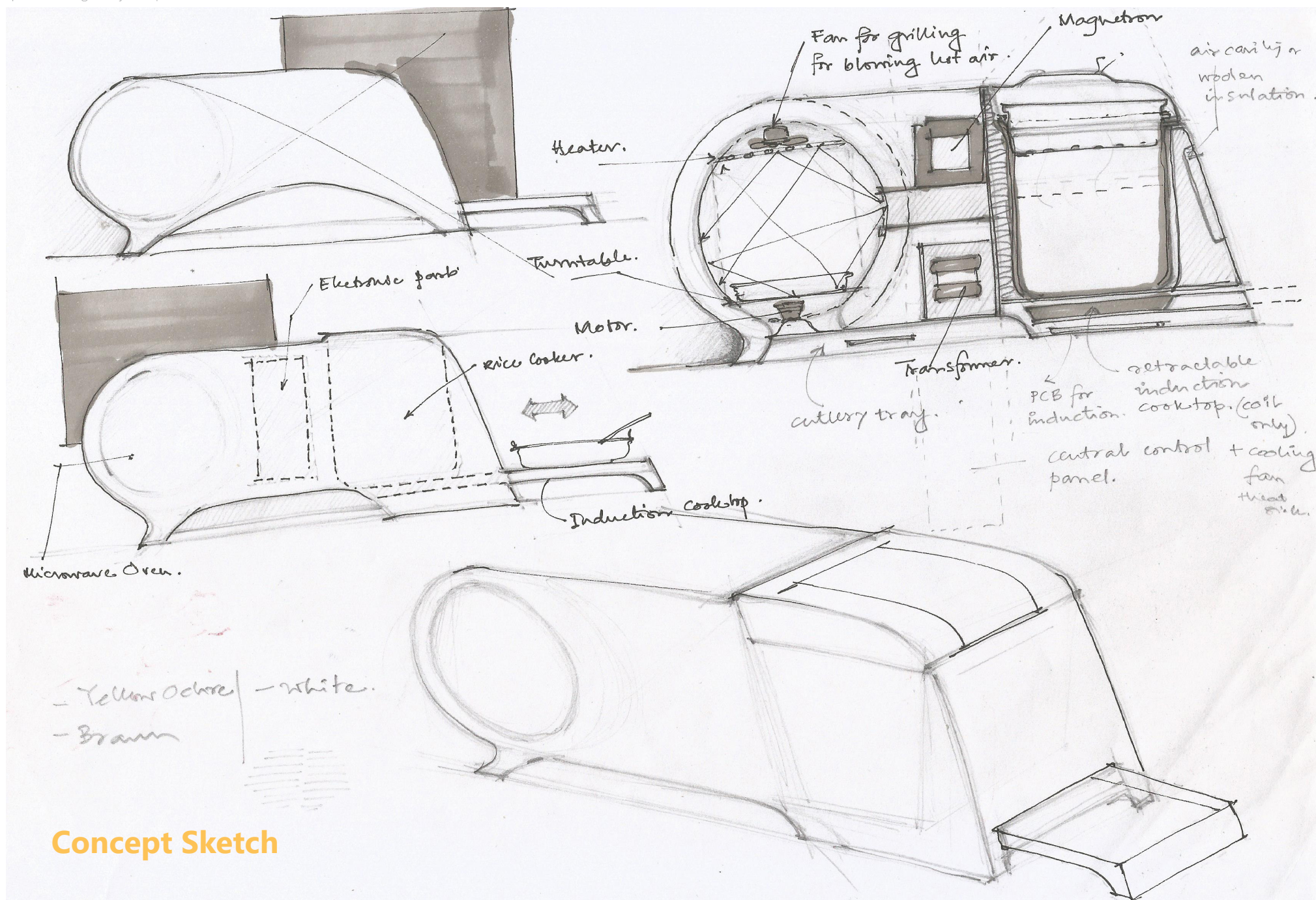
User Feedback & Concept validation

- (i) New but Simple & Clean Form, Visually balanced
- (ii) Easy to understand different functions
- (iii) Try to put basic function at its own position
- (iv) Easy to clean or maintain
- (v) Smart User interface
- (vi) Remote Control through specific Application via Smartphone
- (vii) Graphic Design preferably minimal floral pattern
- (viii) Should go with kitchen ambience
- (ix) Feel proud to show others, main attraction point of kitchen
- (x) Well thought User Experience

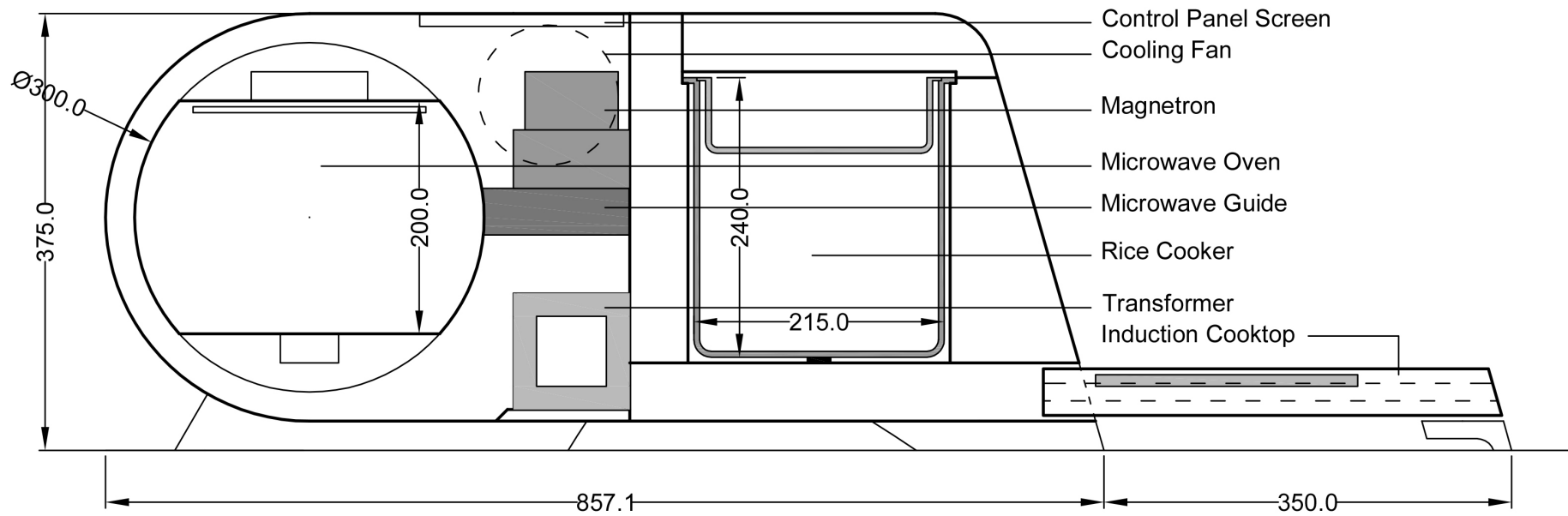


Good Design principles by Dieter Rams

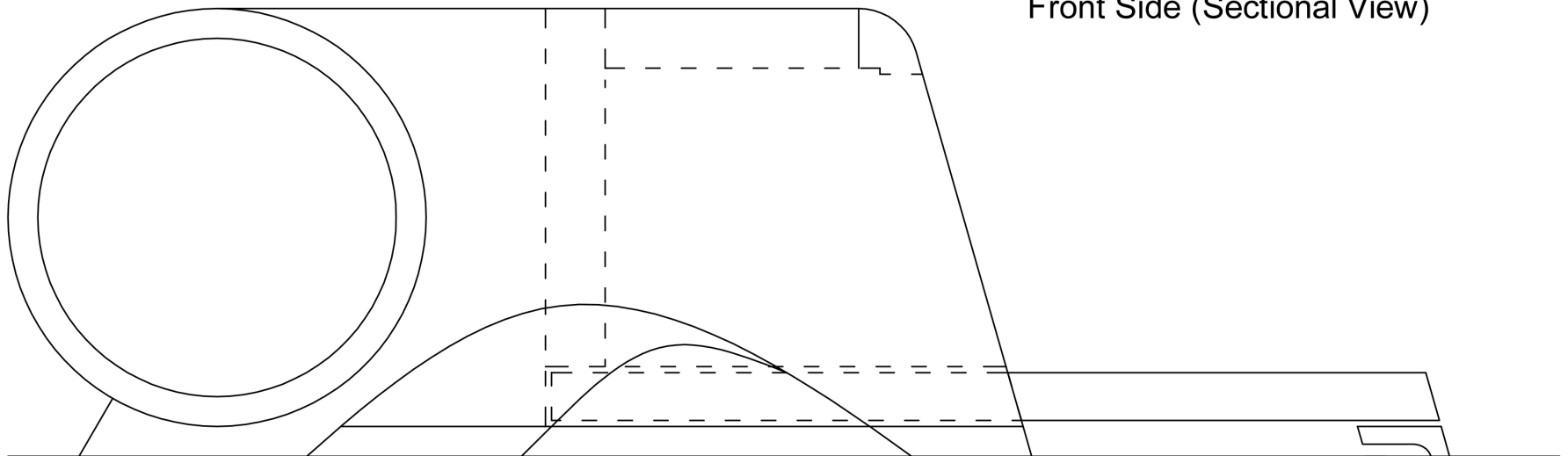
- (i) Is Innovative
- (ii) Makes a product useful
- (iii) Is Aesthetics
- (iv) Makes a product understandable
- (v) Is Unobtrusive
- (vi) Is Honest
- (vii) Is Long-lasting
- (viii) Is thorough down to the last detail
- (ix) Is environmentally friendly
- (x) Is as little design as possible



Concept Sketch



Front Side (Sectional View)

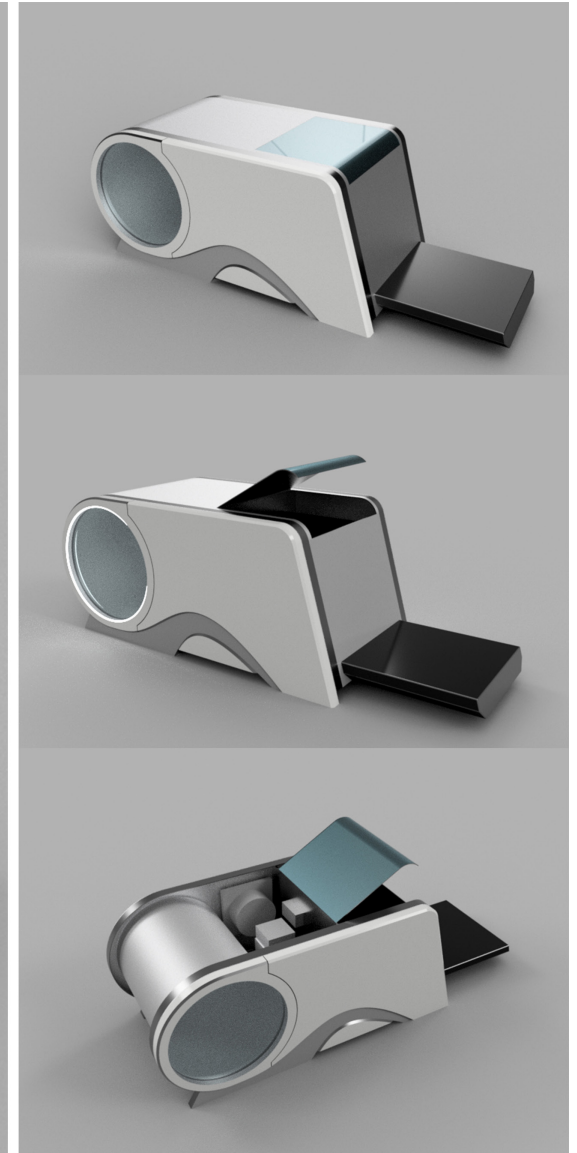


Concept Drawing

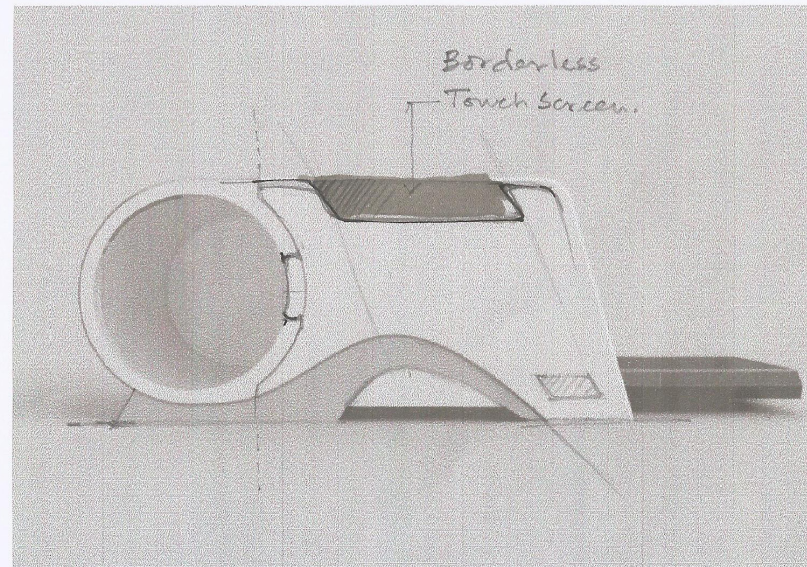
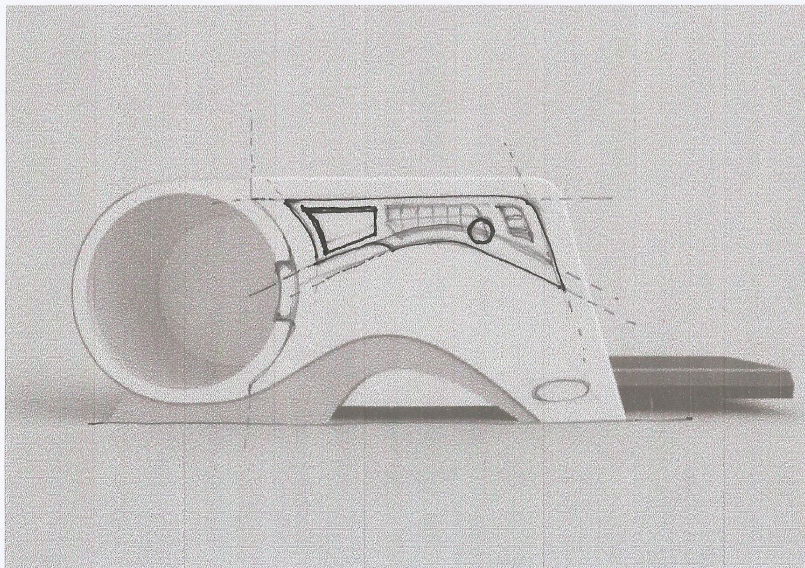
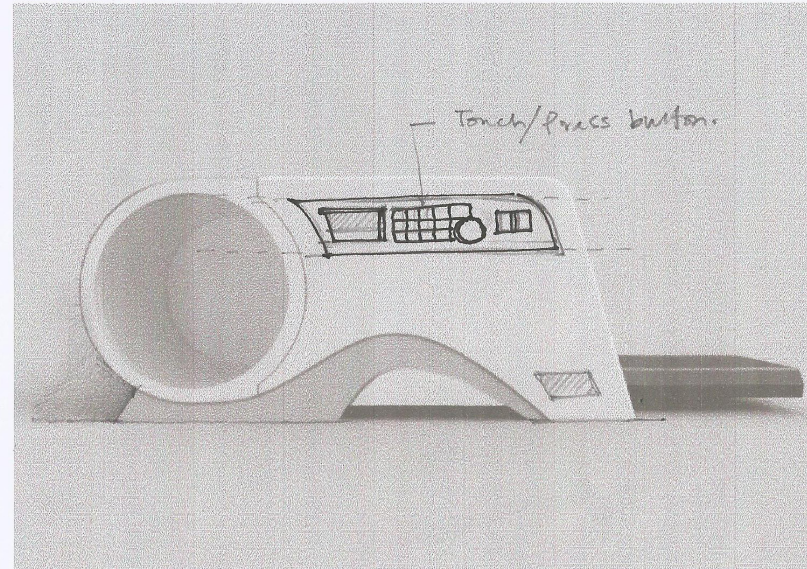
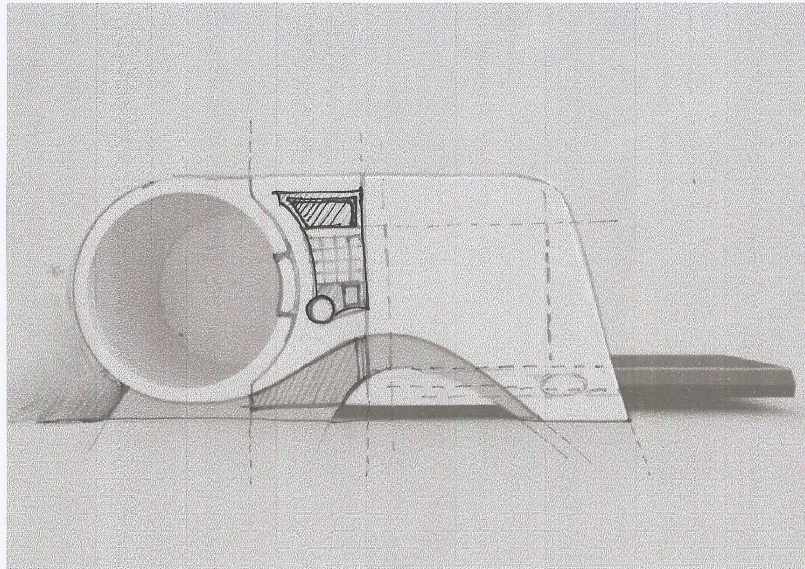


3D Visualisation

3D Visualisation

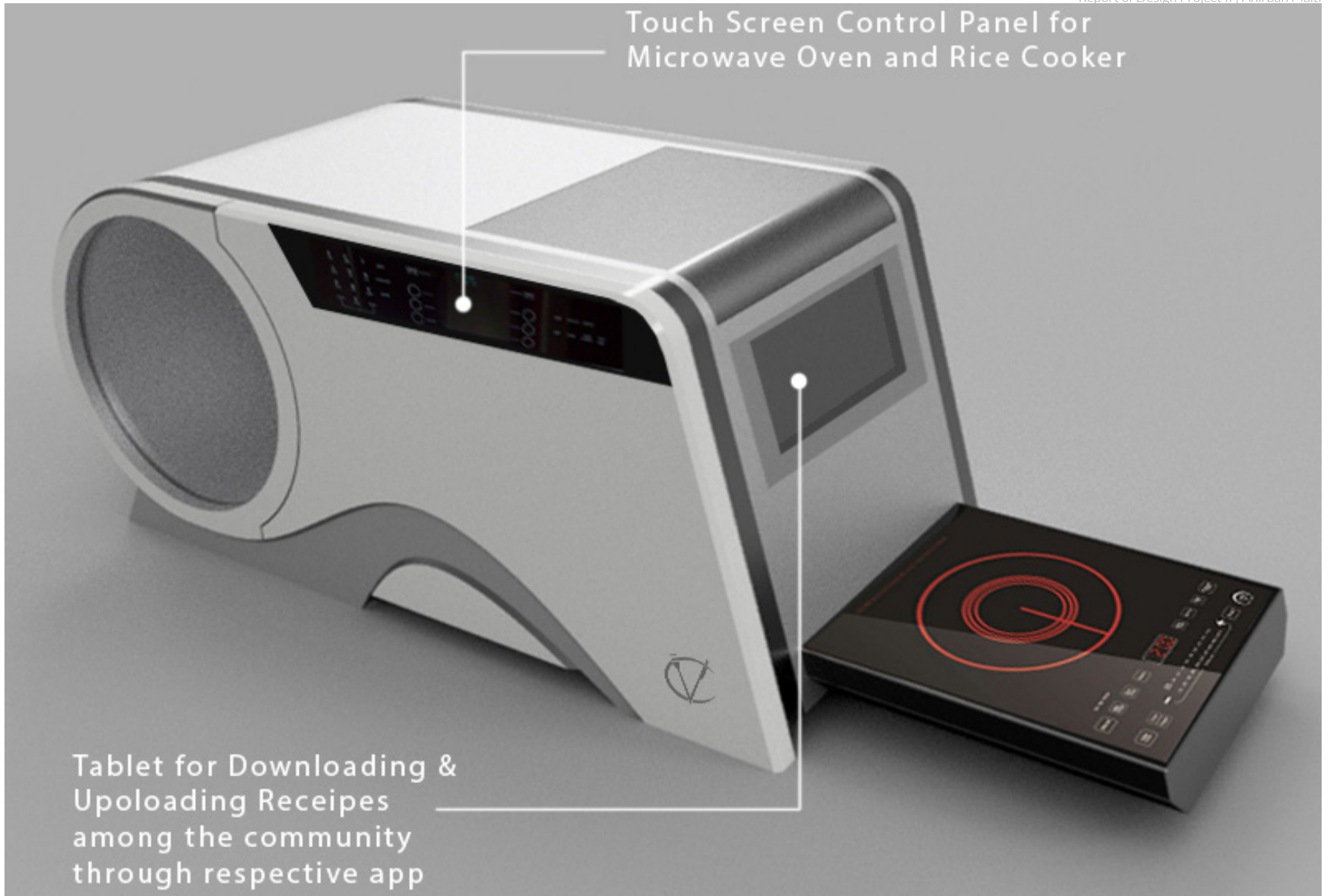


Different iterations for Control Panel

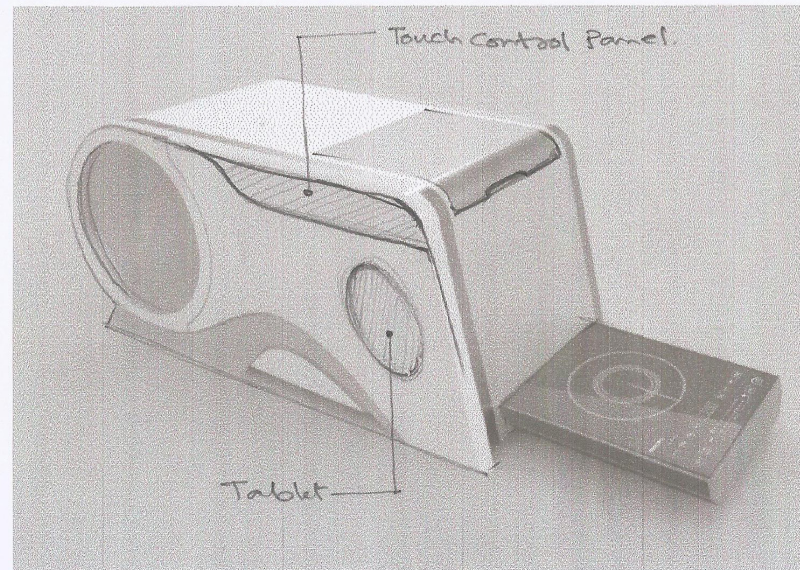
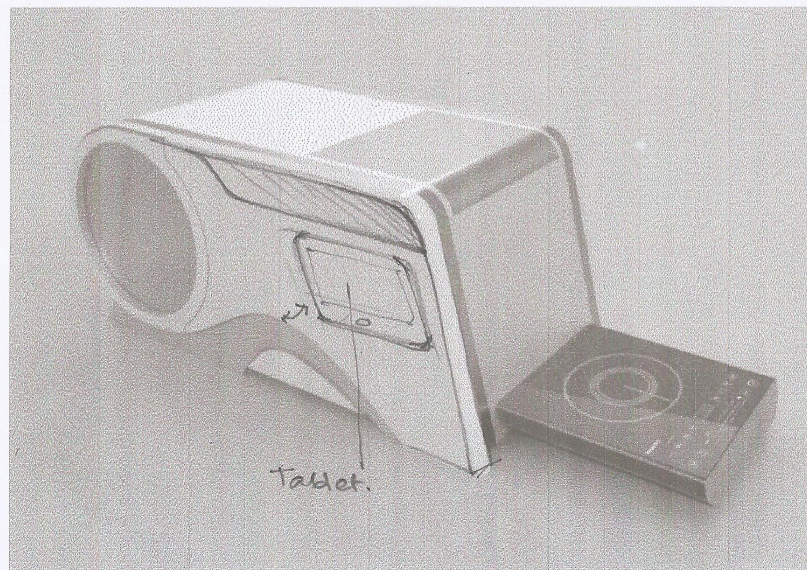
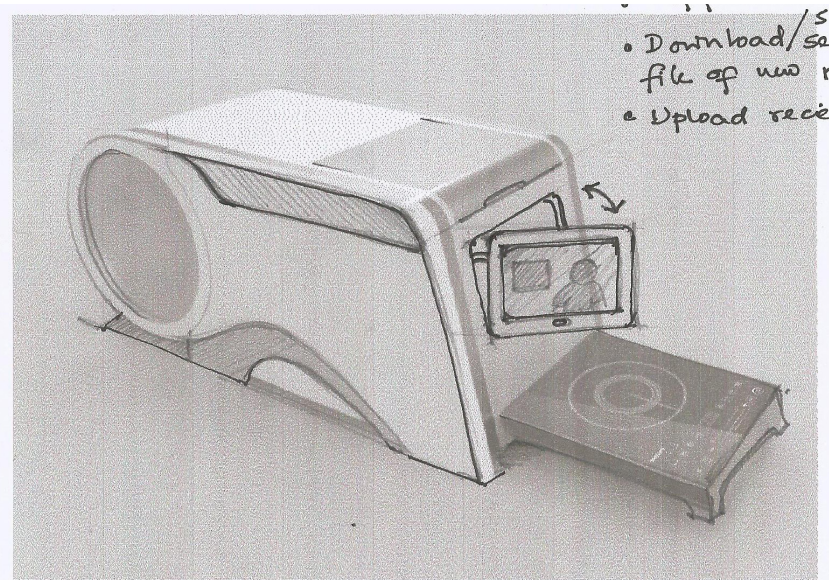
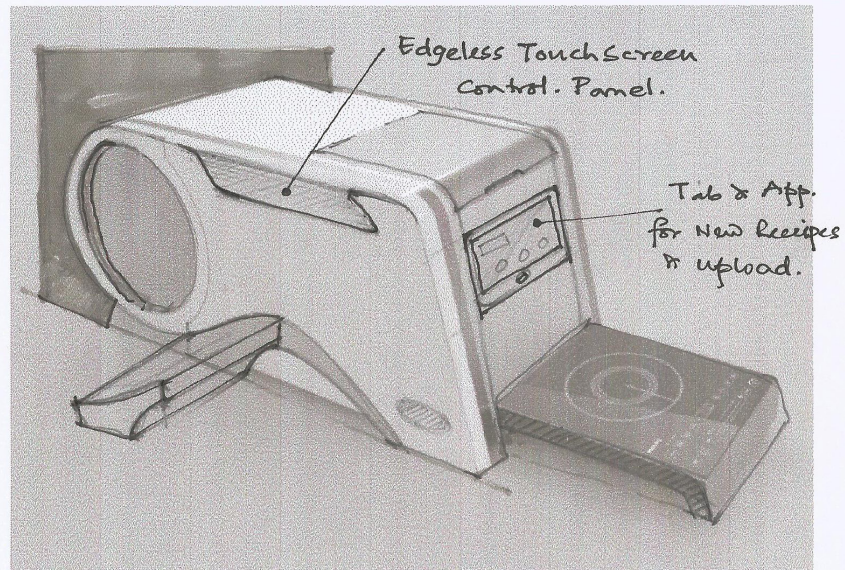


Touch Screen Control Panel for
Microwave Oven and Rice Cooker

Tablet for Downloading &
Uploading Receipes
among the community
through respective app



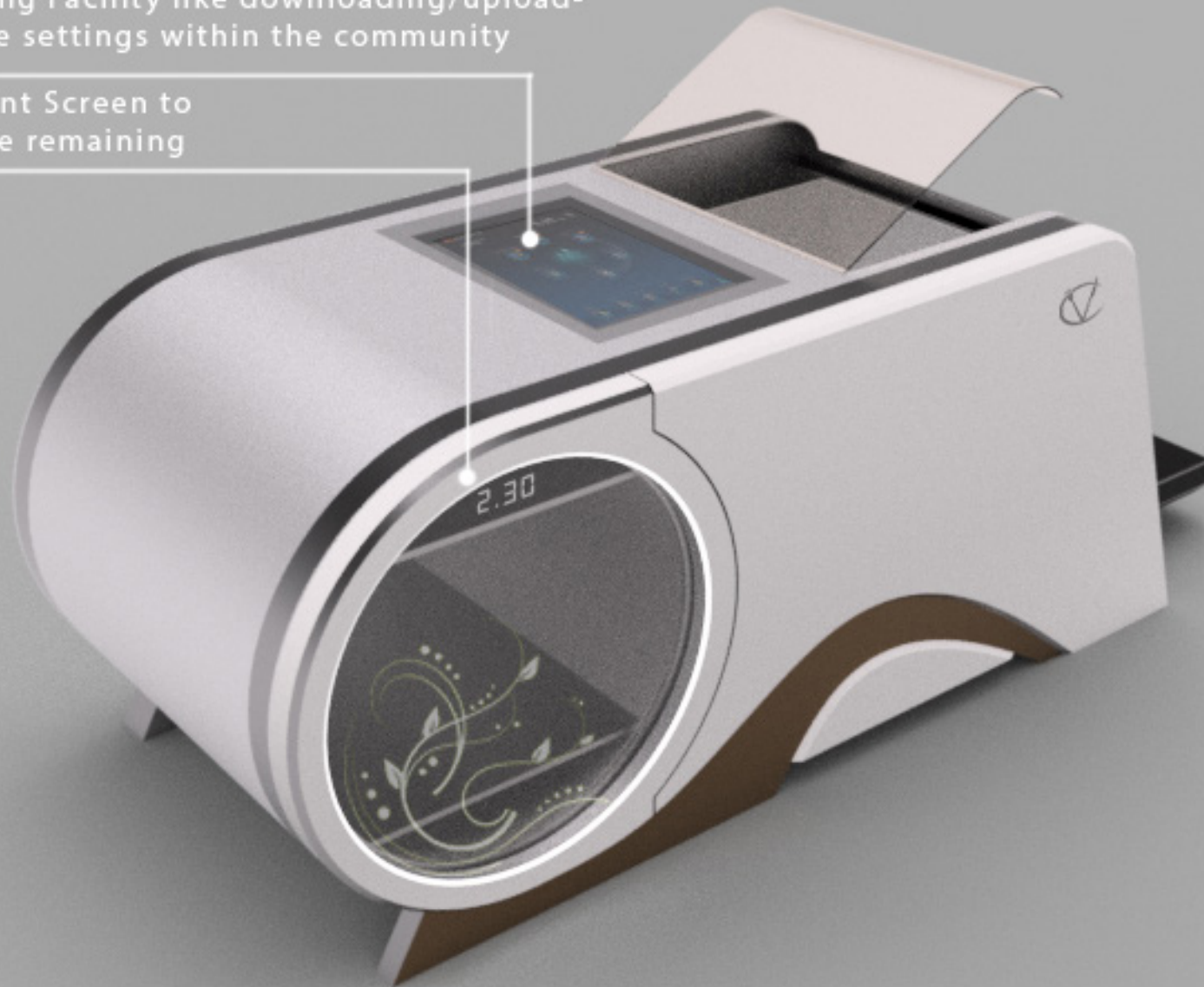
Different options for Tablet Placing

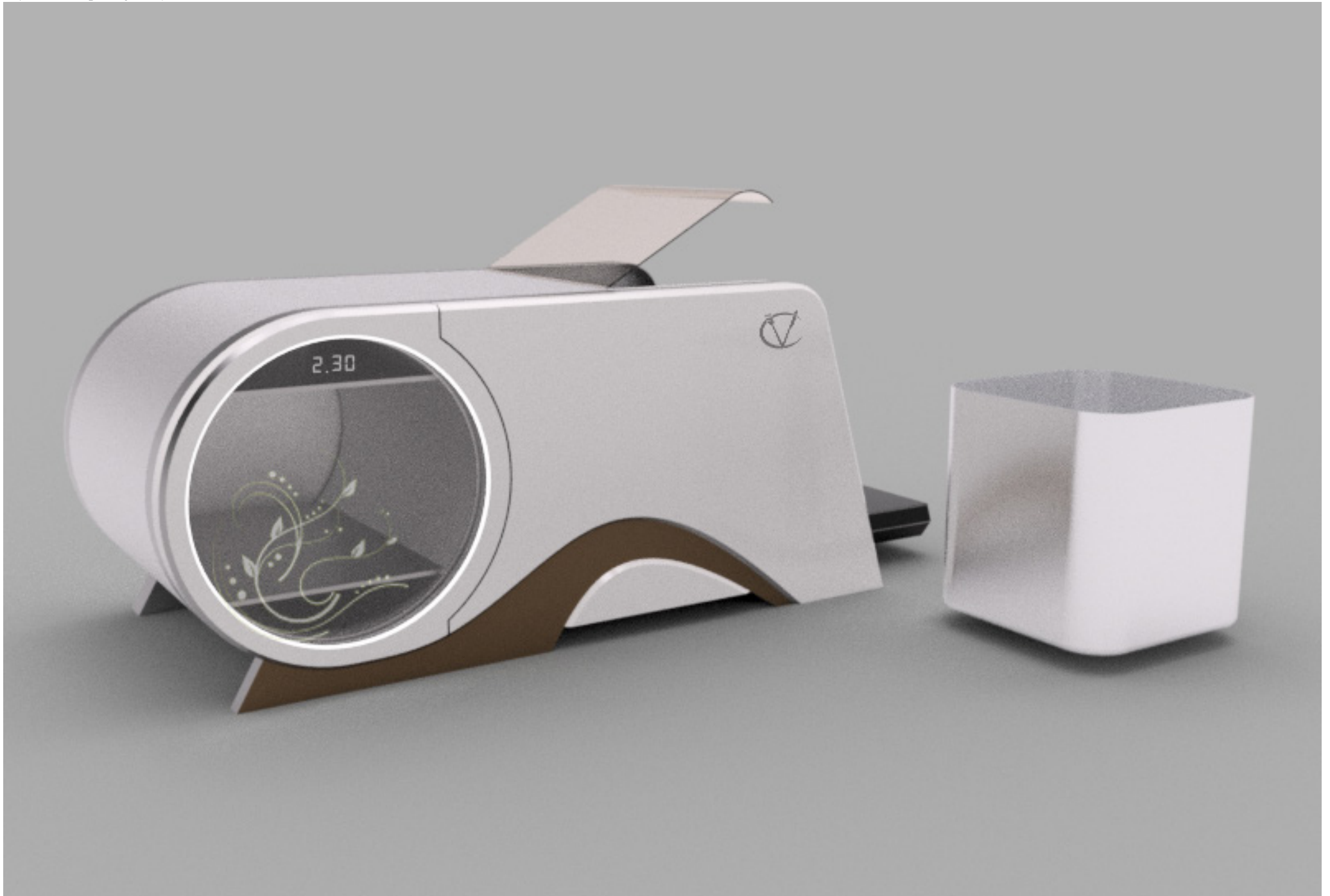


Integrated Control Panel

for Microwave Oven & Rice Cooker and Social Networking Facility like downloading/uploading recipe settings within the community

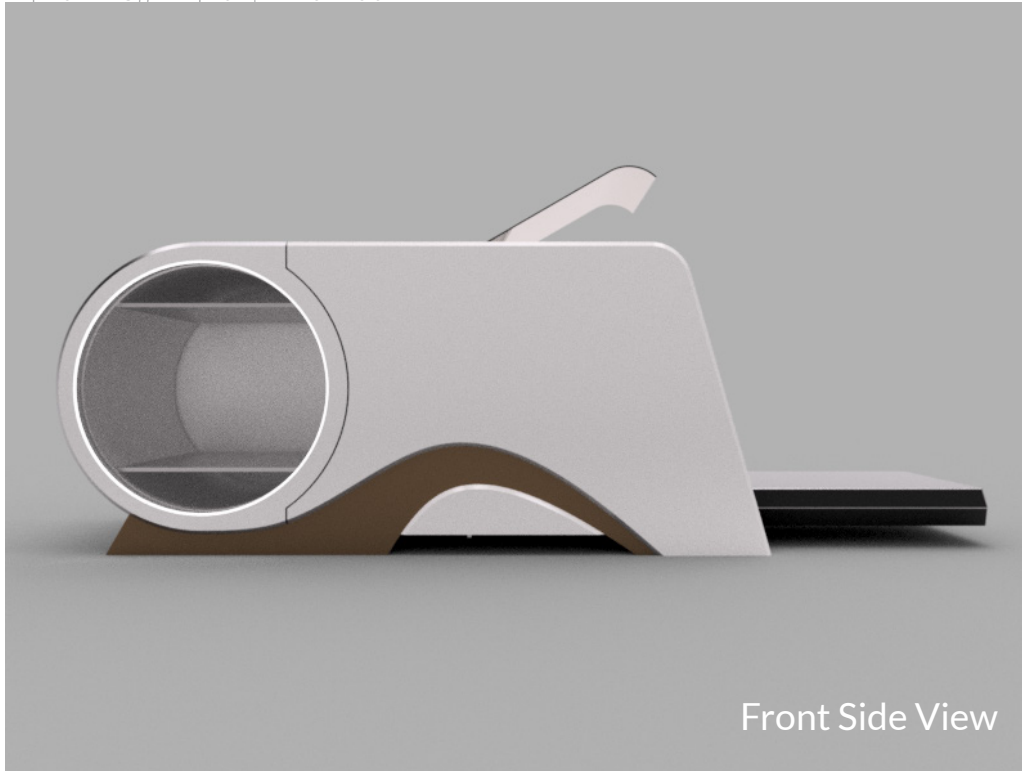
Small Front Screen to show time remaining



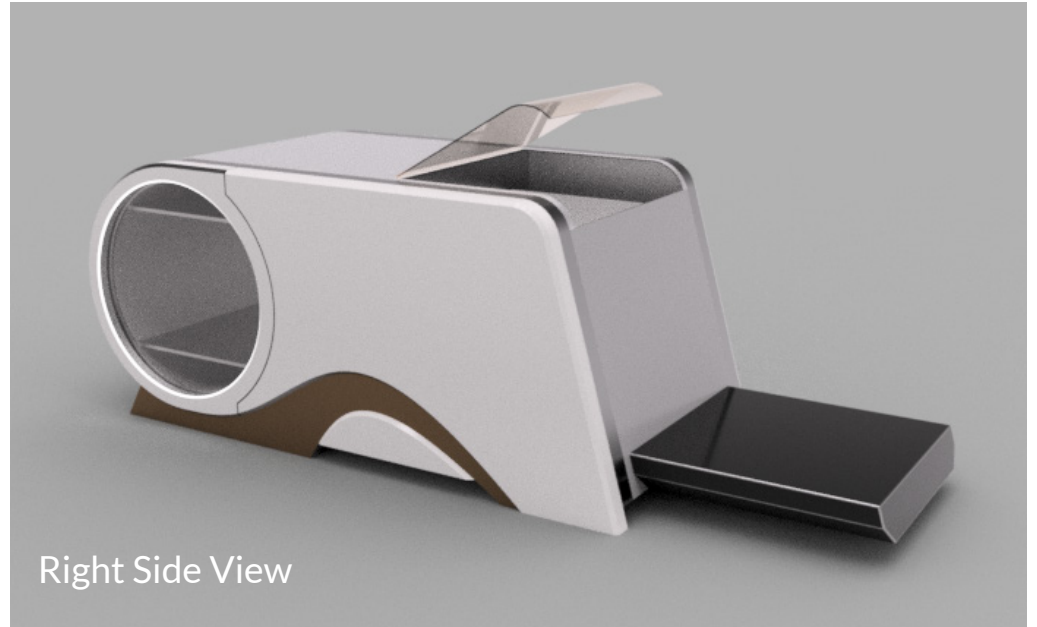




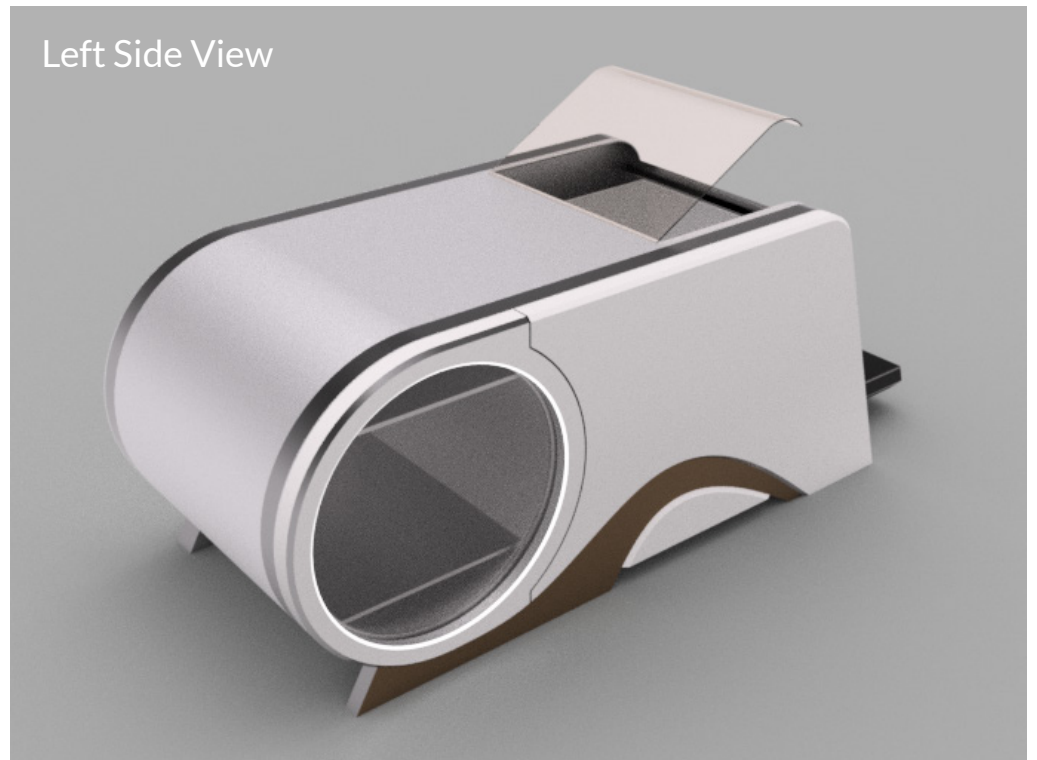
Accessible from Front and Side



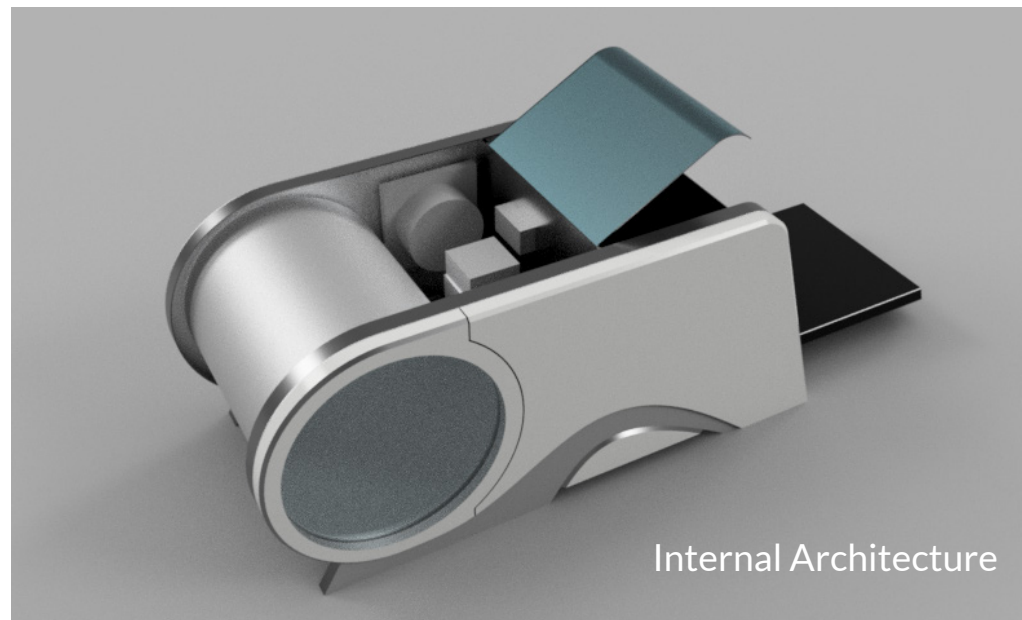
Front Side View



Right Side View

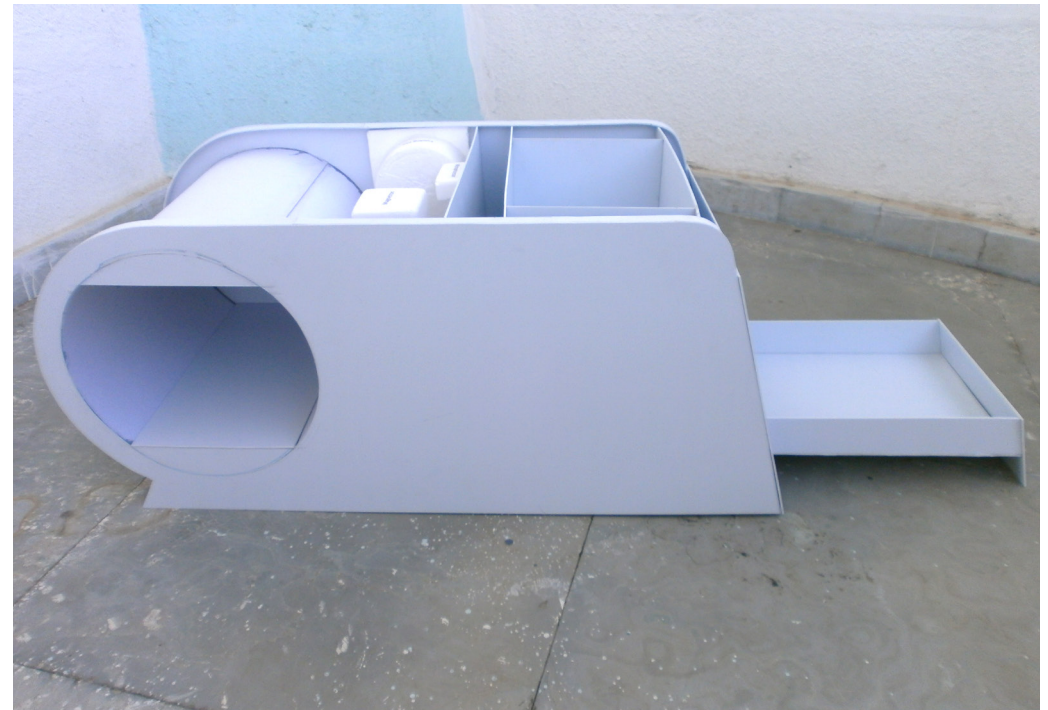
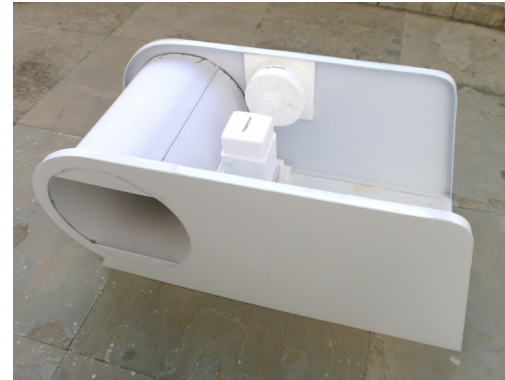


Left Side View



Internal Architecture

Prototype of Final Concept





14

Product Planning and Management

Elevator Speech

There are lots of smart appliance in the current market. But there are needs for more smarter appliance not only with smart user interface, IoT etc. but also with smart user experience which actually people still face in their kitchen evry day.

As we discussed, in the coming days kitchen is going to be very small or open kitchen will be the only option, there will be a need of a compact kitchen appliance which will make major Indian receipes very efficiently, will save space and it can be a central member of the kitchen. One can be proud of having such product and also it will enrich user experience through social networking within the closed group of users via an application on the company platform itself and those data will also influnce in future design of products.

Value Proposition

The main value of this product is multifunctionality in simultaneous. Besides this there are Quick and energy efficient cooking with Safety, Time saving, Space Saving, Easy maintenance factors adds more value. And as it is a electronics device it will not occur any pollution related issues - so green and efficient!

Target - Vision - Mission

As it is not a current need, but from the future perspective it can be easily assessed that this type of product is going to be necessary need for every family, of course for the upper class, small and busy family.

Beachhead Market

There are already lots of electronic appliance with smart feature is there in the current market and they are well in using condition. But some how user interaction is not taking place effectively. Social networking is also have a huge demand. So preparing food in the busy life is not going to very glad job for the people. Thats why incorporating designed user interface with new user experience will make the product hit in the coming smarter world.

It is going to be not only a kitchen appliance, also it will enrich social connection between people and make the product famous itself, as it will act as a common platform for sharing recipes and also uplodaing and downloading different recipes which can be auto loaded in the system memory.

The Business Model Canvas

Designed for: **Smart Kitchen Appliance**

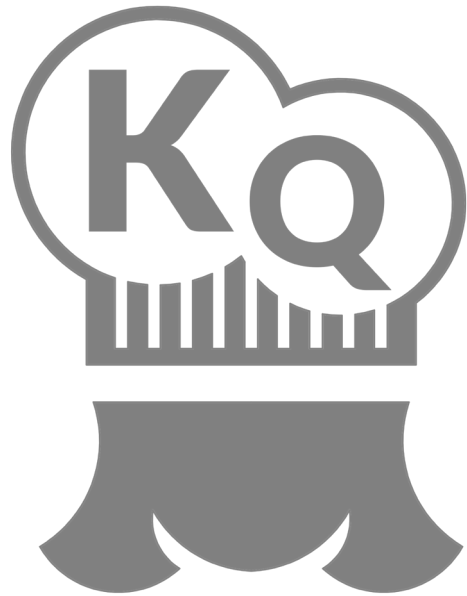
Designed by: **Anirban Maiti**

On: Day 17 Month Nov Year 2016
Iteration: No.

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 on 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 Propositions require? Our Distribution Channels? Customer Relationships? Revenue streams? 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 Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams? 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 all 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 Interactive system, 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 minimalistic 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 damaged 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 designing 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 revenues? 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		

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

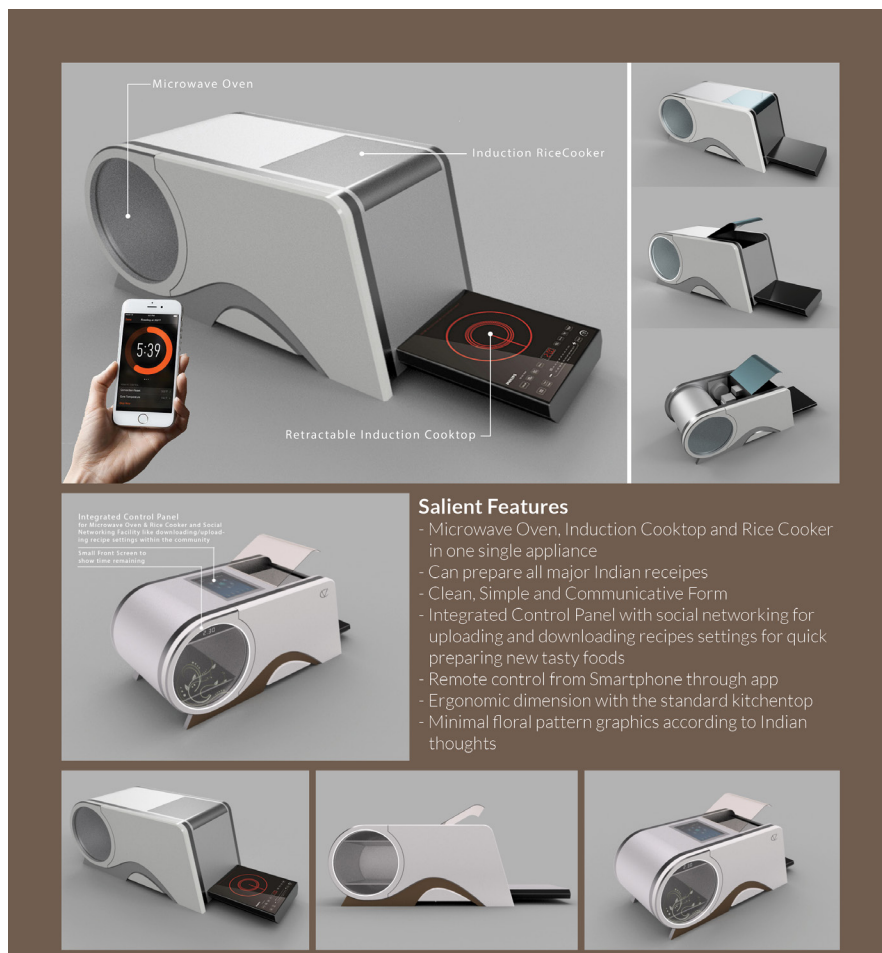
Smart Kitchen | Sample Appliance

meet your future family member to make your kitchen more delightful



*Have Good Food
without a Kitchen...*

If you want to cook food anywhere hasslefree
and also have a clean dining experience here
the solution for you.



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

Product Flyer for the launching event



Kitchen Queen

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meet your future family member to make your kitchen more delightful





Have Good Food without a Kitchen...

If you want to cook food anywhere hassle-free and also have a clean dining experience here the solution for you.



* Offer valid on first 20pc sell on Electronic Exhibition Fair at Pragati Maidan, New Delhi on May2017



Location in the Fair:
Kitchen Queen Store, Row No.- 5, Shop No.-12

Hotline Number | **1800 2544 4444** (tollfree)

Website | www.kitchenqueen.com



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