Emma

by Studio Terra

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Documentation
1. Semster Product Design
Daniel Aeschbacher
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Executive Summary

During the first semester of the product track we worked in a group of three as a design agency, Studio Terra, on the re-design of a coffee machine. For this we followed the process of the Lucerne Design Management Model, that includes a discover, define, develop and deliver phase.

Before the process started, we sat together with our client Hometech to discuss their current product 'Sjöstrand' and their wishes for the new design.

In the discover phase, we conducted research using different methods, in order to gain insights about coffee machines and their users.

In the define phase, we took the insights gained from the research and narrowed them down to create requirements for our coffee machine.

In the develop phase, we started the ideation process by sketching and building prototypes. We then proceeded to create four distinct concepts that were presented to our client Hometech.

In the deliver phase, we sat together with the client and came to an agreement about their preferred concept. We then went on to develop our final design, Emma.

This documentation provides in-depth information about the four phases and the steps that were taken along the way to the final proposal. It concludes with our final thoughts and learnings of the process.

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Product Semantics

Find a picture of our mindmap in the appendix

The research phase is about collecting as much information as possible about the coffee machine and its environment. Several different methods, summarized by looking, learning and asking, can be applied in order to get a broad understanding around the required topic.

Discovery Phase

Product Autopsy

Competitor Comparison
Try It Yourself
Interview
Moodboard
Function Analysis
Product Semantics

Initial Analysis
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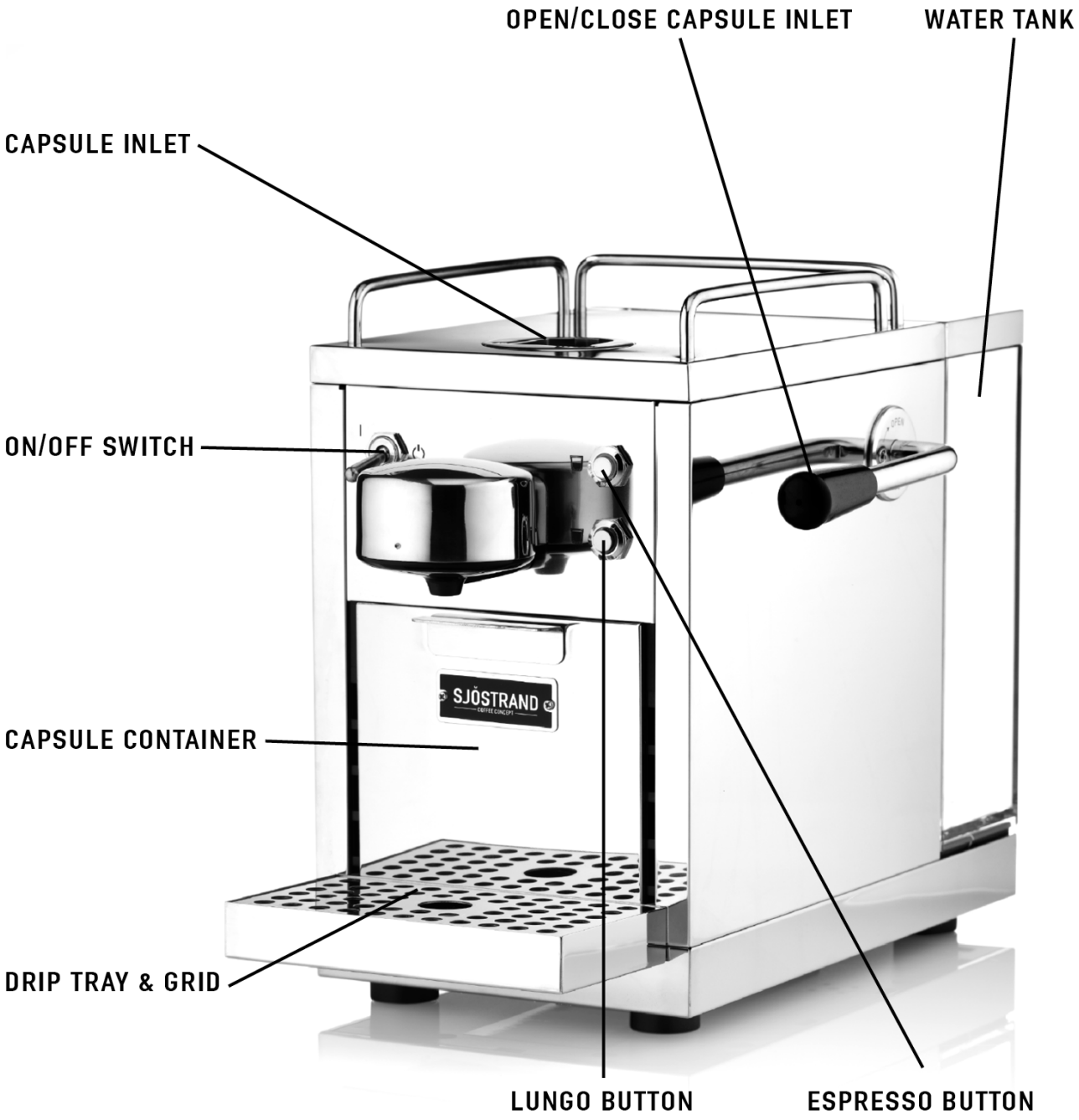
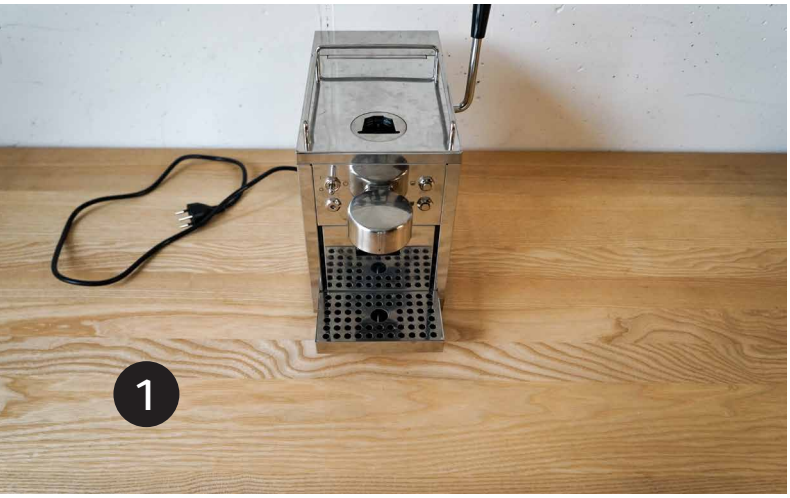
Findings

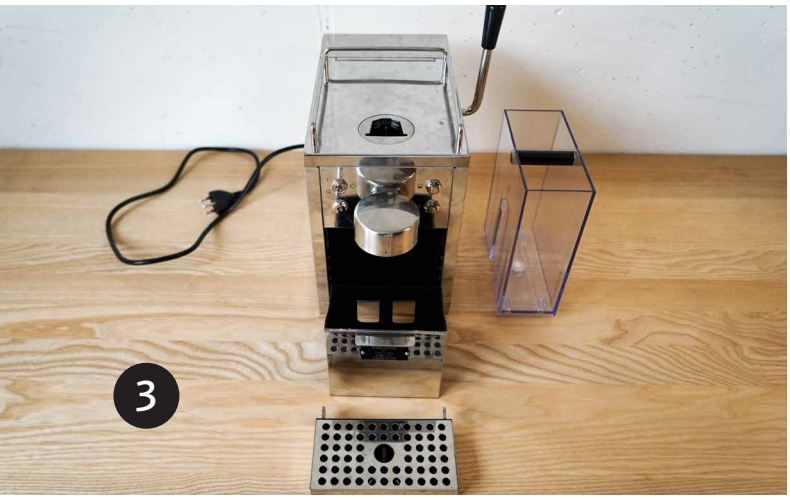
Product autopsy is a method used to gain better understanding of the design decisions that have been made in an existing product and product's life.

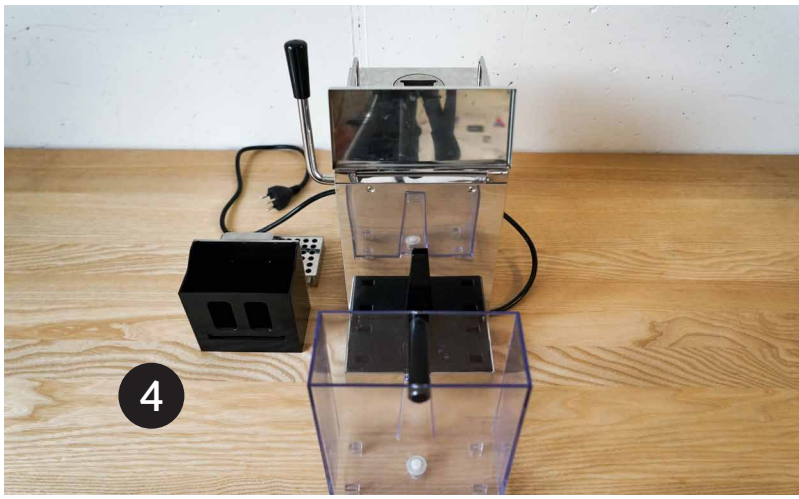
Inital Analysis

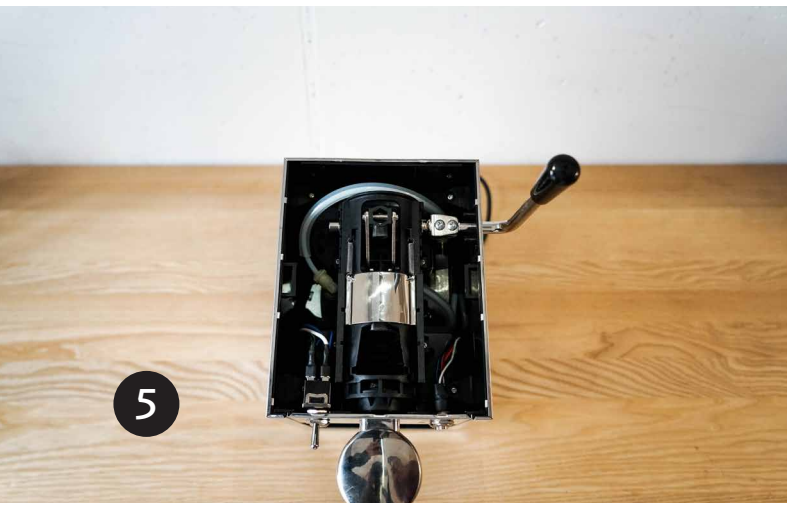


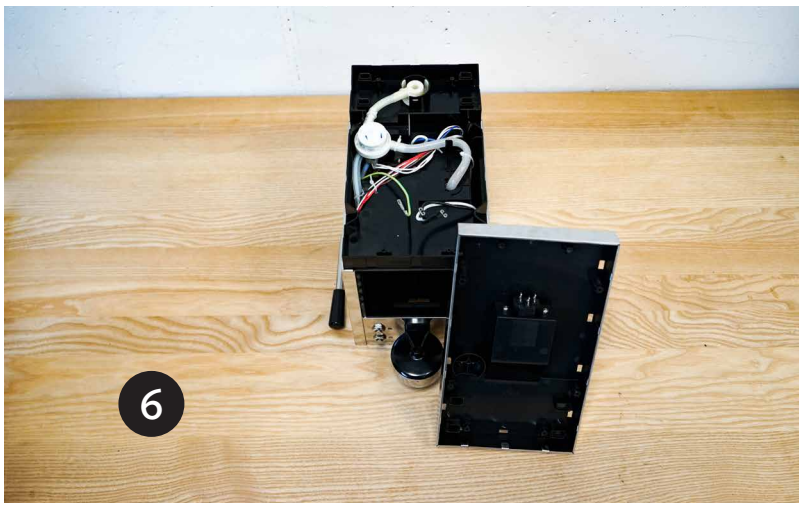
Disassembling Process

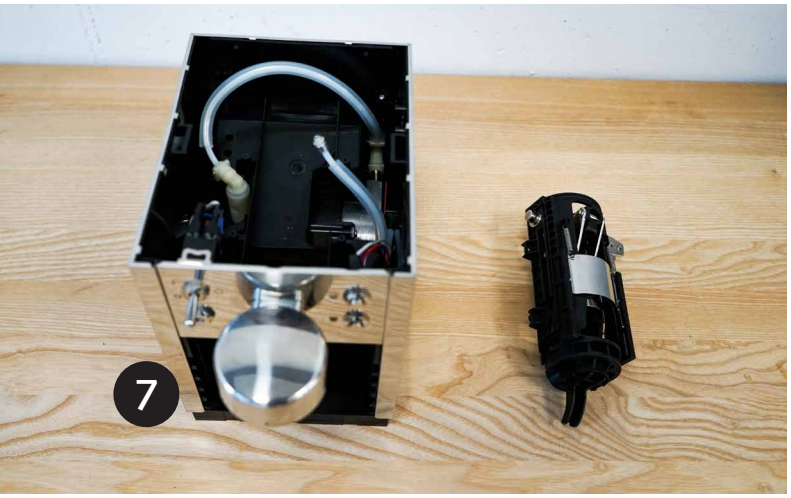


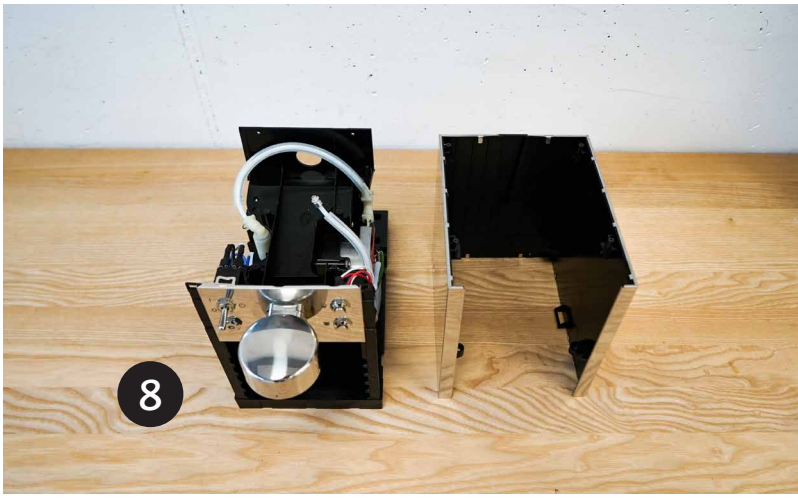


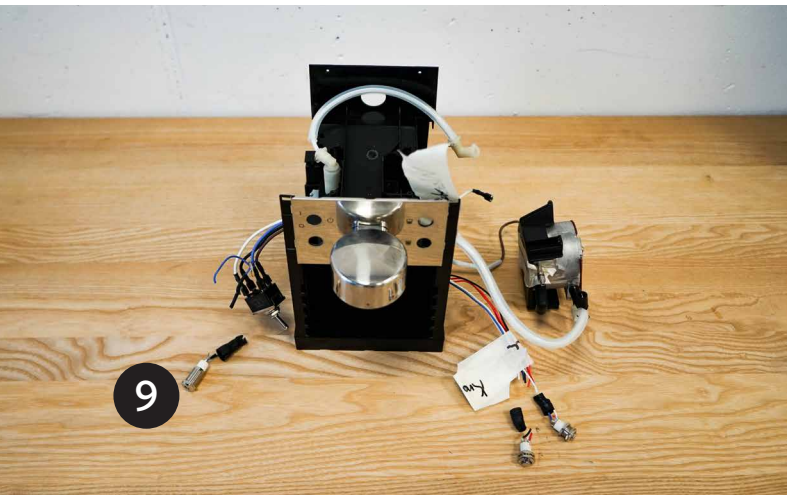


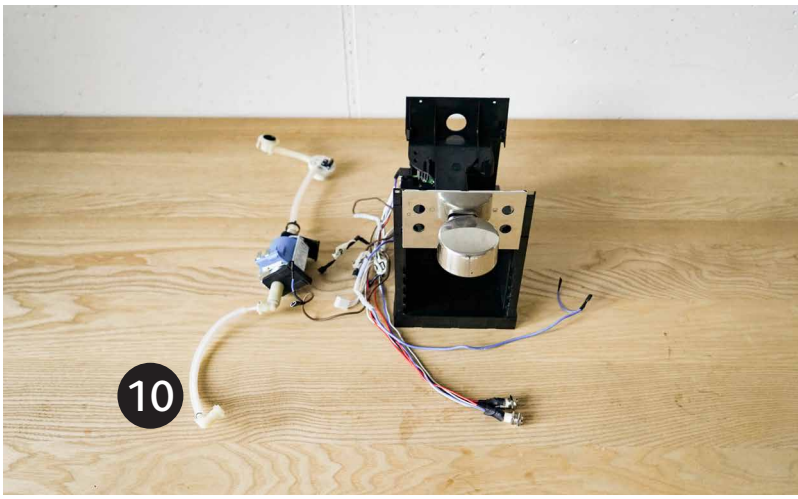


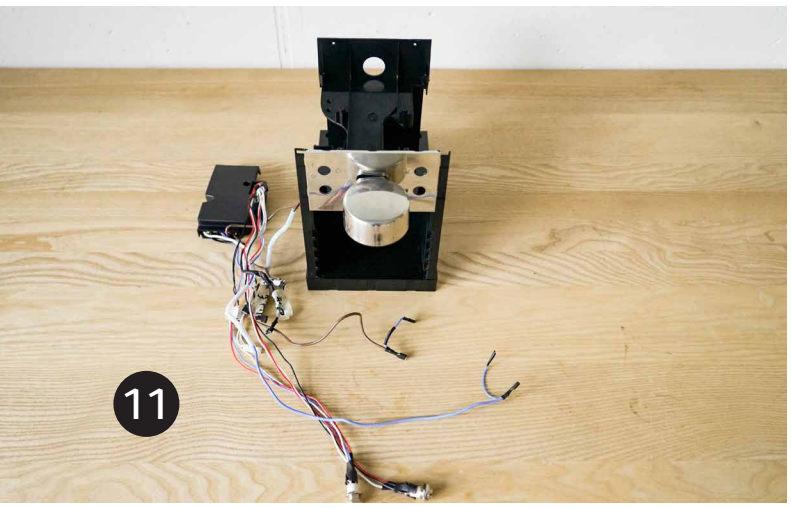


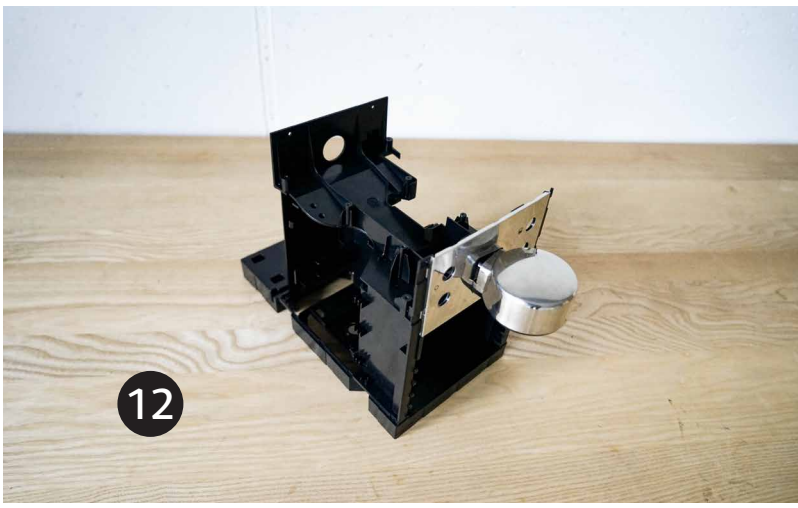




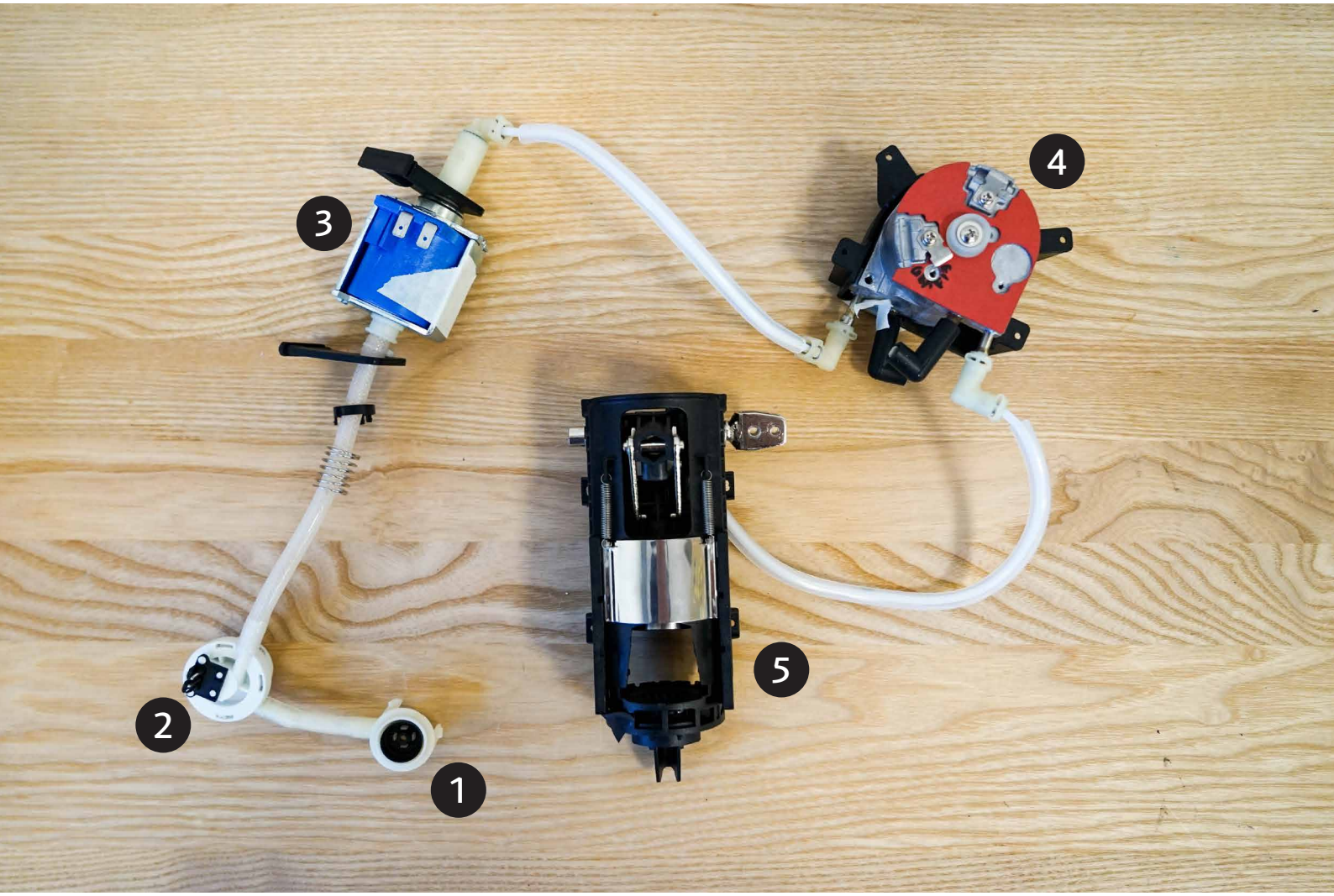






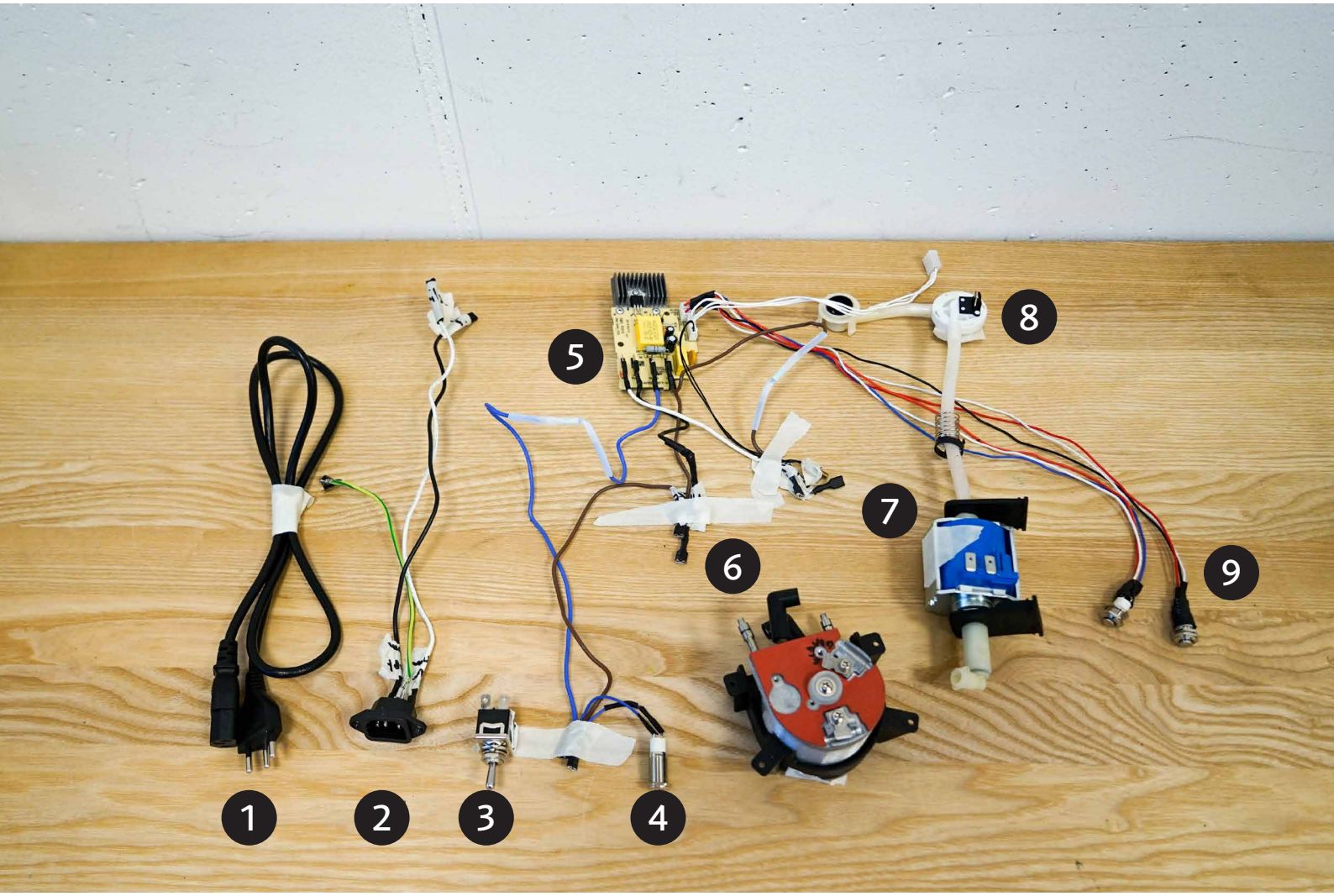


Functional Analysis



Essential process from water to coffee

1. Water entry point
2. Flow meter
3. Water pump
4. Flow heaters
5. Capsule loader

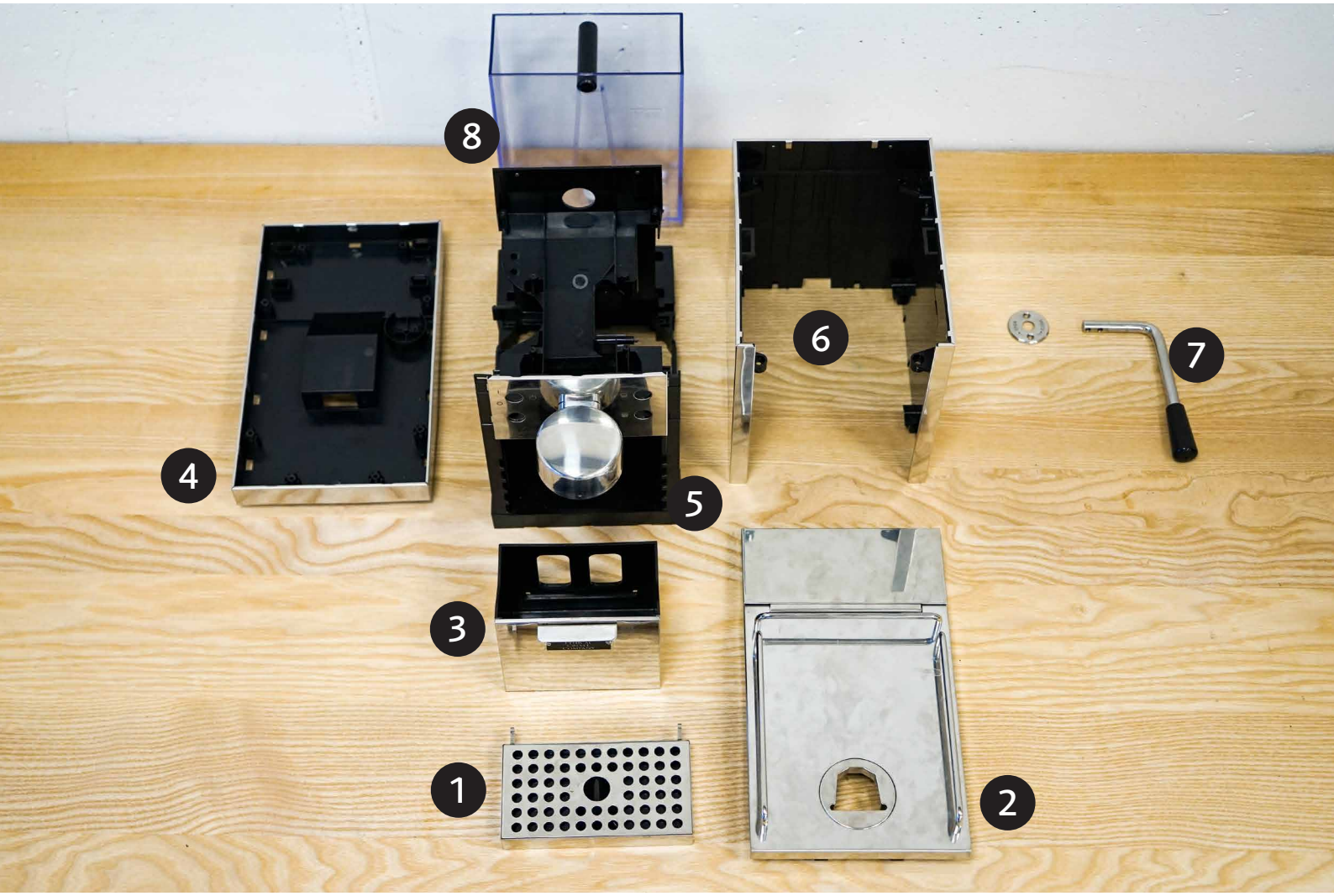


Overall process including power circuit

1. Power supply through socket
2. Power entry point incl. grounding
3. Power switch
4. Led to show current state
5. Circuit board
6. Power supply for the flow heaters
7. Power supply for the water pump
8. Power supply for flowmeter
9. Buttons to chose between espresseo and lungo

Find pictures of the detailed disassembeling of single parts in the Appendix

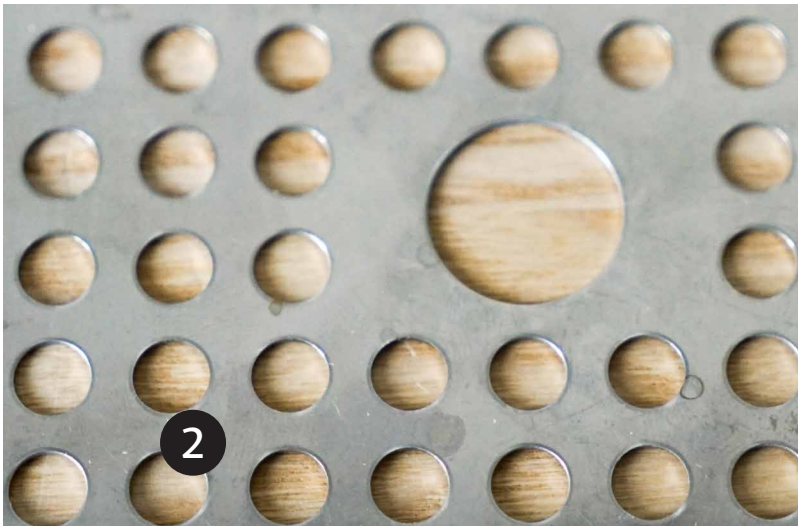
Enclosure Analysis



Enclosure parts

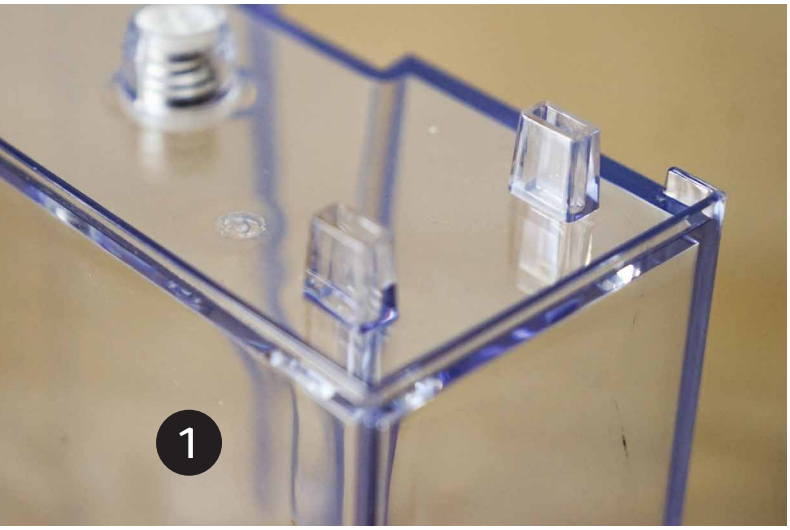
1. Drip tray with grid
2. Top cover with opening for capsule
3. Tray for used capsules
4. Bottom cover with opening for power plug
5. Basis element
6. Side and back cover
7. Capsule loader handle
8. Watertank

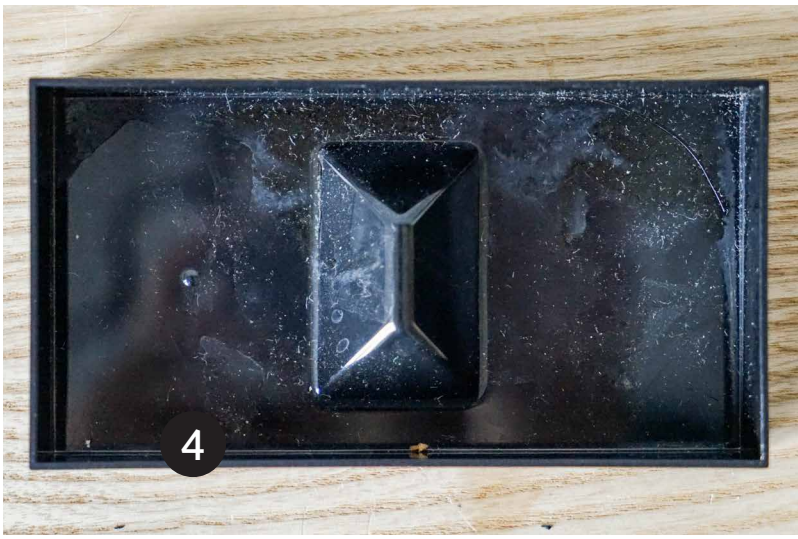
Material Analysis



Stainless steel parts

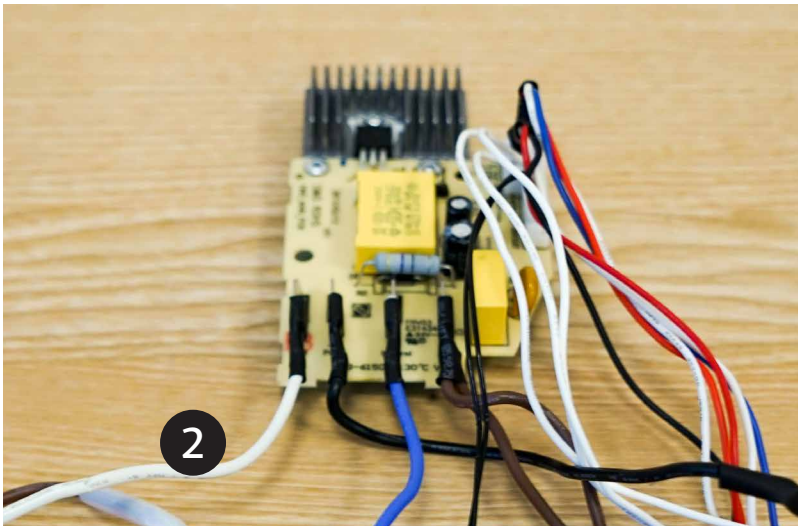
	Part description	Material	Processing
1	Outside surface	Stainless steel	Bent metal sheet
2	Drip tray grid	Stainless steel	Perforated metal sheet
3	Capsule entry point	Stainless steel	Welded metal sheet
4	Top barriers	Stainless steel	Bent metal profile

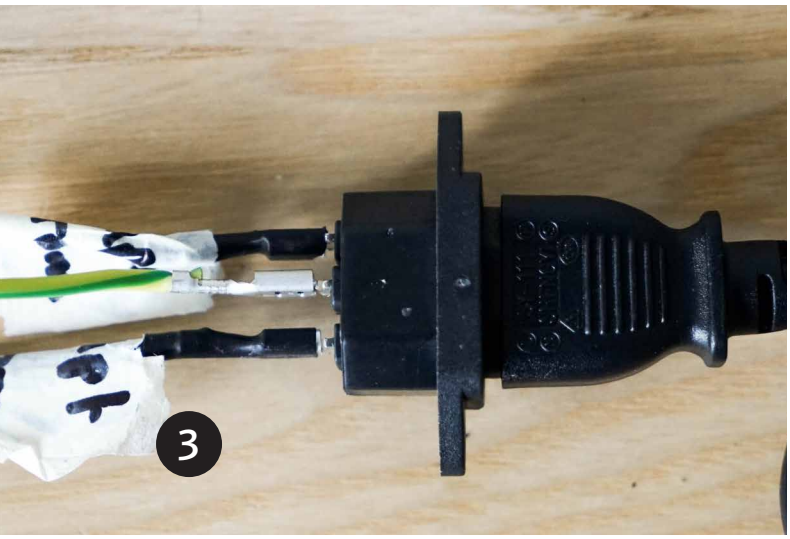


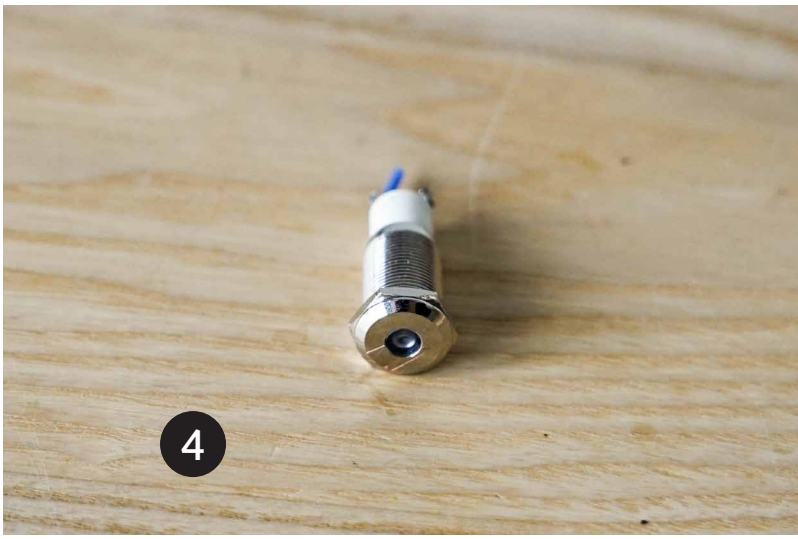


Plastic parts

	Part description	Material	Processing
1	Water tank	Plastic	Plastic injection molding
2	Top cover outside	Plastic	Plastic injection molding
3	Top cover inside	Plastic	Plastic injection molding
4	Drip tray	Plastic	Plastic injection molding, polished finish







Technical parts

	Part description	Material
1	Water tube	Plastic, aluminum, etc
2	Circuit board and wires	Fibre-reinforced plastic, aluminium, etc
3	Power plug	Plastic, Aluminum, etc
4	LED - display	Led, Stainless Steel, etc

Findings

- The surface material (stainless steel) gets dirty very quickly.
- Taking the machine apart was not possible without damaging the parts. The machine was clearly not made to be taken apart.
- We got a good understanding of how coffee machines function and what the essential parts are. (water pump, flow heater, capsule loader)
- The stainless steel was only used as an enclosure material to cover up the parts below, which were made of plastic. The stainless steel finish gives the machine an expensive look and thus can be sold at a higher price.
- Some parts of the machine were unexpectedly complex, for example the button / switch which itself consisted of 15 smaller parts.
- To remove the drip tray, one has to tilt it and thus it spills.

Discovery Phase

Product Autopsy

Competitor Comparison

Try It Yourself
Interview
Moodboard
Mindmapping
Function Analysis
Product Semantics

Web Competitior Comparison
Shop Competitior Comparison
Findings

A competitor products analysis is the process by which a product and its competitors in a specific market sector are examined and evaluated with respect to a predefined set of criteria.

Web Competitior Comparison

We have chosen these coffee capsule machines based on different criterias. On the one hand, we focused on machines with similar characteristics, for example operation (handle), price, pump pressure, material, etc. On the other hand, we have picked some coffee machines due to the user ratings, highest and lowest price level and different funcitonalities. We tried to cover the full variety of capsule coffee machines.

	Brand and Model	Capsule System	Materials	Milk Functions	Energy Efficiency Class	Coffee Quantity Regulation	Water tank Volume, L	Pump pressure, bar	Price, CHF
	Sjöstrand	Nespresso	Stainless steel	None	-	Manual	1.2	19	296.-
	Tassimo, VIVY 2	Tassimo	Metal, Plastic	None	A+	Unknown	0.7	3	49.-
	De'Longhi, Jovia	Nescafe Dolce Gusto	Aluminum, Plastic	None	A	Manual	0.8	15	71.-
	Senseo, HD6563	Senseo	Stainless steel, Plastic	None	-	Automatic	0.9	1	86.-
	Delizio, Carina	Delizio	Plastic	None	A++	Programming	0.9	19	99.-

	Brand and Model	Capsule System	Materials	Milk Functions	Energy Efficiency Class	Coffee Quantity Regulation	Water tank Volume, L	Pump pressure, bar	Price, CHF
	Krups, Essenza Mini	Nespresso	Metal, Plastic	None	A	Programming	0.6	19	115.-
	Spinel, Ciao	E.S.E	Plastic	None	A	Automatic	1	-	199.-
	Tchibo, Cafissimo Latte	Cafissimo	Unknown	Yes	A	Automatic	1L	-	199.-
	De'Longhi, Lattissima Touch	Nespresso	Plastic	Yes	A+	-	0.9	19	274.-
	Koenig, Gran Maestria Platin	Nespresso	Aluminum	Yes	A	Manual, Automatic	1.4	19	399.-
	Kitchen Aid, Artisan	Nespresso	Stainless steel, Plastic	No	A+	Manual	1.4	19	439.-

Source:
https://www.galaxus.ch/en/Comparison/327703-3451762-5996519-6345718-6492190-7723287-8852180-9062386-9426041-9497743

Find shop competitor analysis in the Appendix

Shop Competitor Comparison

Krups Pixie (Nespresso)

- Shortened heating time (approx. 25s)
- Automatic power-off function, machine switches off completely 9 minutes after last use
- Simple operation at the push of a button
- Cup programming: For individual cup filling quantity
- Automatic ejection of used capsules when opened, the empty capsules fall directly into the capsule container
- Removable water tank. Capacity: 0,7 l
- Electrical water level detection
- 1260watt power consumption
- Price: CHF 129.90

Krups Essenza Mini (Nespresso)

- Intuitive, simple to use and contemporary design
- Ultra-compactness: A very small device, easy to place and move in the kitchen
- 2 coffee choices: Espresso and Lungo buttons with automatic "Flow Stop" function - Espresso (40ml) - Lungo (110ml)
- The machine is heated up in 25 seconds
- Auto Power Off: This unit is equipped with a power saving function. After 9 minutes it switches automatically off.
- Price: CHF 99.90

De'Longhi Eclipse (NESCAFÉ Dolce Gusto)

- As a visual delight, this coffee machine enchants the palate with hot or cold coffee, tea and milk variations in a few moments
- A simple touch is all it takes, and the elegant circular machine opens automatically for beverage preparation
- The intelligent flow-stop technology stops the machine automatically after preparation
- Price: CHF 199.-

De'Longhi Stelia (NESCAFÉ Dolce Gusto)

- With stylish design, inspired by a drop of coffee
- The invisible water tank and the unique control surface; a touch of the finger is all it takes to enjoy modern beverage variations
- With a tap of finger user can select the size of the drink
- Price: CHF 149.-

Delizio Compact One II (wWith simple design to capture a small place.

- With four buttons to choose the size of the drink
- Heated up quickly in 15 seconds
- It works whisperingly quiet
- Price: CHF 179.90

Delizio Una Automatic (Delizio)

- Portion system
- It has two programmable buttons for automatic coffee reference
- Hight adjustable tray – suitable for different cups
- Heated up quickly in 15 seconds.
- Price: CHF 79.90

Findings

Web Comparison

- There are brands for the capsule systems and a brands for coffee machines
- The capsule system is important in regard to the price level of the machine. For example, machines that use the Nespresso System are more expensive, because you pay for the brand and marketing.
- Coffee machine that have a milk container or other fancy functions are more expansive than reduced machines.
- Handle and other eloborate design attributes make coffee machines more expensive.
- Coffee machines using metal-based materials are overall more expensive than the ones' using plastic-based materials.

Shop Comparison

- Coffee machines from the same brand have a similar form language.
- Plastic as an enclosure material allows for a wider, more organic form language.
- There are different capsule sizes, each machine operates only on one capsule size.
- Bigger capsules, like Nescafé Dolce Gusto, allow for a wider range of beverages, including milk beverages.
- Capsule marketing seems to be more important than the machine itself, since the capsules for each machine were presented next to it.

Discovery Phase

Product Autopsy
Competitor Comparison

Try It Yourself

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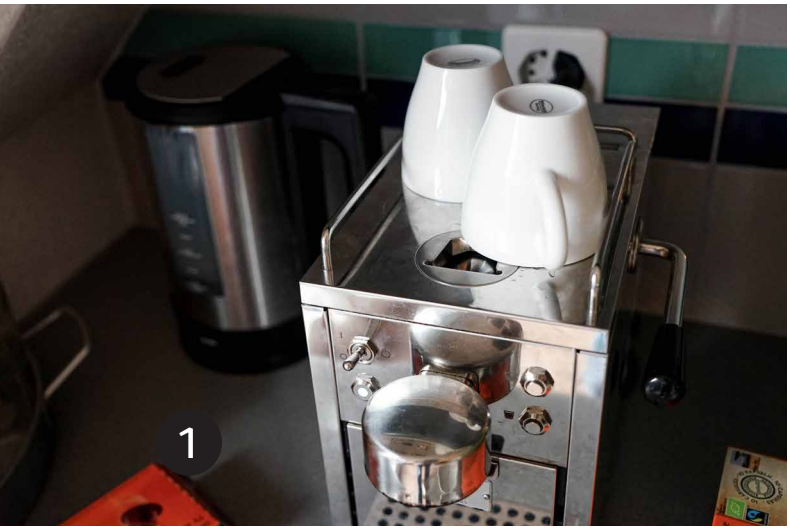
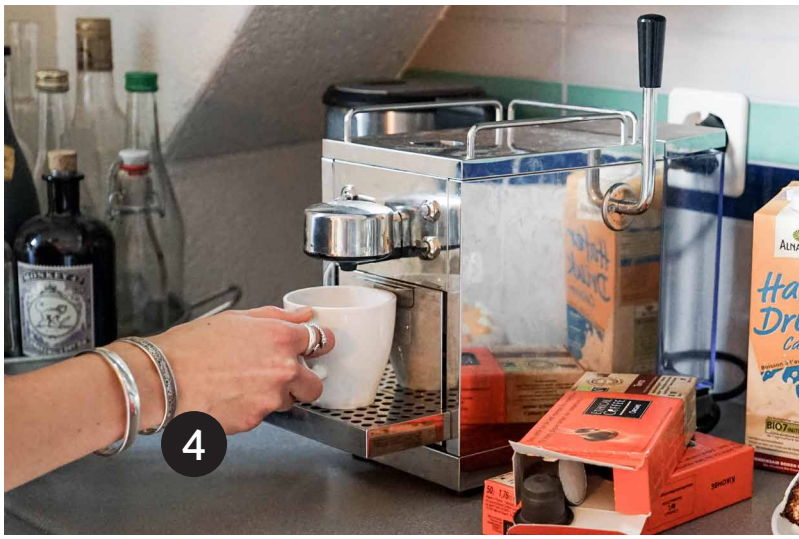
Photographic Documentary
Findings

`Try it yourself' is a research method that enables designers to gain an appreciation of how a product, service or environment is experienced by actual users.

Photographic Documentary





Process, adjusting the dripping tray

1. Cups can be placed on top of the coffee machine to be warmed up.
2. Cup does not fit under the present drip tray height
3. Drip tray can be moved further down
4. Place the cup on the drip tray

Process, load the coffee machine

5. Fill up the water tank, in regions where the water has chalk in it, the water would need to be filtered first
6. Switch the coffee machine on
7. Put the capsule into the coffe machine
8. Close the capsule loader by using the handle

Process, make the coffee

9 After the button stops flashing the coffee machine is heated up. choose between espresso and lungo by pushing the button

10 The coffee pours into the cup

11 Add sugar if needed

Process, emptying the capsule container

12 Try to open the capsule contrainer, but the drip tray needs to be removed first

13 The coffee machine drips on the finger, because the handle is right under the spout

14 Take out the container and empty it

Findings

- The space on top of the machine could be used for storing and warming up cups, but the surface does not get hot enough and has room for only one mid-sized cup. (See picture 1)
- The handle of the capsule container is so close to the coffee spout that by taking the container out the thumb touches the spout, which is messy and unhygienic. (See picture 13)
- When emptying the capsule container, the drip tray has to be taken out first. This is getting messy when the drip tray is full. (See picture 14)
- After turning the machine on the function buttons start blinking. It is not immediately clear that this indicates the warming up of the machine.

Discovery Phase

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Questions and Answers
Observations
Photographic Documentary
Findings

Interviews, a series of questions posed directly to the participants, are a way for understanding consumer perceptions, opinions, motivation and behaviour concerning products.

Questions and Answers

How do you like the appearance of the machine?

- Beautiful, fits anywhere
- Neutral
- Likes urban and metallic look of the machine
- Good
- Likes how metallic surface reflects, and cubical, simple form of the machine
- Looks a bit dirty, but in general likes the metallic appearance
- Minimalistic (positive)
- Housing could be more homely / friendly
- Looks dirty, looks only good when cleaned
- It's cool but she won't buy it because it looks cold, not homely

How did you experience using the machine? (Buttons, handle,…)

- Didn't figure out how to use handle, handle is stupid
- Learning curve, handle of the machine (because it's on one side you can't place the machine next to a wall)
- Function is simple but pushing the handle down needed a lot of force
- Her cup was a bit too big (didn't see adjustable height of drip tray), but otherwise the machine was easy to use
- Very intuitive and easy
- Very clear, easy
- Size of cup was an issue (didn't see adjustable height of drip tray), was easy to use, quite obvious
- It was quite simple for the first time, handle was not really obvious
- Obvious, you can't make a mistake because of capsule place
- On and off button was not obvious

What did you like about using the machine, and what not?

Likes:

- It was fast, she likes that buttons are in the front and have backlight
- Straight forward
- Simplicity
- Easy, fast, and very simple
- Fast, use without any obstacle, not a mess, the surface was shiny

- Handle
- Simple, fast
- Front of machine was good (function panel layout)
- Liked using the machine, on/off-switch, stainless steel looks professional
- Easy to use

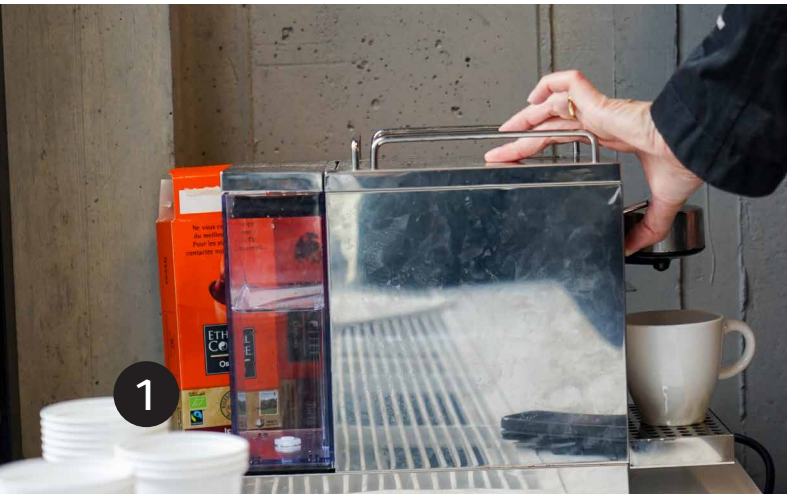
Dislikes:

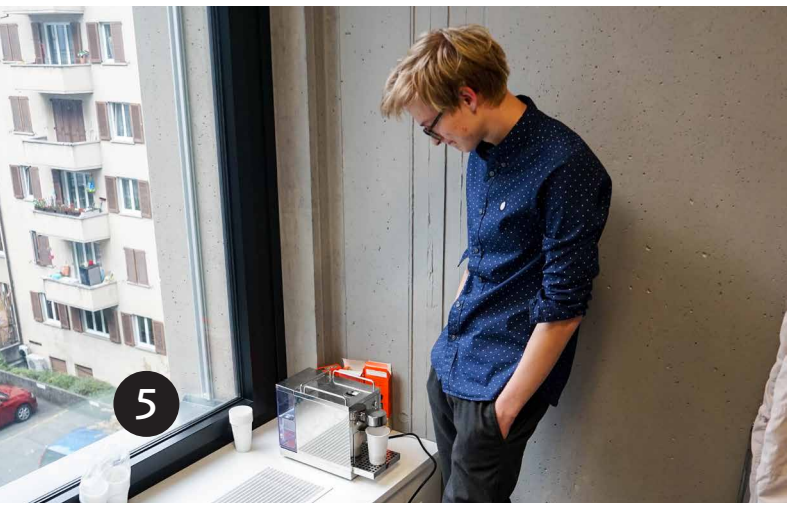
- Handle
- Not clear when to place in the capsule and use handle
- When buttons were blinking (didn't know why they were blinking)
- Cup didn't fit, fingerprints on machine, needs to be cleaned often
- The sound of the machine was too loud
- Machine looks heavy / bulky
- The light of the buttons, handle
- It looks expensive, didn't see any benefits from using this machine, on/off-switch is an issue
- A bit confusing

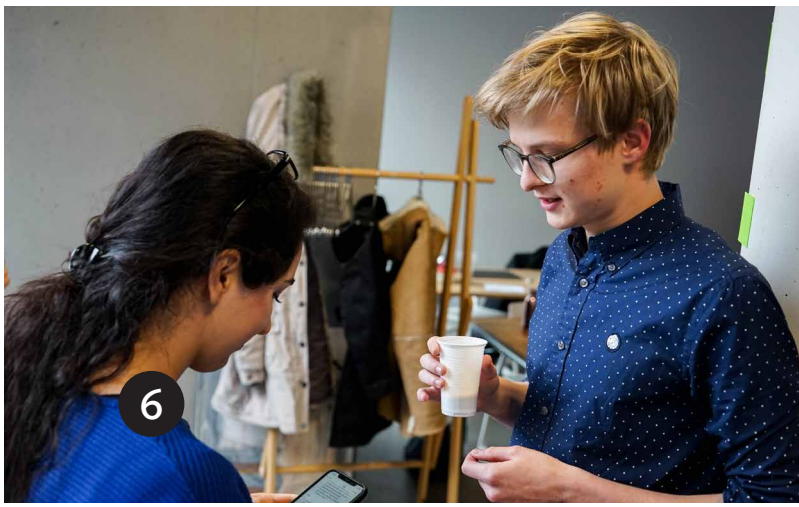
Any wishes for improvement?

- Handle
- Handle and the position of the handle (because machine can't be placed next to wall)
- Make the handle easier (because it needs a lot of force)
- Change material (because it shows fingerprints)
- No wishes for improvement
- Sound (make it less noisy)
- Integrated machine for both capsules and beans, make it smaller (less bulky)
- Include milk tank, explanation for handle and light (blinking) / make it more intuitive
- Easier capsule container emptying (because drip tray is in the way and will spill when full)
- Write "On" and "Off" next to on/off-switch

Photographic Documentary





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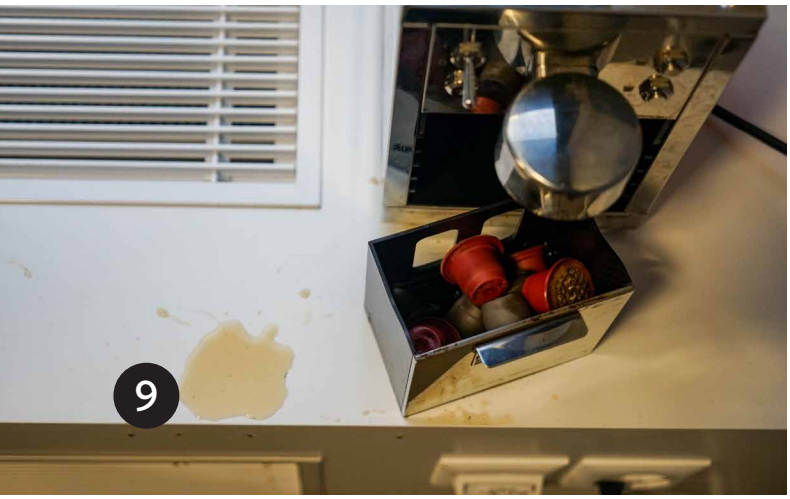
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Observations

General observations

- Blinking: most of them didn't understand the blinking, "What does it mean?", "Ah now it's warming up... or?"
- Indication that it's a capsule machine not clear for all (forgot handle or didn't see handle when it was down)
- Most people who used it had no problems with the machine
- Some didn't know what to do first (first push button or insert capsule / handle)

Handle

- Handle was not clear for everyone
- Someone didn't see the handle when it was down
- Someone didn't put handle down and the water came out at the bottom of machine on the table
- Handle needed too much force for some

Cup size

- Someone had difficulties because cup was too big, didn't get adjustability of drip tray

Someone empty the tray / capsule container

- Coffee water spilled out from drip tray when trying to empty
- Coffee water spilled out of capsule container
- Very messy

Findings

- There were issues with the handle, for example the amount of force that had to be applied, when the handle was down and thus not visible, or that the handle is positioned on the side and thus can't be placed close to a wall.
- Placing of the cup caused problems for some, since the adjustability of the drip tray is not so obvious. One of the cups even did not fit under the spout. (See picture 3)
- When emptying the capsule container, the full drip tray spilled over. Also, the capsule container was filled with water and spilled over when taking it out. (See picture 9)
- The surface material (stainless steel) looks dirty very quickly because all the fingerprints are visible. The machine only looks good when it is cleaned frequently. (See picture 10)
- The blinking as an indicator for warming up was not understood by all.
- Experienced coffee machine users had no problem using this machine and found it to be very intuitive and easy, while others found it to be confusing and unintuitive.
- Nobody complained about the speed of the machine.

Discovery Phase

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Competitor Comparison
Try It Yourself
Interview

Moodboard

Function Analysis
Product Semantics

Moodboard

Moodboards are used to give an overall atmosphere of a product or concept. They include pictures, sometimes also sketches and material samples.

Moodboard

For this moodboard we worked with the client brief from Hometech to filter out the feeling they are trying to get across. Since the coffee machine is intended for a variety of indoor settings, such as living and working environments, we tried to get across an inclusive and neutral feel. It should also be suitable for users of different ages and backgrounds.
The atmosphere we thus chose for the moodboard is modern, simple, warm and friendly. The moodboard gives ideas for possible shapes, materials and colours, which according to Hometech should be elegant and simple but still homely. We drew inspiration from the warmth and cosiness of drinking coffee, and the shape of coffee beans.

Discovery Phase

Product Autopsy
Competitor Comparison
Try It Yourself
Interview
Moodboard

Function Analysis

Product Semantics

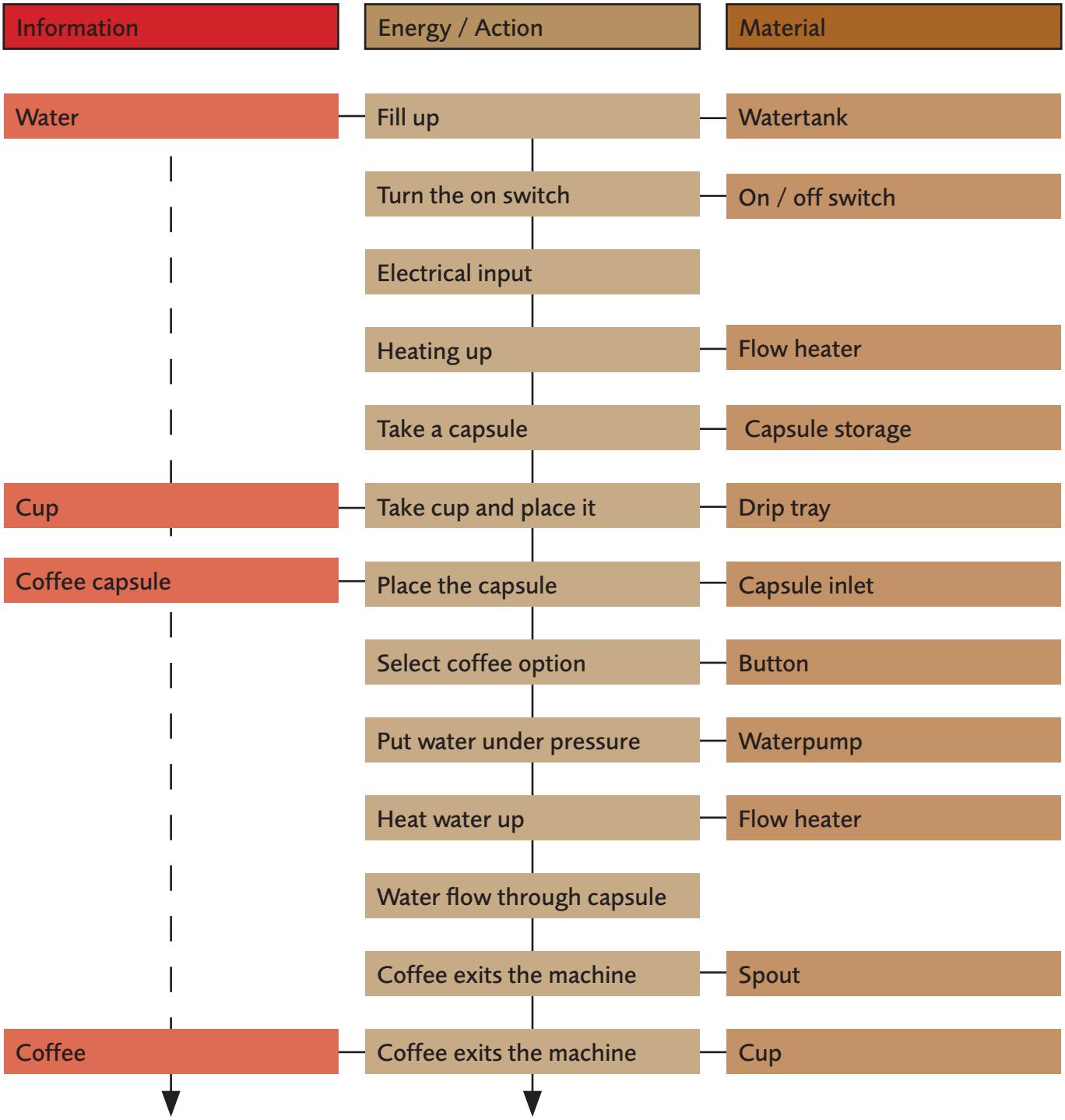
Morphological Chart
Function Structures
Customer Journey

Function analysis is a method for analysing and developing the function structure of an existing product concept. It helps to describe the intended functions of the product and relate them to its parts and 'organs'.

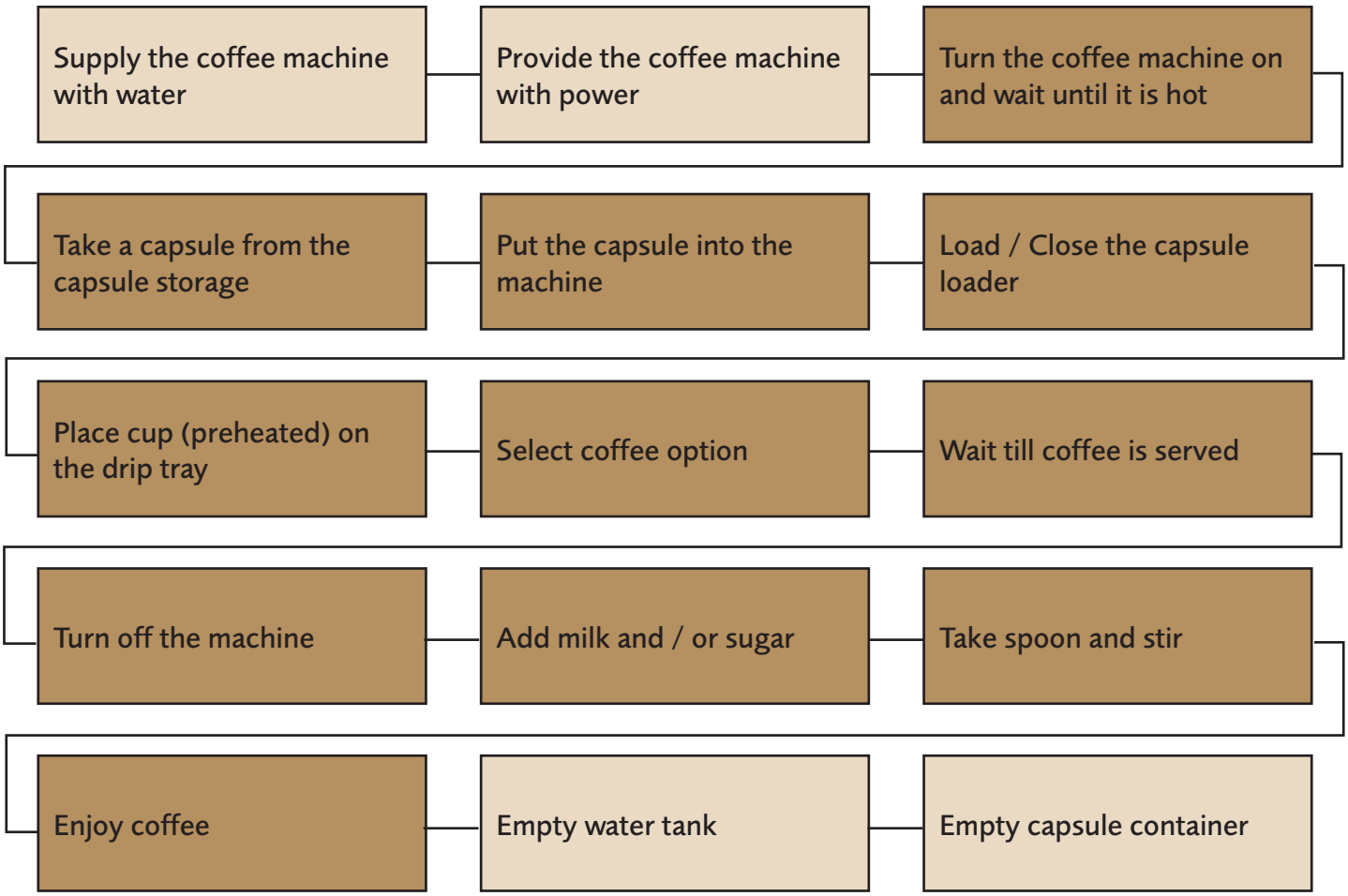
Morphological Chart

Function	Means					
Supply water	connected to water pipe	water tank	integrated lime filter			
Insert capsule	on top	front	capsule magazine / integrated storage	filter holder for capsule and ground coffee		
Choose coffee	button	switch (coffee / espresso)	touchpad	voice / smart home	turning switch	remote / phone app
Outside material	stainless steel (brushed)	glass	polymer (recycled)	aluminium (recycled)	wood	organic fibres (flax?)
Form	cubical / straight	organic form	round / cylindrical	mix of cube and round		
Turn on / off	switch	button	voice	automatic (turn off)	program -mable	
Loading mecha-nism	handle (top / side)	automatic	by choosing function			
Drip tray	round holes	slits	round	square / angular		

Function Structure



Customer Journey



Discovery Phase

Product Autopsy
Competitor Comparison
Try It Yourself
Interview
Moodboard
Function Analysis

Product Semantics

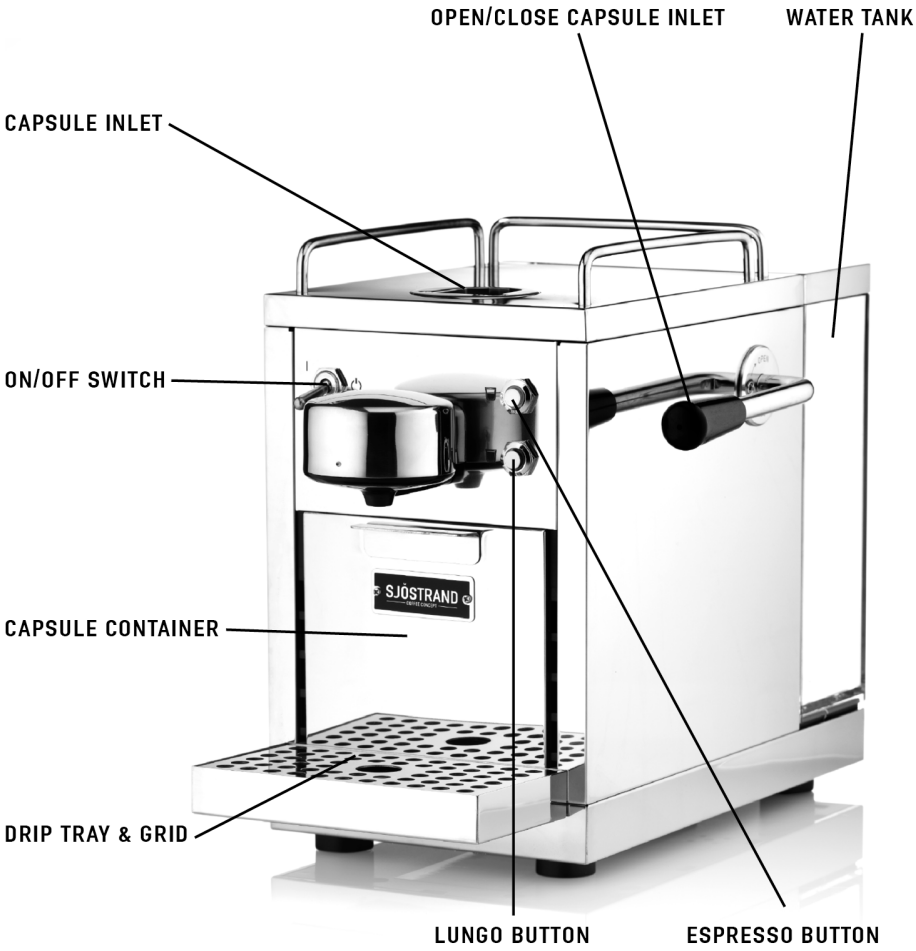
Appearance Functionality
Practical Functionality
Symbolic Functionality

Product semantics are used to get information about the product language, they are a study of the symbolic qualities of man-made forms in the context of their use.

Appearance Functionality

Form: The form of the coffee machine is cubical, geometric and vertical.
Material: The enclosure material is stainless steel.
Surface: The surface is shiny and reflecting.
Color: Due to the stainless steel surface the color is silver.
Gestalt Concepts: The Gestalt concept of the coffee machine is additive, because the functions of the machine are optically discernable.
Scale of Perception: relaxing, calming

Practical Functionality



The coffee machine consists of clearly distinguishable parts, which all have their functions. Examples are the clearly visible hole for the capsule, and also the handle, which is for loading. The on/off-switch on the panel, as well as the function buttons for lungo and espresso, are self-explanatory. Further, it is clear where to place the cup, since the spout and drip tray indicate the outlet of coffee. The water tank is transparent, so the water level is clearly visible. After turning the machine on, the function buttons start blinking, indicating the warming up of the machine.

Symbolic Functionality

The coffee machine looks rather traditional, but the design is timeless. Also, the machine has a rational, serious and cold look, reminding of Scandinavian design.

Semantical Differentiator

	-3	-2	-1	0	1	2	3	
old								young
cold								warm
traditional								modern
natural								artificial
strong								weak
rational								emotional
funny								serious
extraordinary								casual
interesting								boring
luxury								modest
active								passiv
overloaded								simple
dynamic								static
new								well-known
extrovert								introvert
hard								soft
elegant								ungainly

Define Phase

Insights
Requirements

The define phase is about structuring the gathered information. The research outcomes should be described, followed by a requirement definition. This requirement brief will be the foundation for the development phase.

Define Phase

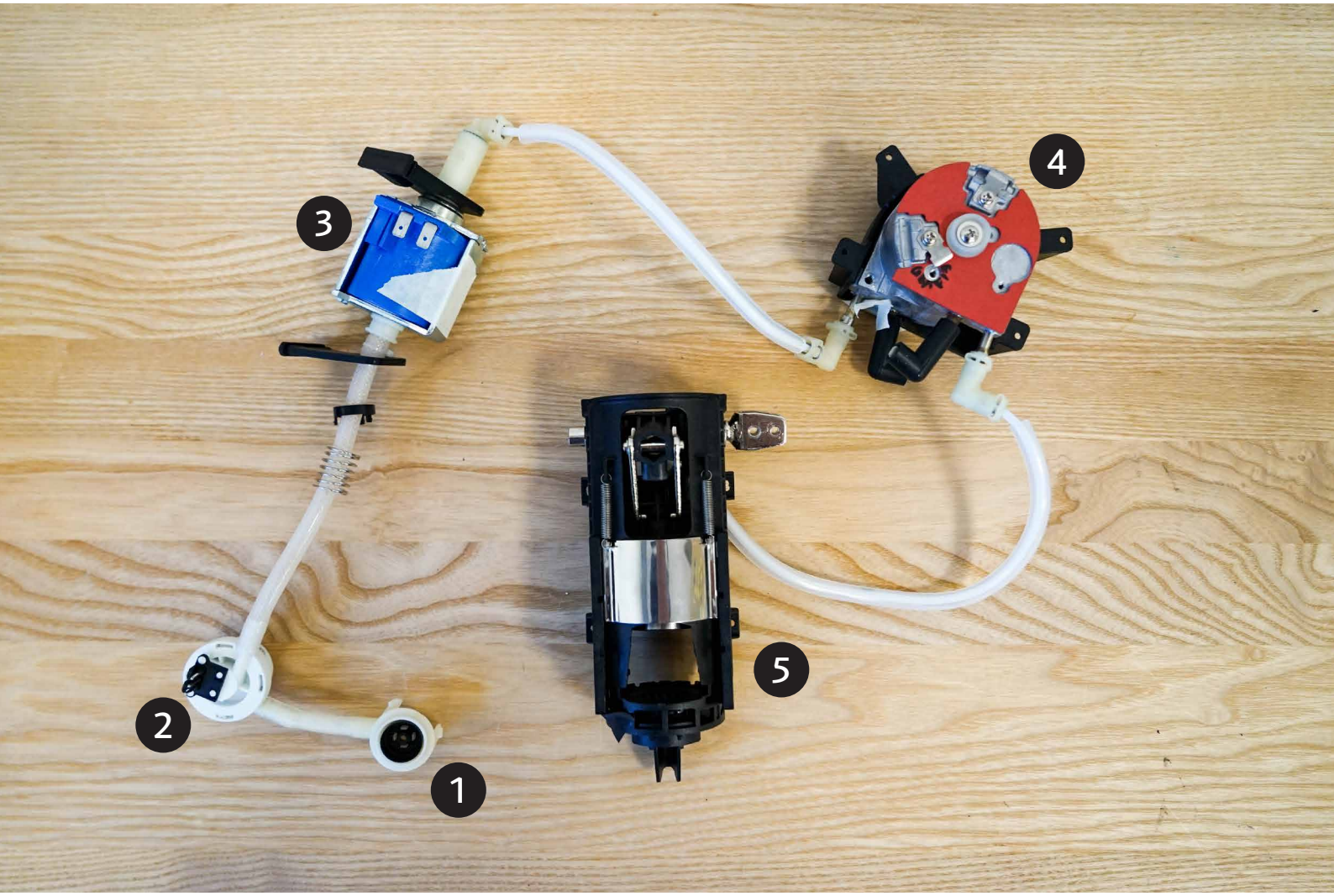
Insights

Requirements

Functional Principles
General Insights
Issues

Insights are the summery of the most important findings from the research conducted.

Functional Principles

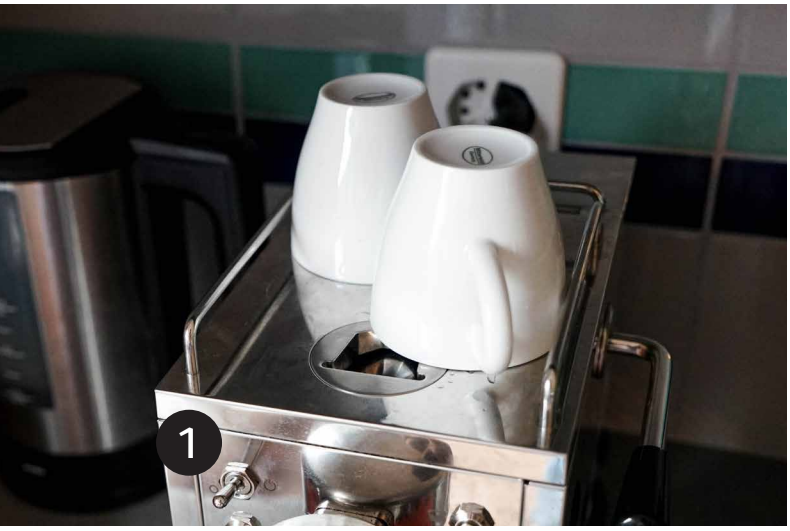


- Reduced to the main functional parts, a coffee machine consists of 5 different parts: ❶Water entry point with Watertank, ❷ Flow meter, ❸ Waterpump, ❹ Flow heater and ❺ Capsule loader with a spout.
- Firstly, the water in the watertank enters the coffee machine through water entry point. It gets roughly filtered. Further, the flow meter measures the amount of water that enters the pump. The pump builts up a pressure of 19 bar, which is needed to push the water later through the capsule. Before the water reaches the capsule, it gets heated up by the flowheater. When the coffee machine intially is turned on, the flow heater needs some time to heat up, as the water runs through it always with the same speed. After the water reaches the right temperature, it flows through the coffee capsule.
- The flow meter, the pump and the flowheater require electricity. The capsule loader works with manual force. The water entry point works with gravity.

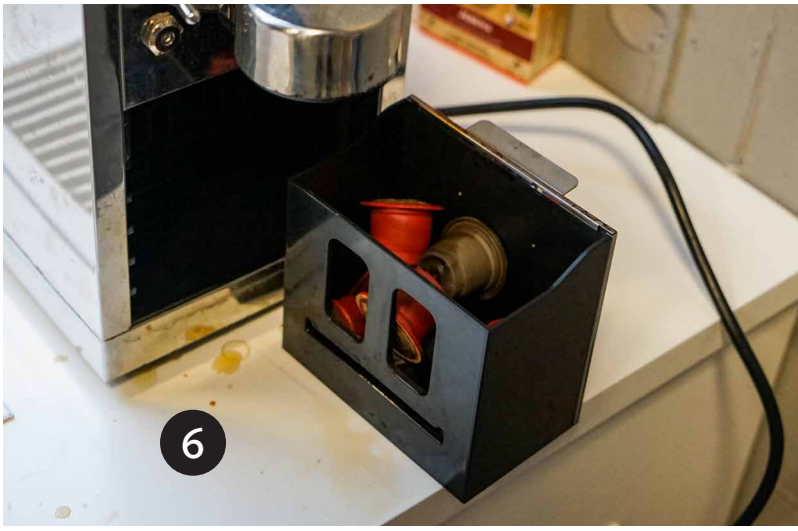
General Insights

- From the product autopsy we got a good understanding of how capsule coffee machines function and what the essential parts are. (Water entry point with watertank, flow meter, waterpump, flow heater and capsule loader)
- Further, we realized that the stainless steel was only used as an enclosure material to cover up the parts below, which were made of plastic. The stainless steel finish gives the machine an expensive look and thus can be sold at a higher price.
- From comparing different coffee machines online and in a shop we noticed that handles and other elaborate design attributes make coffee machines more expensive.
- Also, coffee machines that have a milk container or other additional functions can be sold at a higher price than reduced machines.
- In addition, plastic as an enclosure material allows for a wider, more organic form language.
- Product comparison and the user observation revealed that coffee machines with less functions are easier to operate and thus suitable for a wider range of users, which is important to our client.
- From the store competitor comparison and mindmap we figured out that there is also much emphasis placed on complementary products such as capsules.
- From the observation and try-it-yourself we recognized that backlit buttons can help guiding the users through the process of making coffee.
- From the mindmap and the morphological chart it became evident that there are different options for loading the capsule: it can be manual (e.g. handle) or automatic.
- In the interviews it was often mentioned that the stainless steel surface gives a professional look and thus does not look very warm and homely. This finding is also visible in the semantical differentiator.
- From the moodboard we found out that the atmosphere of drinking coffee is warm and friendly; this can be reflected in the materials, colors and shapes of the coffee machine.
- From the product semantic analysis we learned that a good coffee machine clearly communicates the functions by applying an intuitive form language.
- From the product semantic analysis we also learned that neutral and simple design is timeless and is not affected by emotions or trends.

Issues



1. The space on top of the machine cannot be used economically. The flowheater has not enough heat to heat up the cups.
2. The handle of the capsule container is so close to the coffee spout that by taking the container out the thumb touches the spout, which is messy and unhygienic.
3. There were issues with the handle, for example the amount of force that had to be applied, when the handle was down and thus not visible, or that the handle is positioned on the side and thus cannot be placed close to a wall.
4. Adjustability of the drip tray is not very obvious.



5 When emptying the capsule container, the full drip tray spills over because the mechanism of the drip tray forces you to tilt it.

6 The capsule container was filled with dirt water and spilled over when taking it out because there is a slit in it.

7 The surface material (stainless steel) looks dirty very quickly because all the fingerprints are visible. The machine only looks good when it is cleaned frequently.

Define Phase

Insights

Requirements

Requirements are created through the insights to give direction for the development phase.

Requirement Definition

Requirement definition

- The surface materials should be resistant to fingerprints and other stains.
- Emptying the capsule container or the drip tray should be easy and not cause a mess.
- The capsule container should be removable without touching the spout.
- The loading of the capsule should be easy and intuitive. If the machine has a handle for loading, it should be clearly visible, easy to operate and using space economically.
- Operating of the machine should be clear and intuitive.
- The machine should be suitable for users of different ages and in different settings.
- The shape of the machine should be elegant and simple, but still homely.

Development Phase

Product Language
Ideation
Concepts

The development phase is about creativity and ideation. By sketching and quick prototyping, different solutions are explored. The phase concludes in a concept selection.

Development Phase

Product Language

Ideation
Concepts

Poduct Language

Product language is the way a product communicates to the user and how it indicates the functions of the product.

Product Language

What is the contextual interrelationship (product to human, product to space, product to object)?

- The coffee machine should be humble, and not fight for the user's attention.
- The machine should be neutral and small, so it fits into a broad range of surroundings.
- The objects (such as cup, capsule and water) should work seamlessly with the machine and not cause any problems.

What is the physical, sensual and social perception (experience)?

- The size of the machine should be rather small, the width of it should not exceed 15 cm, and the height should not exceed 30 cm.
- The parts of the machine should be rather integrative, and thus build a holistic, calm unity.
- Using the machine should put emphasis on the experience of preparing and drinking coffee, without adding any unnecessary stimuli.
- Materials should be sustainable both environmentally and economically.

What is the practical usability and are there operational demands?

- The operation should be intuitive and simple, and not cause confusion.
- Coffee functions: 3 different amounts of water, manual button for water.
- The handle, capsule container, drip tray, water tank and operation buttons need to be practical.

What are the operational indicators?

- The handle should be on the top of the machine, it could be designed in a way that it hides the capsule hole and by closing it the capsule is loaded.
- The capsule container can accessed from the side of the machine.
- The water container is taken out from the back top or side.
- The spout and drip tray indicate where to place the cup.
- The buttons are located in a visible space and clearly indicate the coffee options.

Development Phase

Product Lanugage

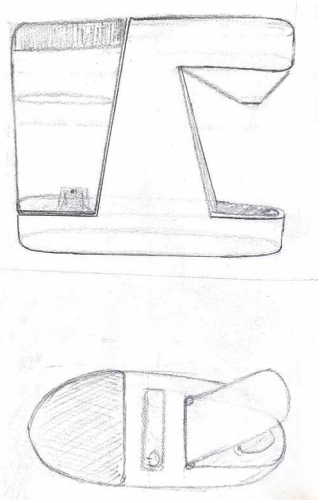
Ideation

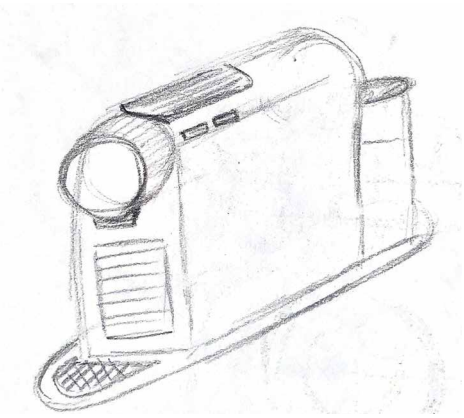
Concepts

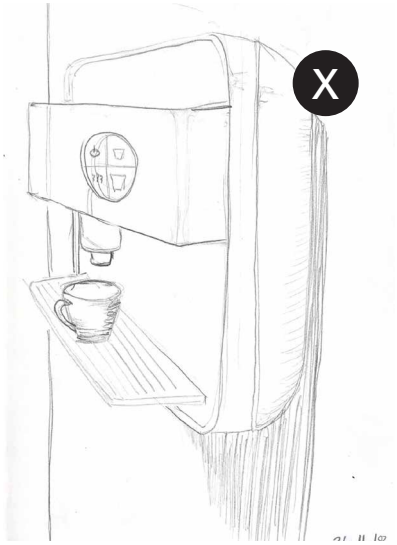
Ideation Sketches
Ideation Model
Sketching Insights
Model Building Insights

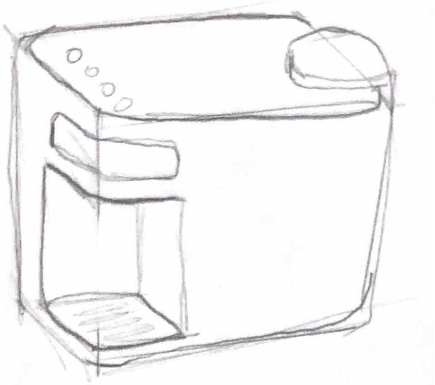
Ideation is the phase where a lot of ideas are collected and explored, in order to gather a big amount of possible solutions.

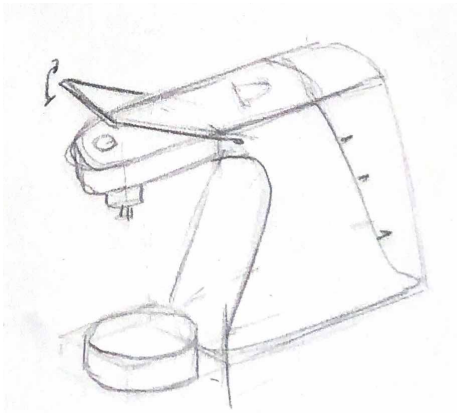
Ideation Sketches

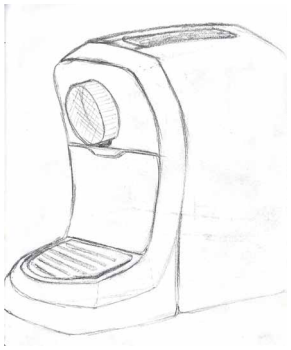


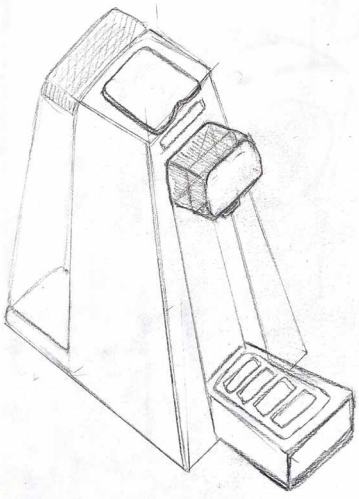


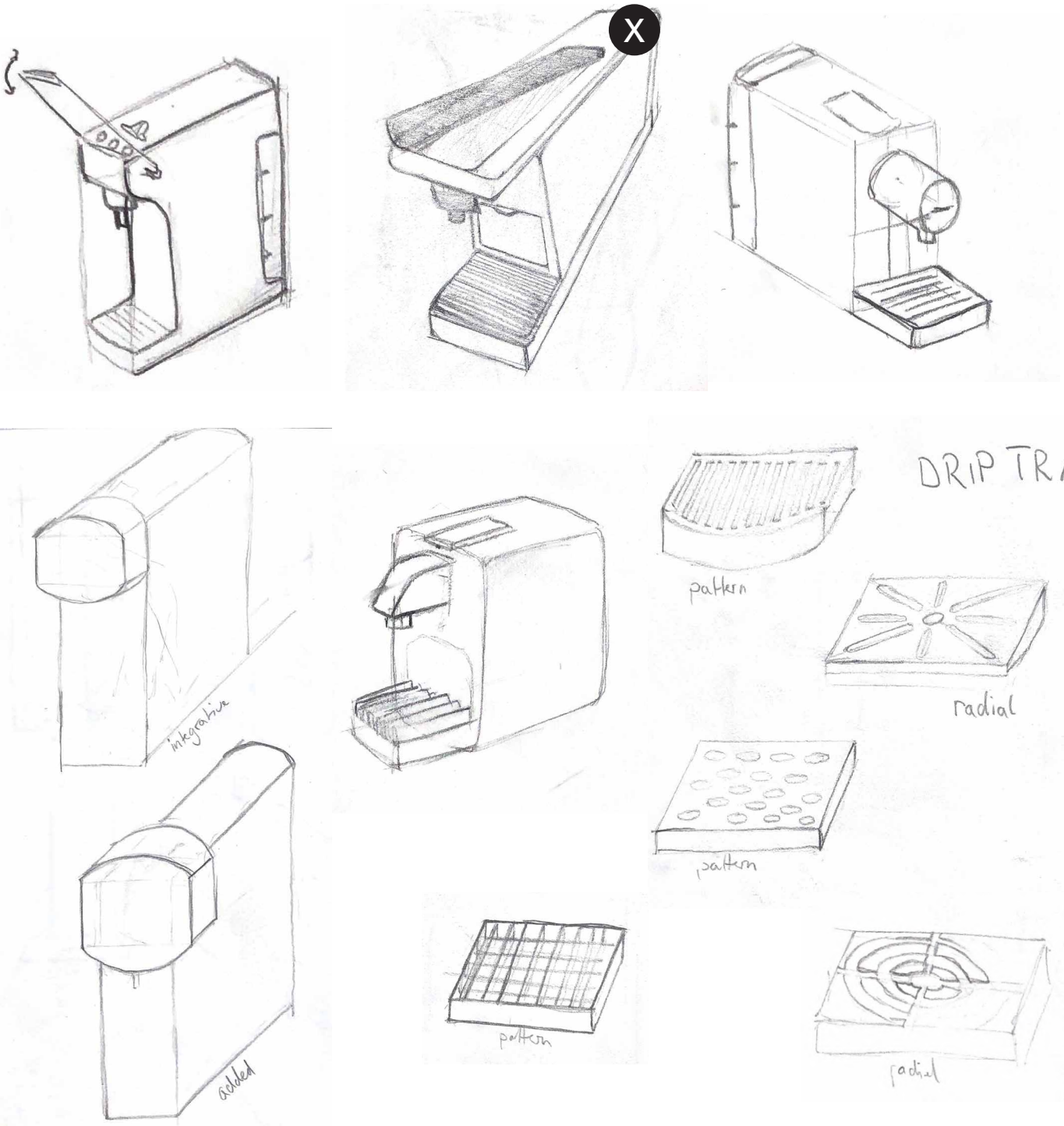






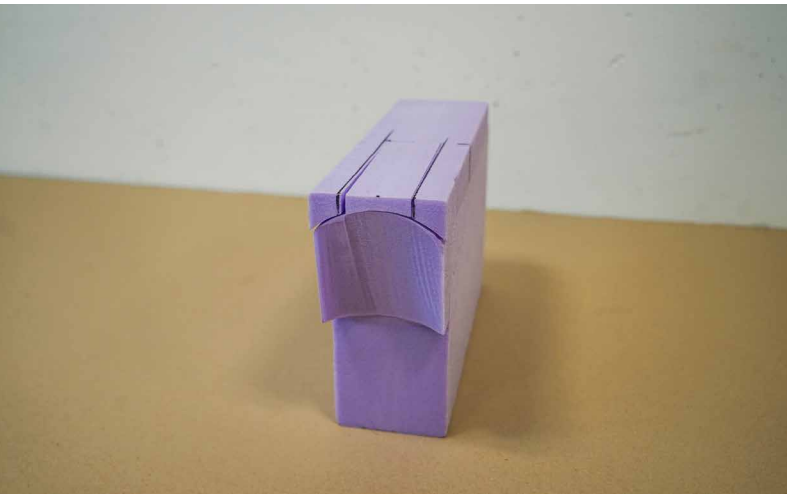




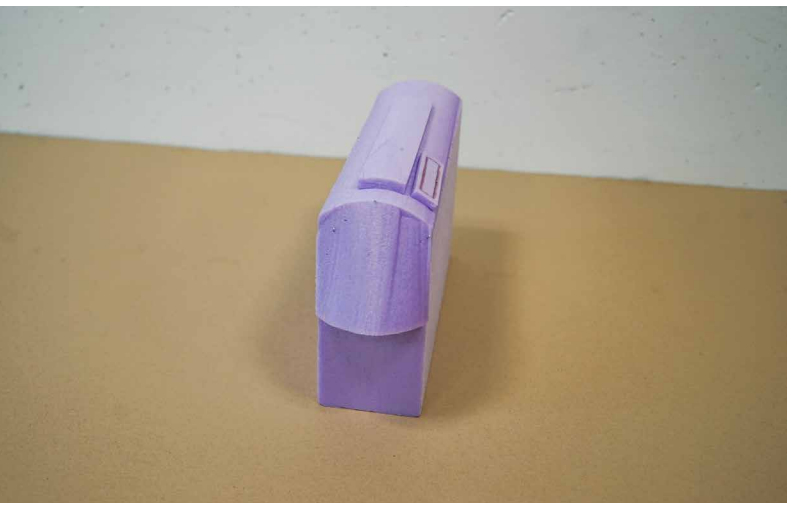
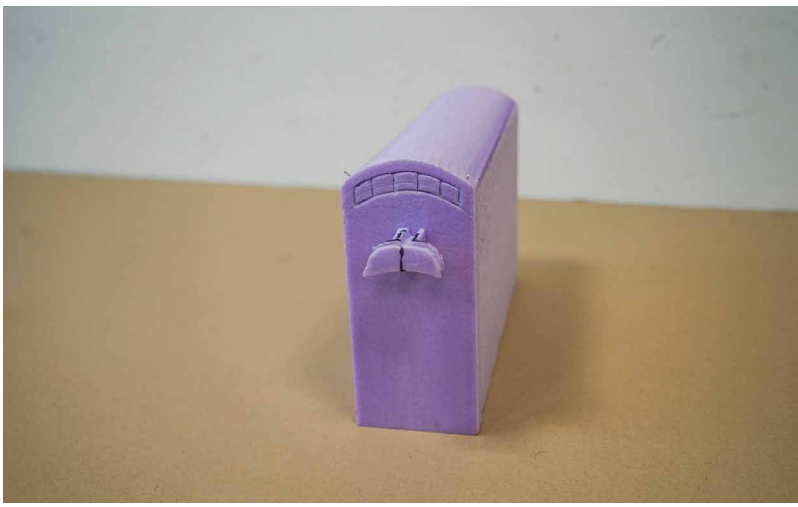


Further sketches can be found in the appendix.

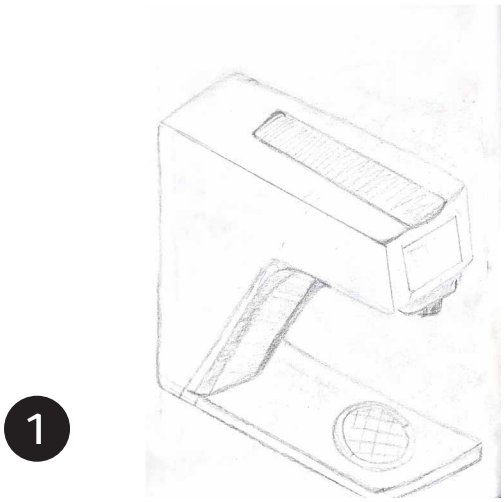
Ideation Models

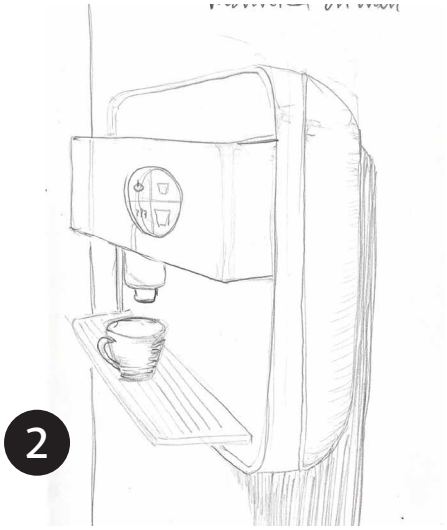


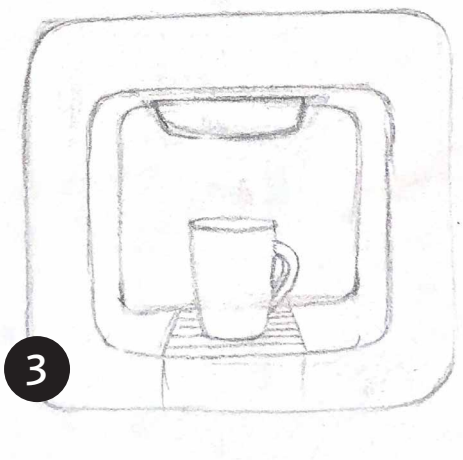


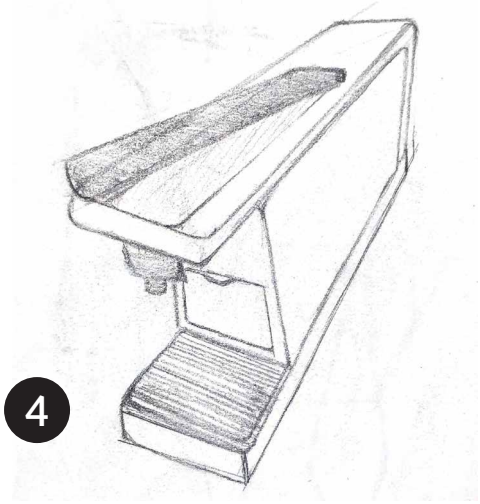



Sketching Insights





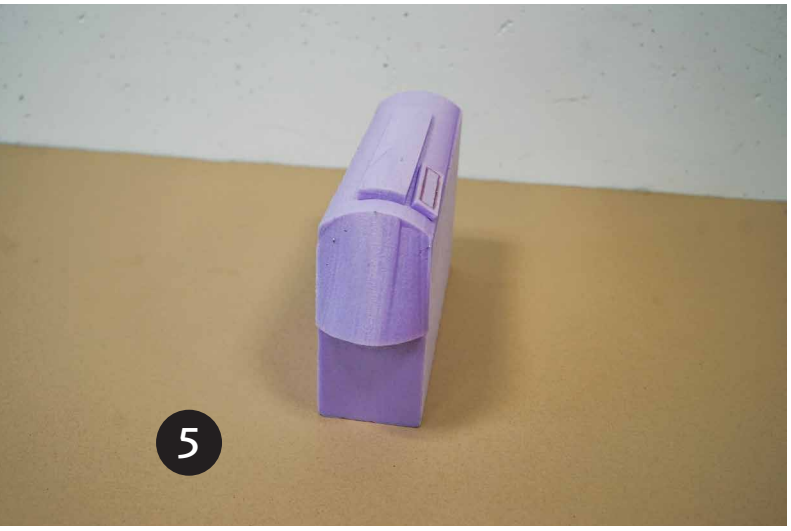


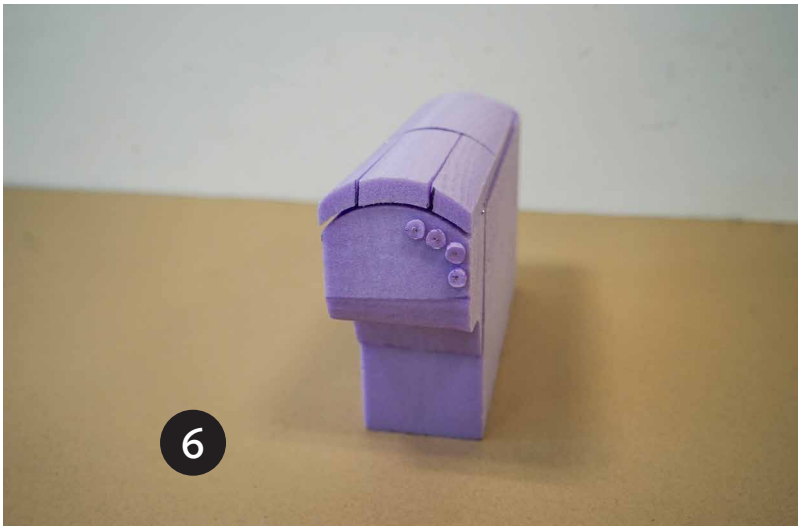


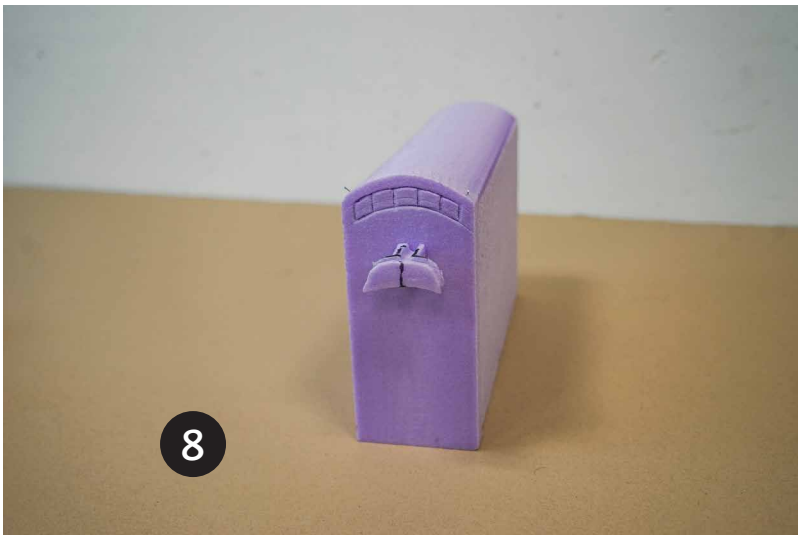
Sketching insights

1. By creating space for the cup under the coffe machine, it feels like the machine gives space to the coffee experience.
2. A wall mounted coffee machine is extraordinary and can be practical in space with little storage. Nevertheless it is complicated mount it to the wall.
3. With this machine we liked the way the cup is placed inside of the coffee machine, but decided not to go with this idea since it takes a lot of space on the sides.
4. For the handle, we really liked the idea of having the handle on top, so it saves space on the side. Also, the capsule inlet can be placed under the handle to make the machine more sleeker.

Model building Insights







Model building insights

5 We liked the fact that the spout is covered under the overhang, that takes up the round form of the coffee machines body.

6 The intergral handle makes the machine look very interesting. The buttons are rather additive, which puts emphasize on the choice the user have to make.

7 In this variation the spout is coming out from the coffee machine and allows the user to observe how the coffee is streaming into the cup.

8 This machine is reduced to the spout, which has to form of traditional filter holders. Like this an authentic traditional coffee experience can be created, even though the machine works with capsules.

Development Phase

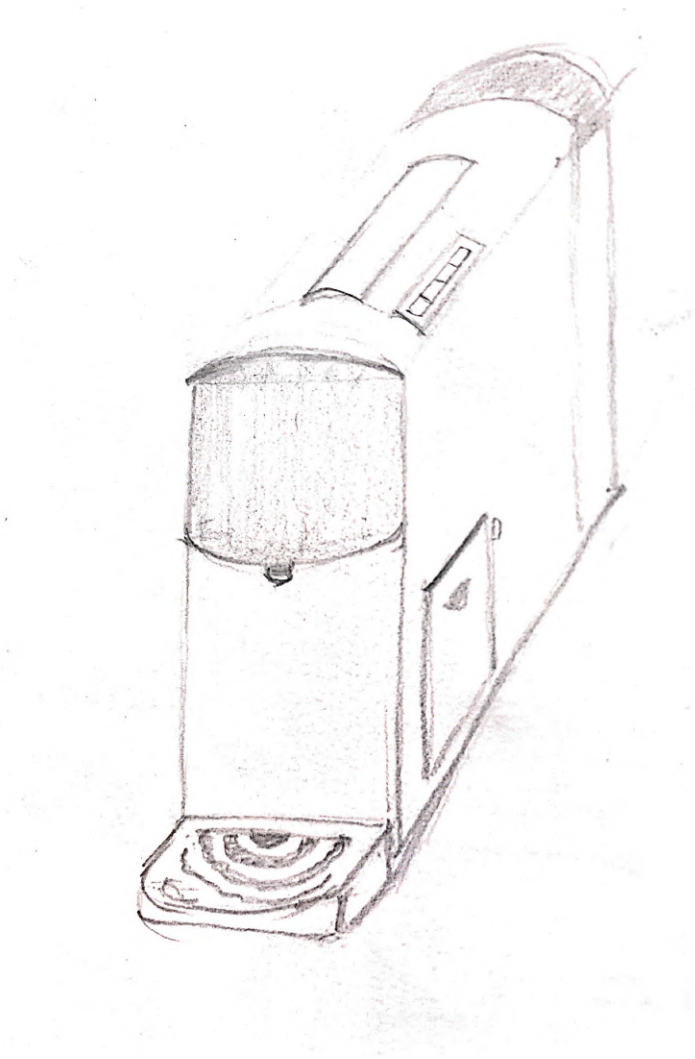
Product Language
Ideation

Concepts

Daisy
Charles
Steve
Emma
Concept Evaluation

Concepts are organized around a specific idea or theme, and they are usually illustrated with pictures, sketches, prototypes and explanations.

Daisy



The compact, cubical and slighty rounded form is the basic characteristic of this coffee machine. Daisy has a rather modest design and takes up very little space in the kitchen. The gestalt concept is intgrative, nevertheless the handle and buttons are clearly visible. The drip tray is adjustable to diffrent heights. The capsule container is accessible from the side and the water container is in the back. All the openings of the coffee machine are hidden, for instance the capsule inlet is hidden under the handle and the spout covered by the cover. The machine is made out of a polymere. It is unicolor.

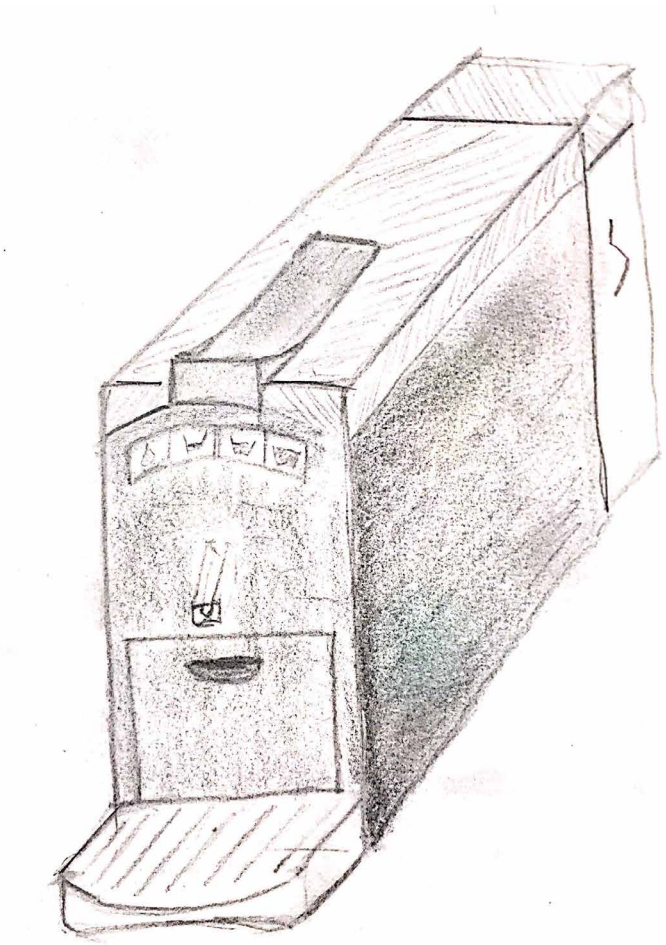
Pros:

- Small footprint
- Roudnded form gives a warm feeling
- Adjustable drip tray
- Capsule container

Cons:

- Bigger mugs might not fit under the spout

Charles



This concept's main characteristic is the spout, which jumps out of the restrained surface. It gives the user the possibility to watch how the coffee flows out of the coffee machine into the cup. When the capsule loader is closed, the coffee machine is a cube, except for the spout. There is a capsule container acessible from the front. Two different materials are used for the machine. The handle and the the side material are brushed stainless steel, the rest of the top material is polished stainless steel.

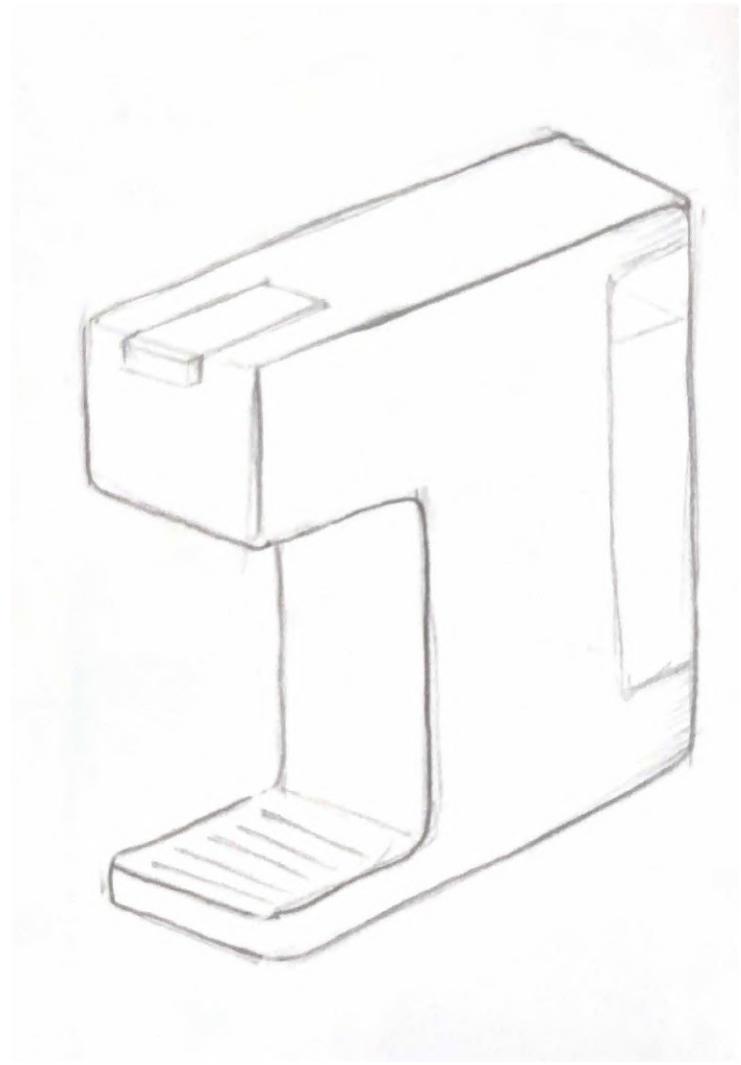
Pros:

- Small footprint
- Emphasizing coffee experience by showing coffee flow
- Capsule container
- Physical buttons

Cons:

- Drip tray not adjustable

Steve



This coffee machine is minimal and elegant. While the overall form is rather cubical, the edges are rounded to give it a softer and friendlier look. Also, the coffee machine is kept very simple. The singular parts are reduced and kept integral, though the handle is clearly visible. There are no buttons visible, because after placing a capsule inside of the machine a sensor recognizes it and it turns on automatically. The buttons then light up on the surface of the machine and then turn off again after the coffee is done. This way, the machine has a very decent and calm look when turned off. The materials would be of high quality.

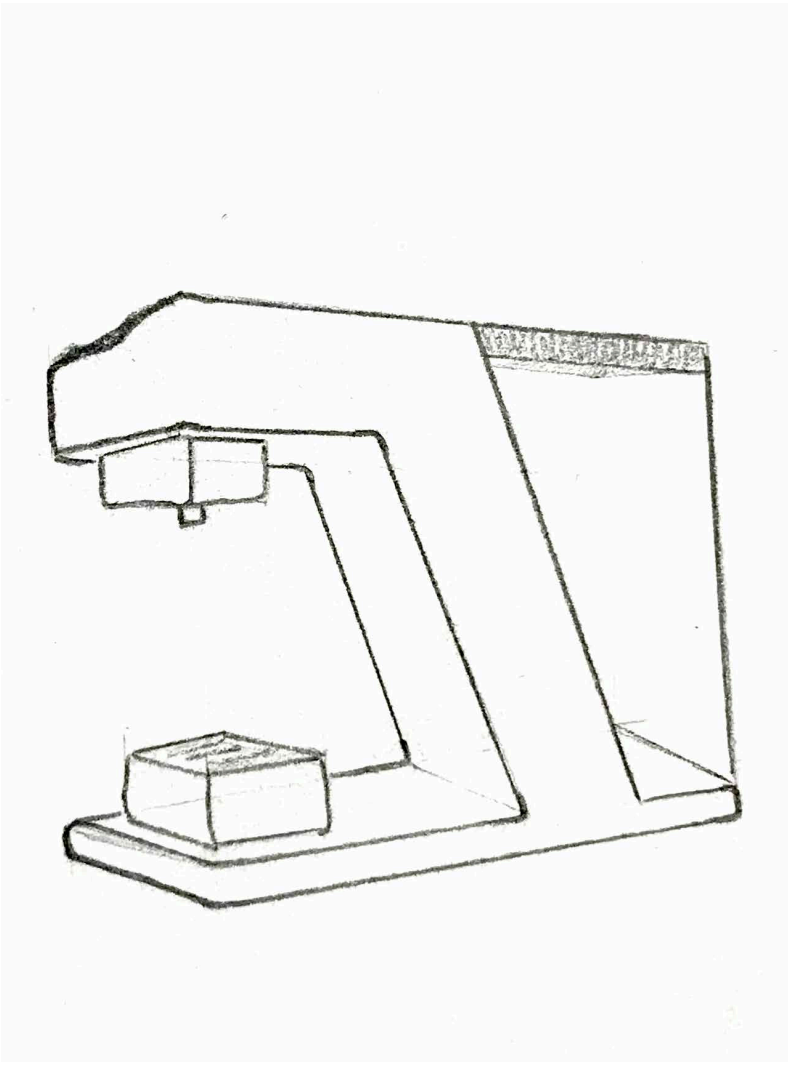
Pros:

- Rounded corners give a warm feeling to the machine
- Control panel with touch sensor
- Neutral look that fits into a lot of environments

Cons:

- Drip tray not adjustable
- No capsule container

Emma



This coffee machine has plenty of space for a wide variety of cup sizes. The extra adjustable drip tray allows for a clean use even with small cups, and gives Emma a unique look. The capsule loader needs to be emptied after every use, since there is no capsule container. The coffee machine has a touch sensor control surface which is only visible when the coffee machine is turned on.

Pros:

- Rather sharp edges and cut out make the machine looks sleek and modern
- Control panel with touch sensor
- Adjustable drip tray
- A lot of space for various cup sizes

Cons:

- No capsule container

Concept Evaluation

	Daisy	**Charles**	**Steve**	**Emma**
Form	round	cubical	cubical	cubical
Edges	sharp	sharp	round	sharp round
Handle	integrative	integral	integral	integral
Buttons	physical top next to handle	physical front	touch front	touch front
Drip Tray	adjustable	not adjustable	not adjustable	adjustable
Spout	hidden	visible open	hidden	additive
Capsule Container	on the side	on the front	no	no
Water Tank	integral	integral	integral	integral

Delivery Phase

Solution Brief
Solution Visualisation
Solution Specification
Final thoughts

The deliver phase is about execution and further development of the selected concept. Building models and sketching helps to get to a final solution proposal.

Delivery Phase

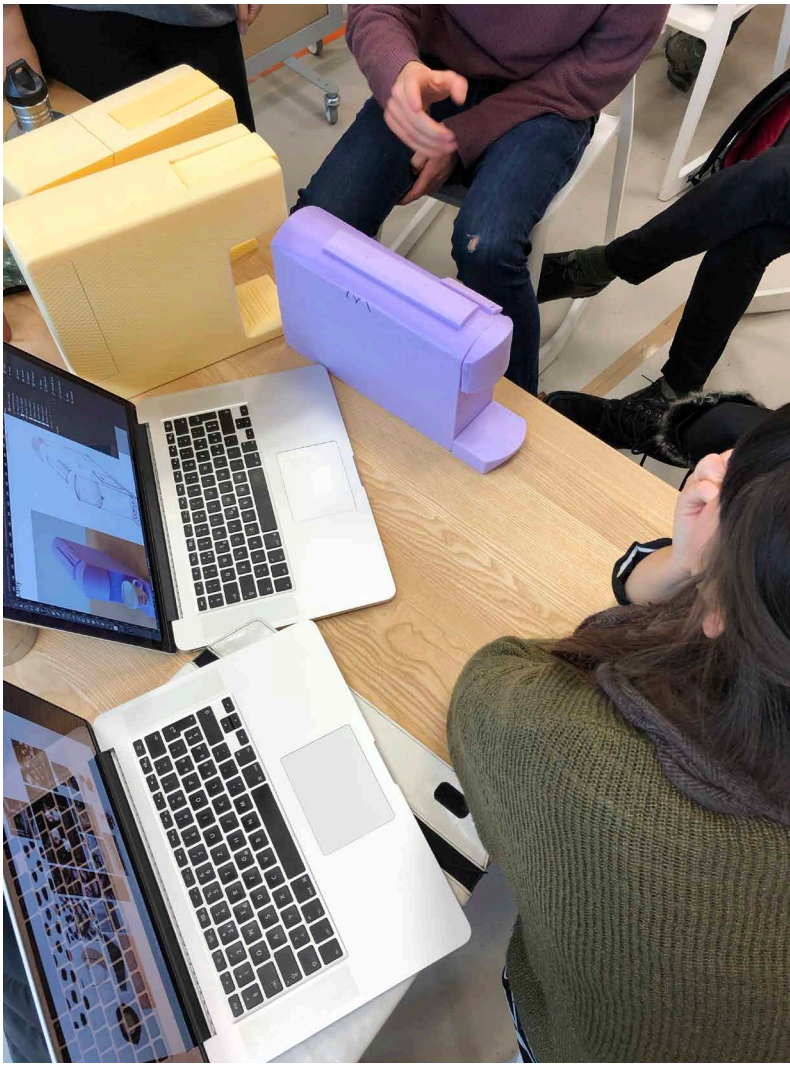
Solution Brief

Solution Visualisation
Solution Specification
Final Thoughts

Solution Brief

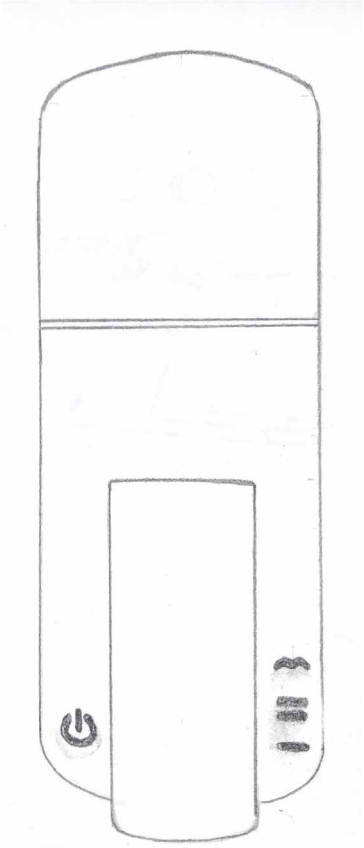
A solution brief summarizes the findings from the concept presentations and clarifies the steps that need to be taken in the development of the final design.

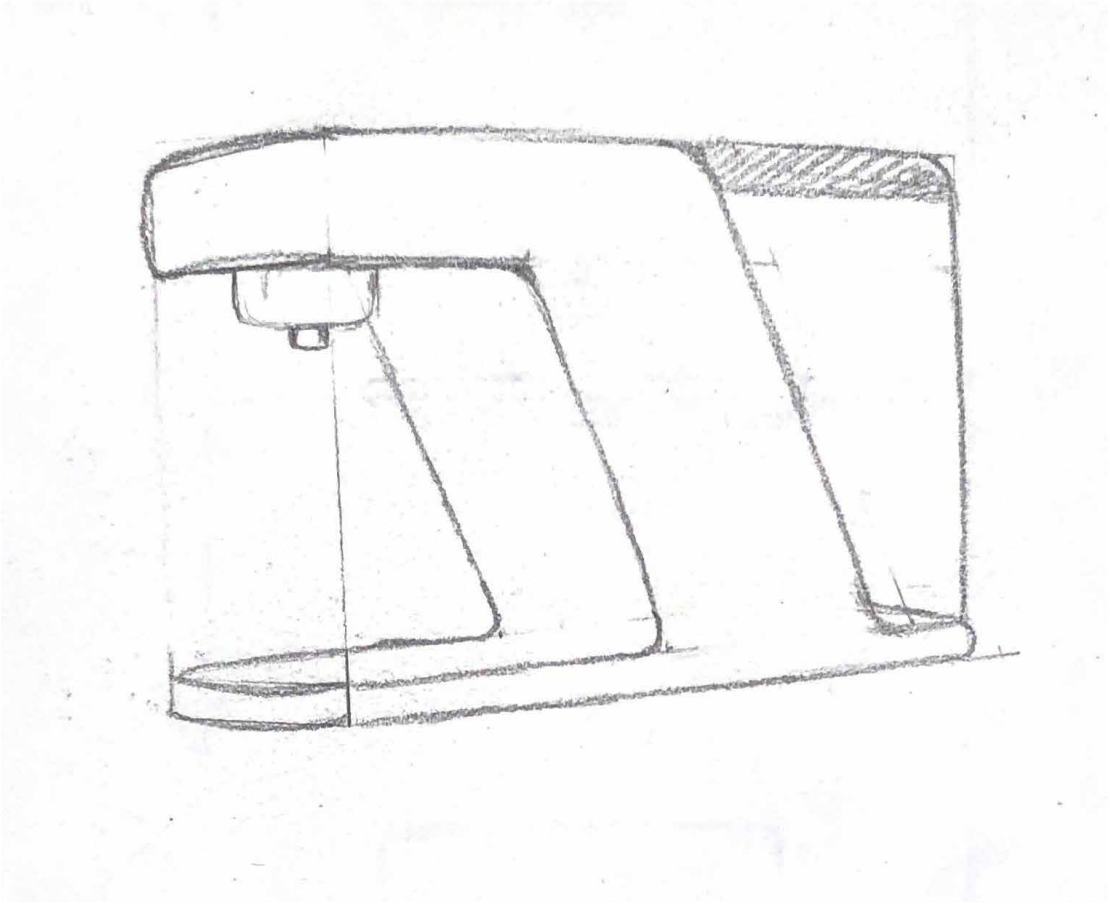
Solution Brief



After meeting our client Hometech and presenting four concepts to them the following requirements for the final solution have been defined:

- The concept of the coffee machine Emma is the basis for the final design, since the general form with the angle was well perceived by the client. As a handle they preferred the one from the concept Steve, which also goes nicely together with Emma' form language.
- The form and the edges of the coffee machine should be more rounded than it was in the concept of Emma. Viewed from the top, the machine should have an almost elliptical shape. This way the coffee machine gets a friendlier and homelier feeling.
- The water tank should be large but still ergonomically well designed, so it can be easily taken out. The initial water tank from Emma is rather wide and therefore hard to hold with one hand. Also, it should not be too big, so all the mechanical parts have enough space in the solid middle part of the machine.
- The coffee machine should have no capsule container. After every use, the capsule needs to be taken out from where it was placed in and be disposed. This reduces the size of the coffee machine and makes it simpler to use, since there is no capsule container that has to be emptied and cleaned frequently. Thus, there is no accumulation of empty capsules in the container, which can eventually start to mold.





- The drip tray should not be adjustable, in order make the coffee machine more purist. Rather, the bottom of the drip tray should be a bit higher to bring the coffee cups slightly closer to the spout. Also, the drip tray can be taken away to make emptying and cleaning easy.
- The spout is coming out slightly in a cylindrical form, rather than a cubical form that was originally designed for Emma.
- The coffee machine will be operated by three buttons indicating three different coffee sizes, espresso (small) and lungo (large), and a manual start/stop button to use for individual preferences. The operation buttons should be located next to the handle, so they are clearly visible.
- The coffee machine should have a light indicator to show if it is on or off.
- For material, our client is satisfied with recycled polymers.

More ideation sketches for the final solution can be found in the appendix.

Delivery Phase

Solution Brief

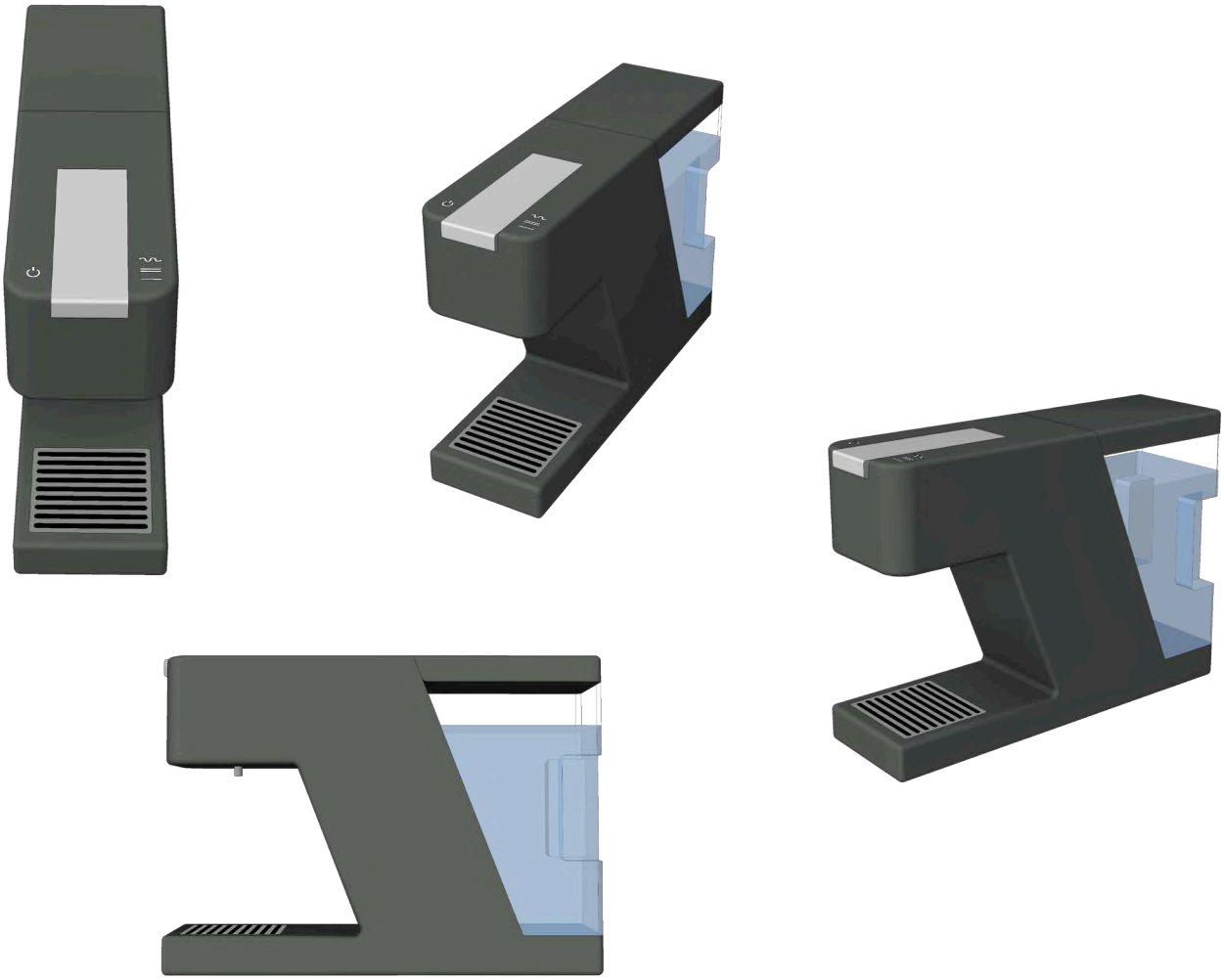
Solution Visualisation

Solution Specification
Final Thoughts

Rendering
Model

A solution visualisation illustrates the final solution using different media, such as sketches, models or renderings.

Rendering



Model

Delivery Phase

Solution Brief
Solution Visualisation

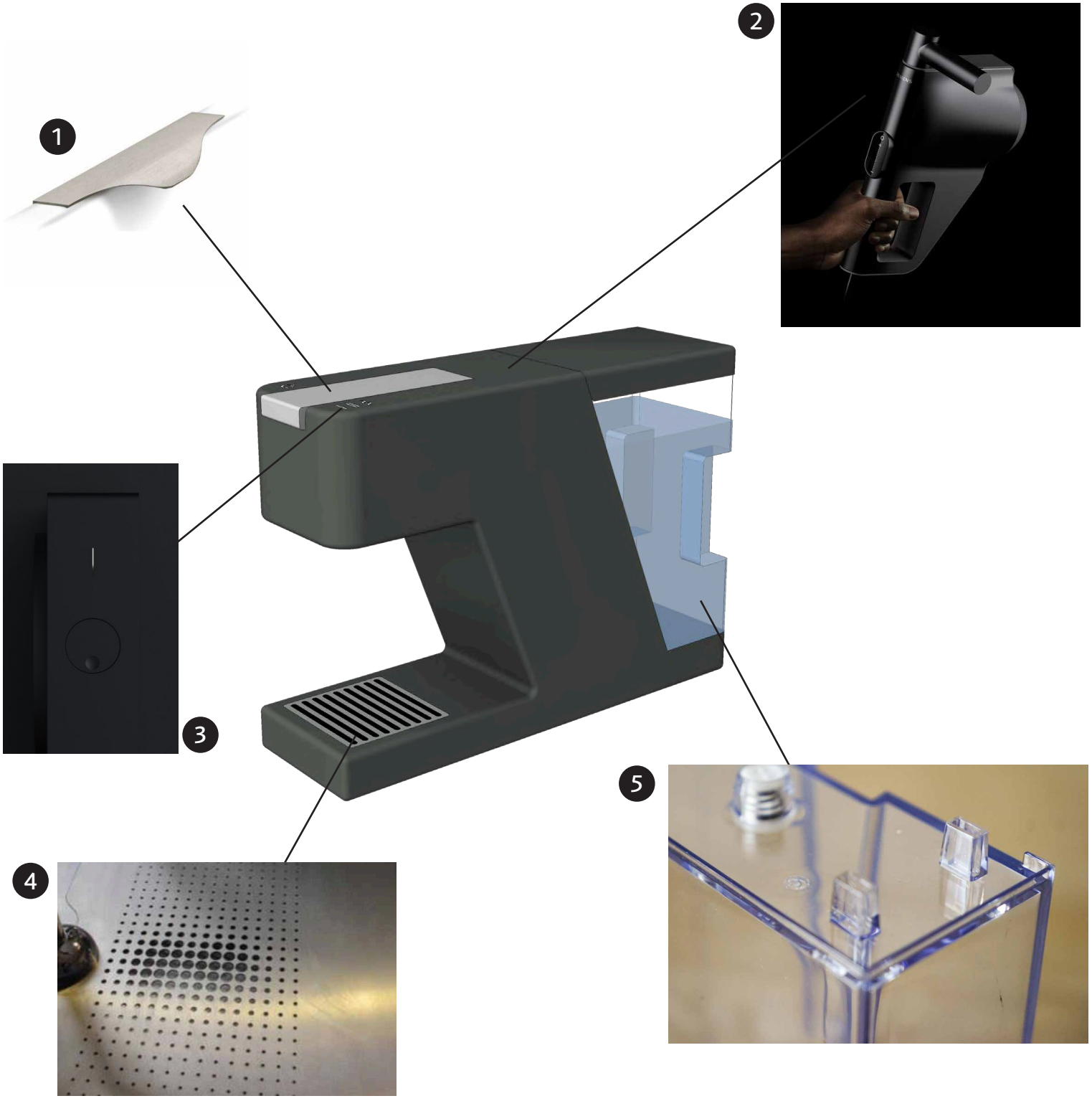
Solution Specification

Final Thoughts

Material Specification
Functional Specification

A solution specification describes the final solution in more detail to gives more clarifications on the single parts or functions.

Material Specification



Material Specification

1. The handle of the coffee machine is nicely integrated into the top surface of the machine. The material is brushed aluminium.
2. The outside material of the coffee machine is a black matte polymer that has a special dirt-repellent coating.
3. The buttons on top of the machine appear only after the coffee machine has been turned on, thanks to small LEDs below the touch-sensitive surface.
4. The drip tray is, as the handle, brushed aluminium.
5. The water tank of the coffe machine consits of a transparent polymer, and has indents on both sides so it is easier to take out. The volume of the water tank is 1.3 litres.

Function Specification

- The coffee machine is supplied with electricity when it is plugged in and the on/off-button appears in red.
- Before preparing a coffee, make sure the water tank is filled and there is a cup on the drip tray.
- When pushing the red on/off-button, it turns white and the machine turns on and starts heating.
- The 3 coffee size options, espresso, lungo and manual, become visible in white right next to the handle.
- Now the capsule can be placed below the handle. Pushing the handle down loads the capsule.
- After choosing a coffee size option the coffee starts pouring into the cup
- The manual button starts letting out coffee with one first push, while it lets coffee through it turns red. A second push stops the coffee flow and the button turns white again.
- After the coffee has been made, the handle can be opened and the capsule is pushed out for easy removal.
- The coffee machine can be turned off again by pushing the on/off-button, or it automatically turns off after 10 minutes.

Delivery Phase

Solution Brief
Solution Visualisation
Solution Specification

Final Thoughts

Final Thoughts

Final thoughts are a summary of the process and our own experience with the project.

Final Thoughts

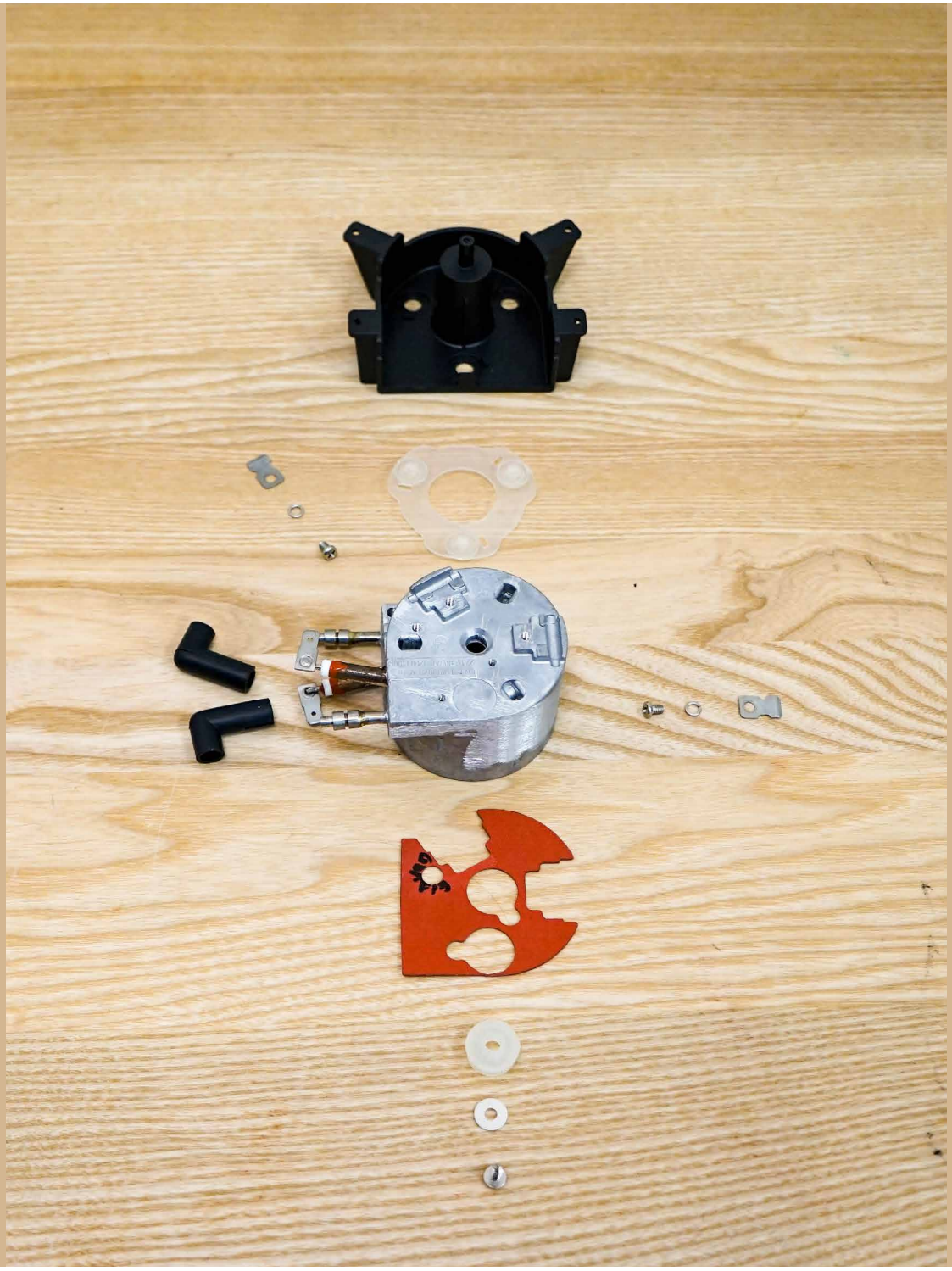
This major project taught us on a small scale what a product creation process looks like from the first client pitch to the presentation of the final solution. We were able to comprehend the individual steps that go into this process, and that it is not always so linear and straight-forward as it might seem.
During this project we worked closely with the Lucerne Design Management Model, which nicely illustrates the four phases (Discover, Define, Develop, Deliver) and the iterative connection between them. We think that having worked with this model, we got a good understanding of how this process might look in the real world, but also what challenges might arise and how to productively solve them to not get stuck.
Team working, planning and time management skills were the most important to ensure effective work. Especially in team working we faced challenges in regards to expectation management but were able to successfully overcome them.
Concluding, we are very happy with our final result 'Emma'.

Appendix

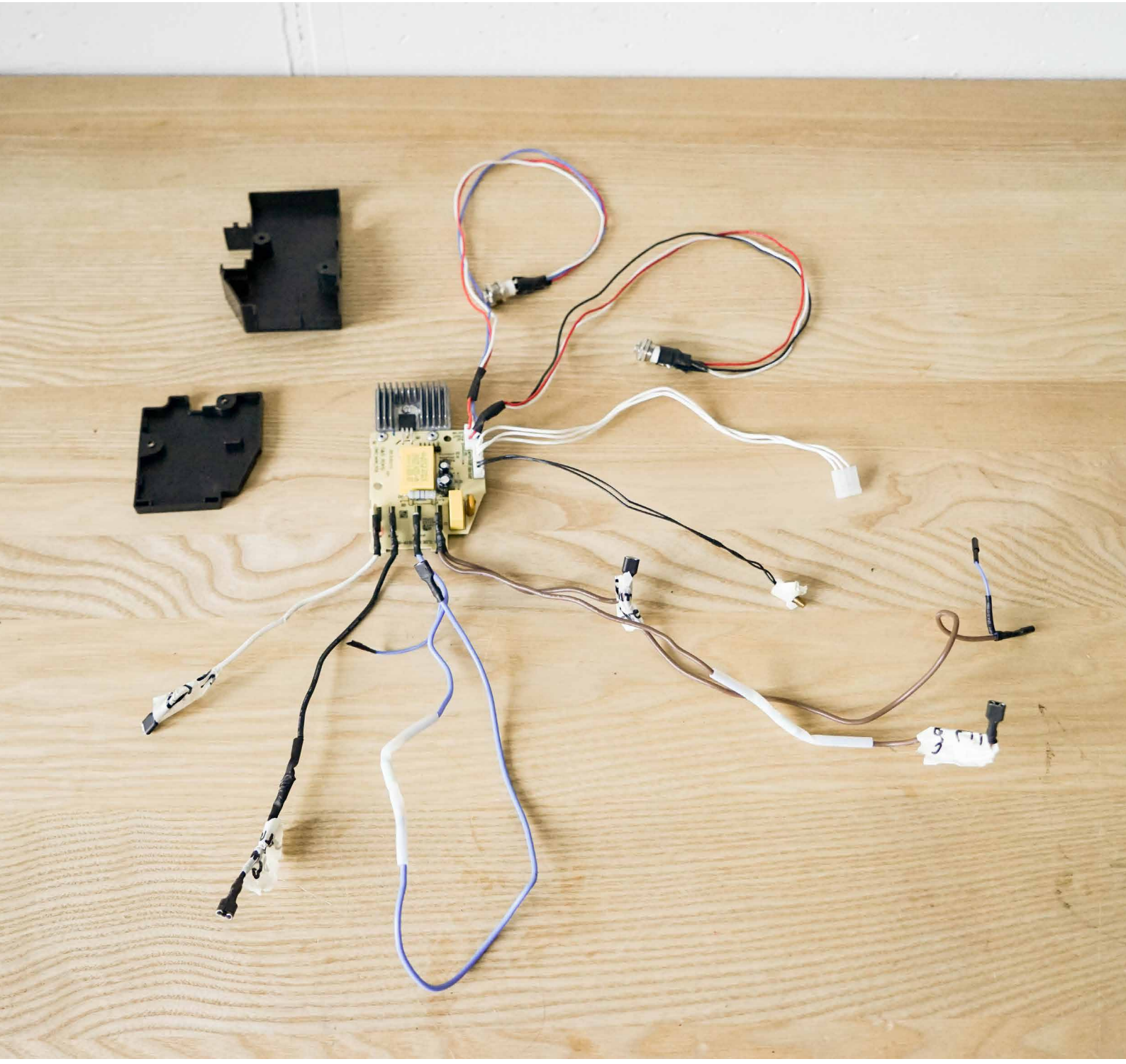
Autopsy
Mindmapping
Sketches
Sketches for Final Solution
Client Brief – Team Hometech
Assignments

Autopsy

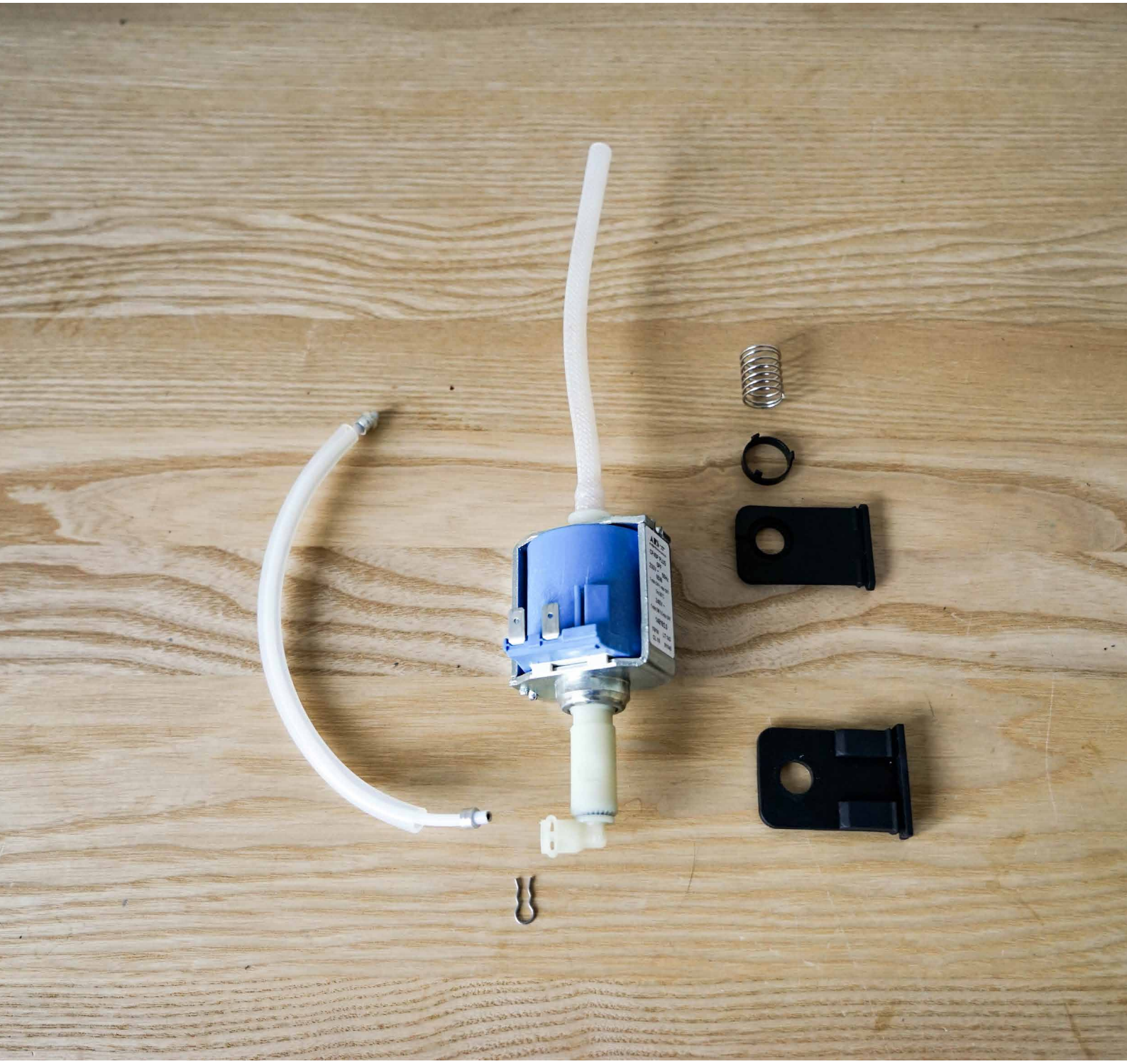
Flow Heaters



Circuit Board



Water Pump

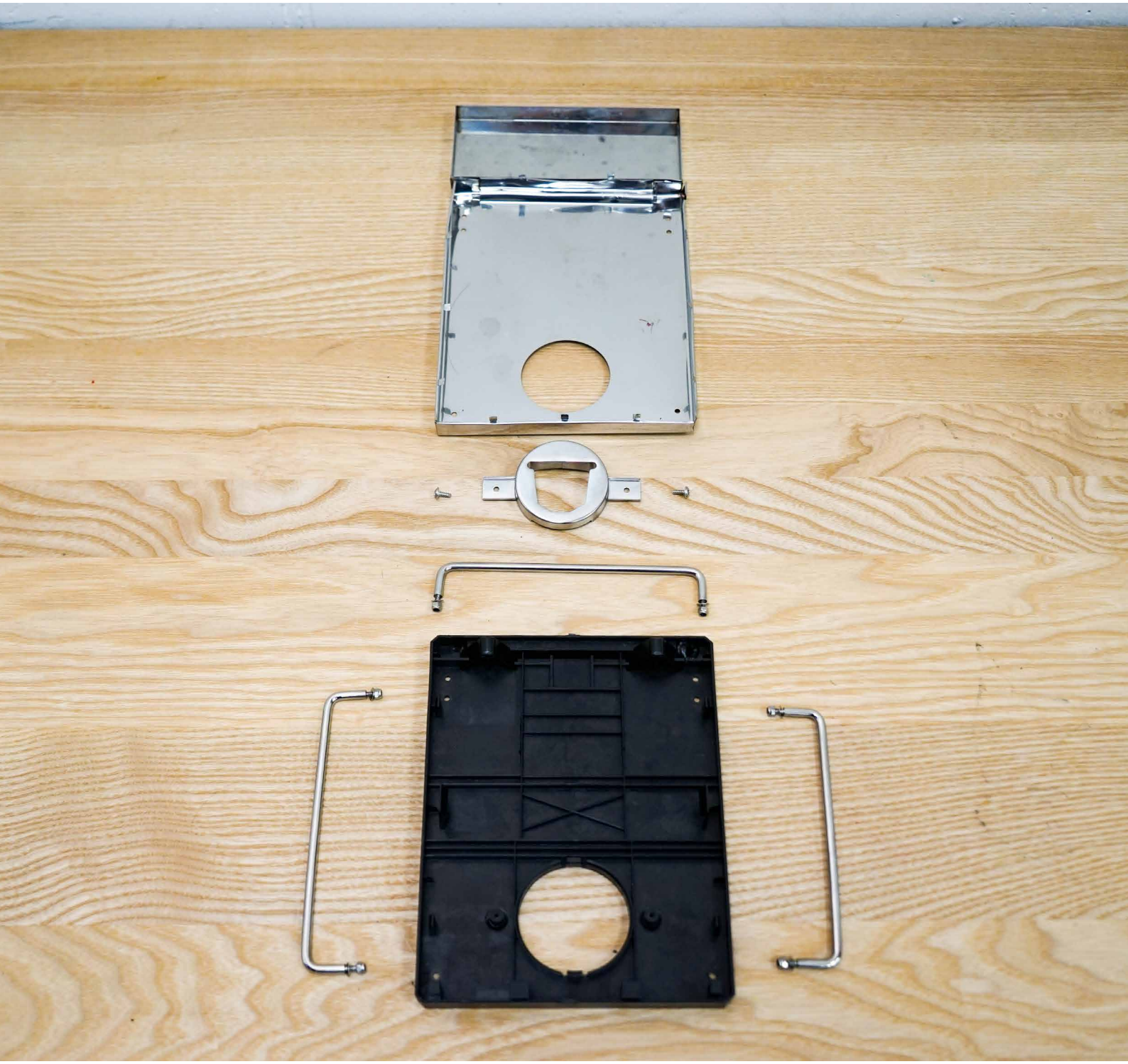


Capsule Loader

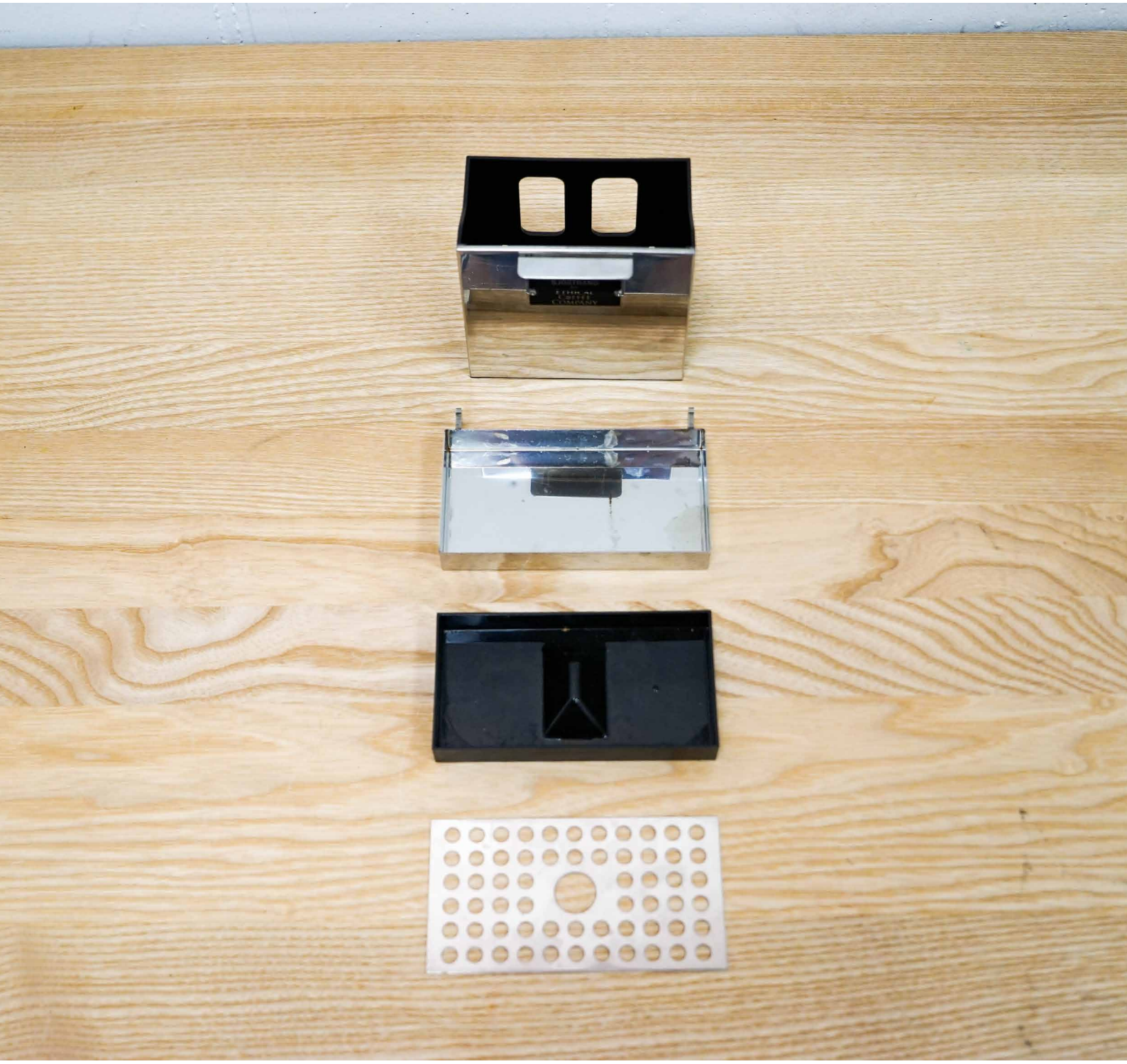
Flow Meter

Power Switch

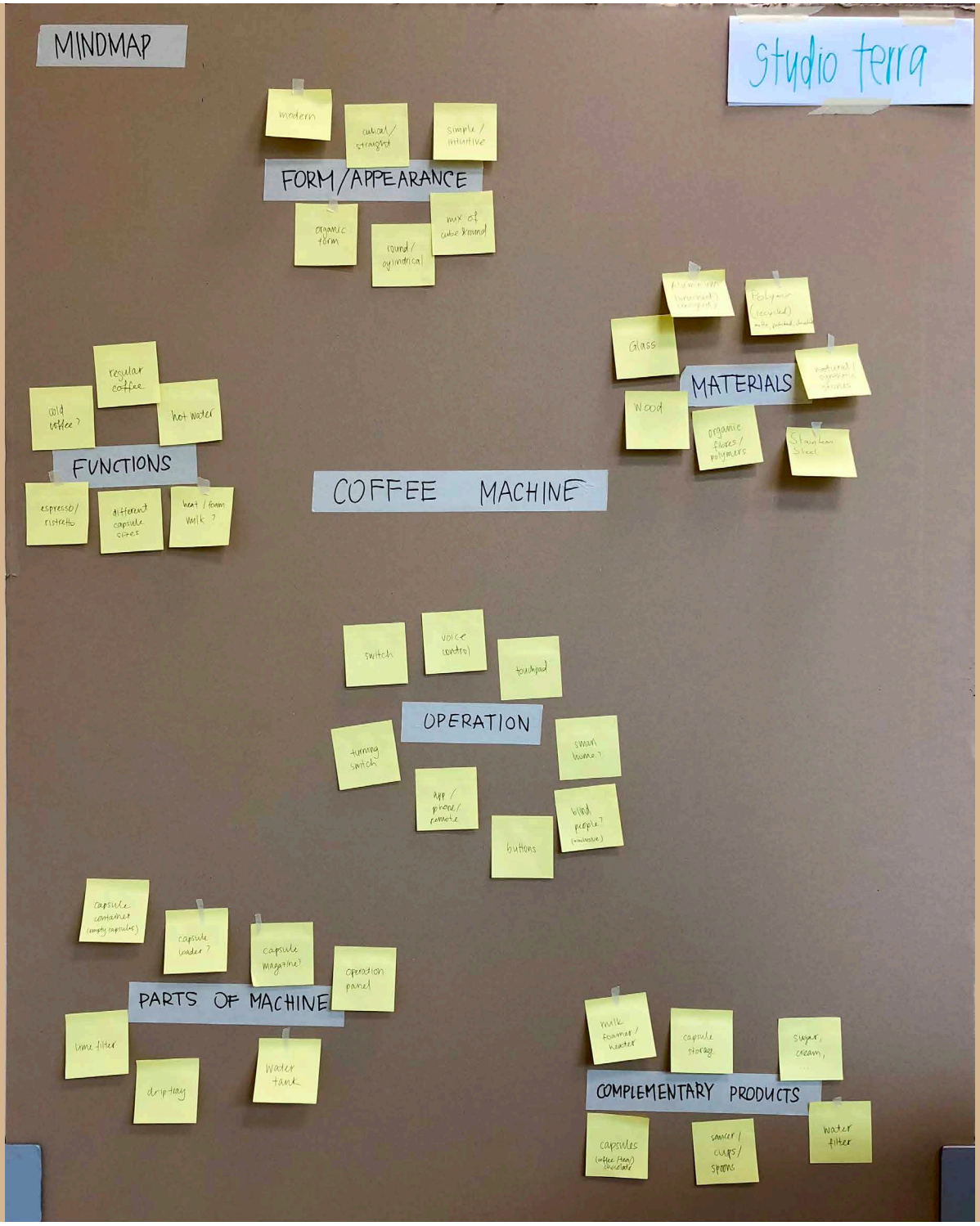
Top cover with opening for capsule



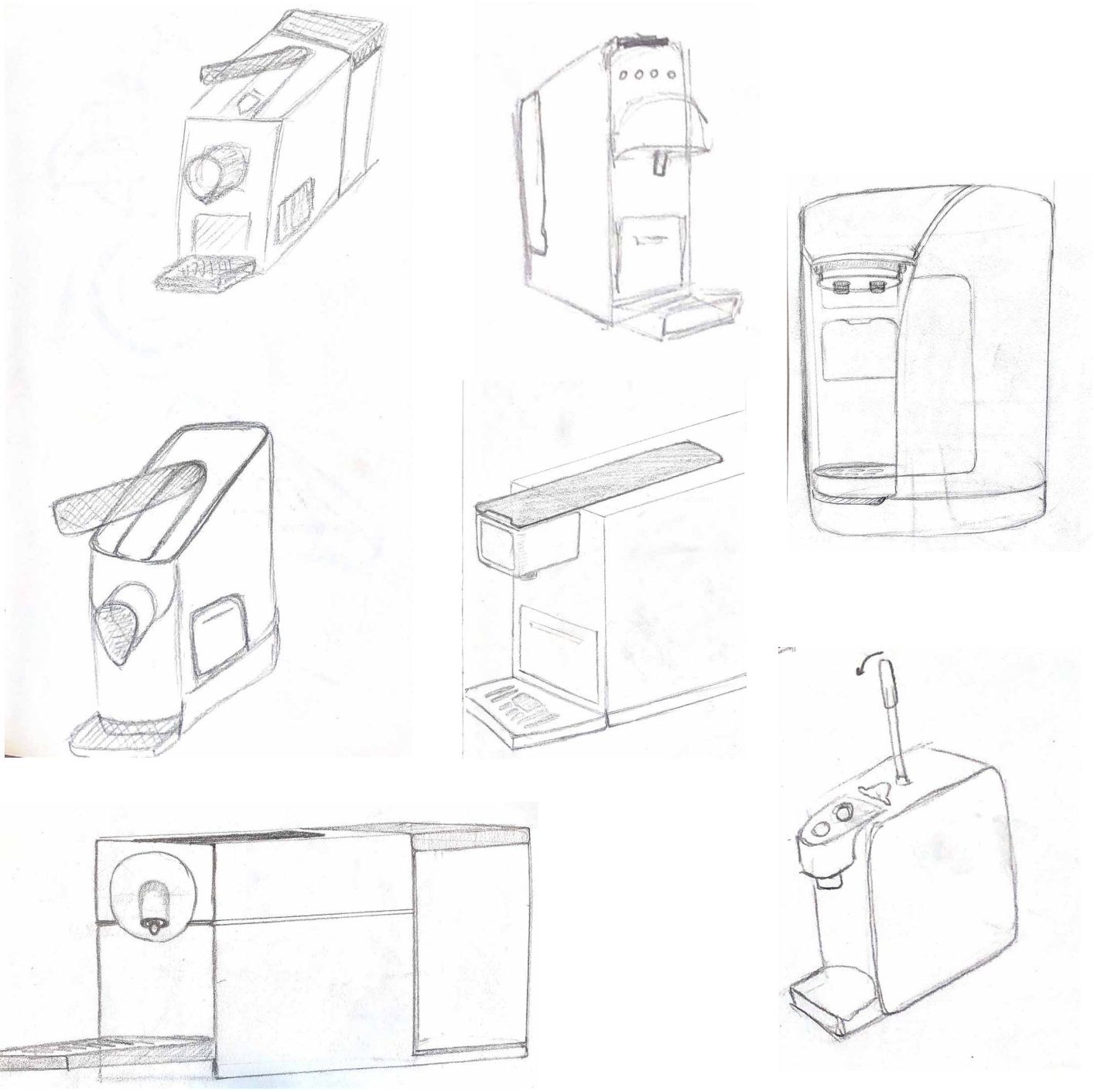
Drip tray and tray for used capsules

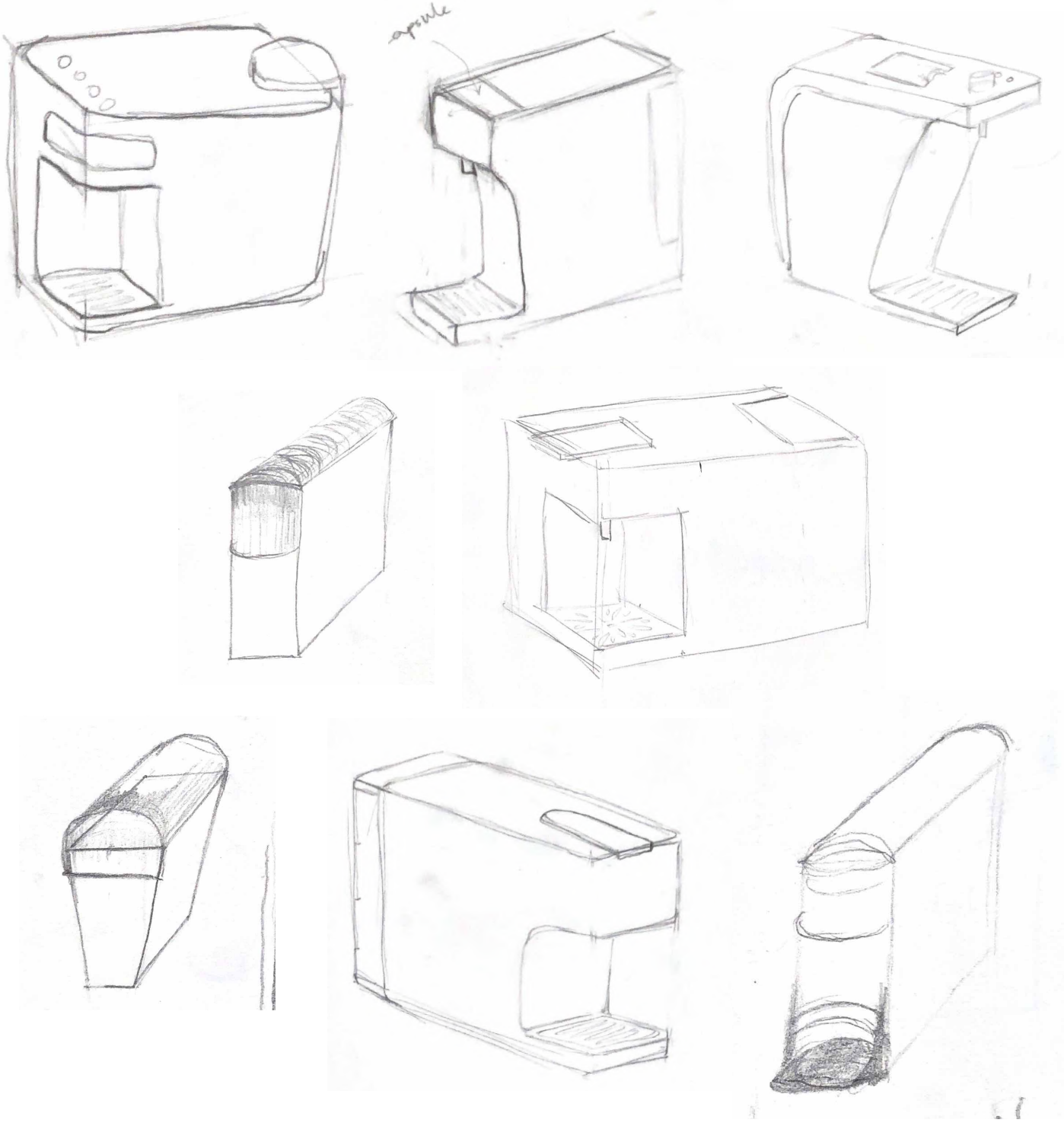


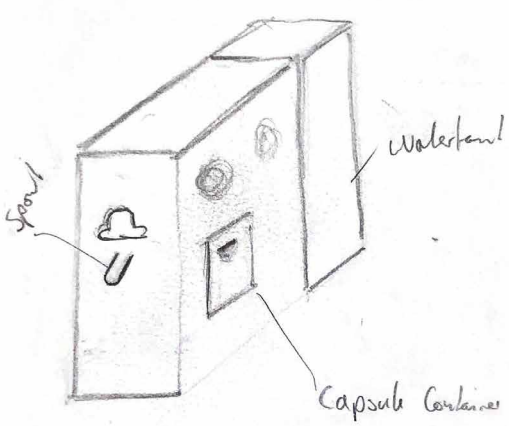
Mindmapping

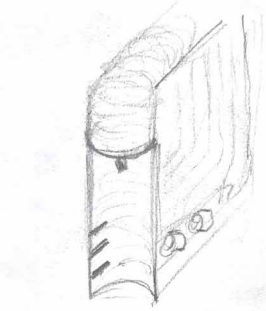


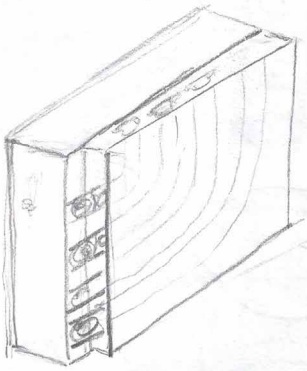
Sketches

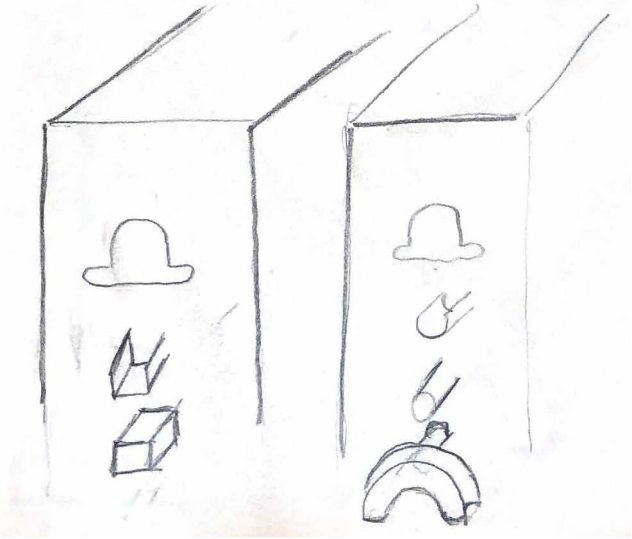


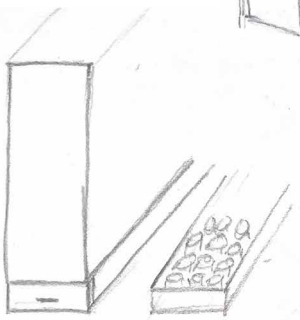

apple

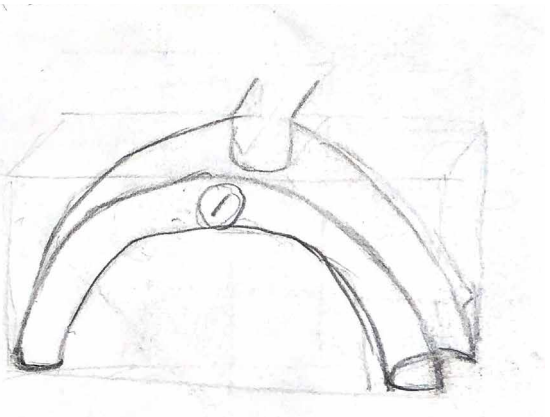

Spoon
Waterfaucet
Capsule Container

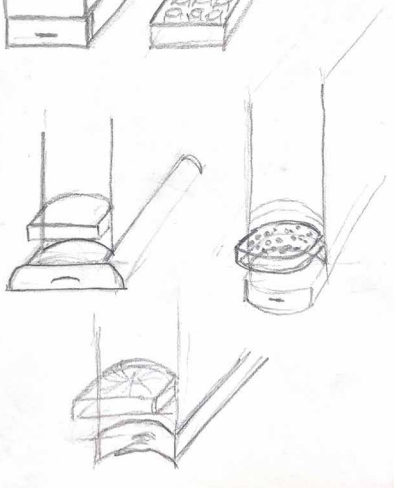

Capsule Storage



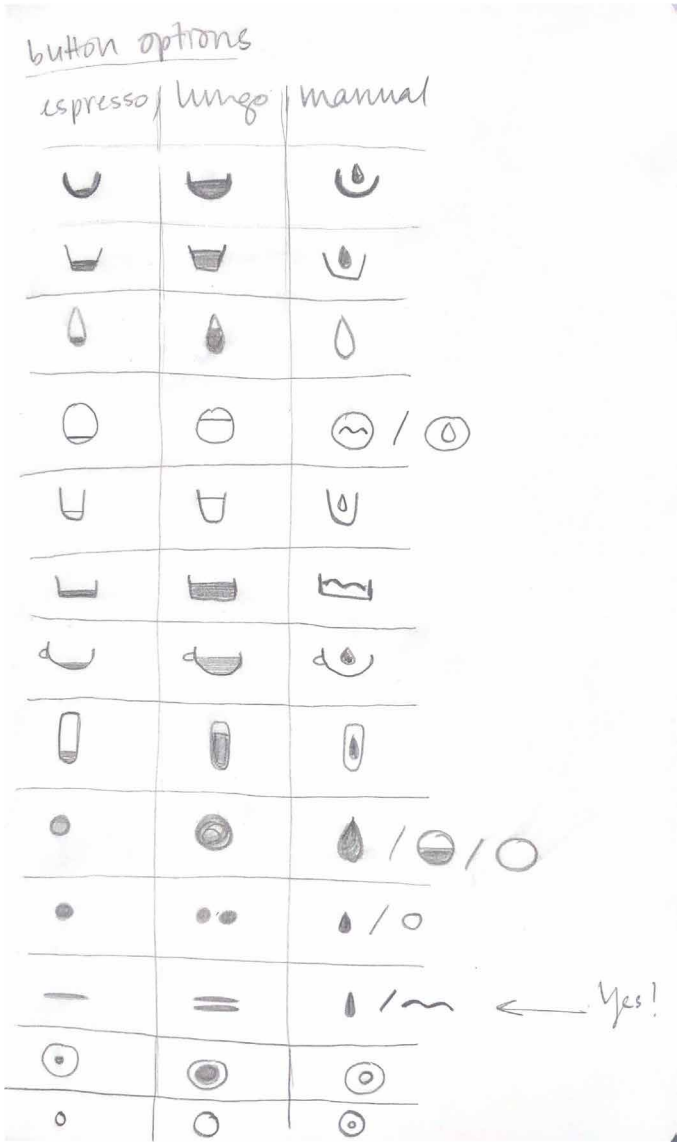


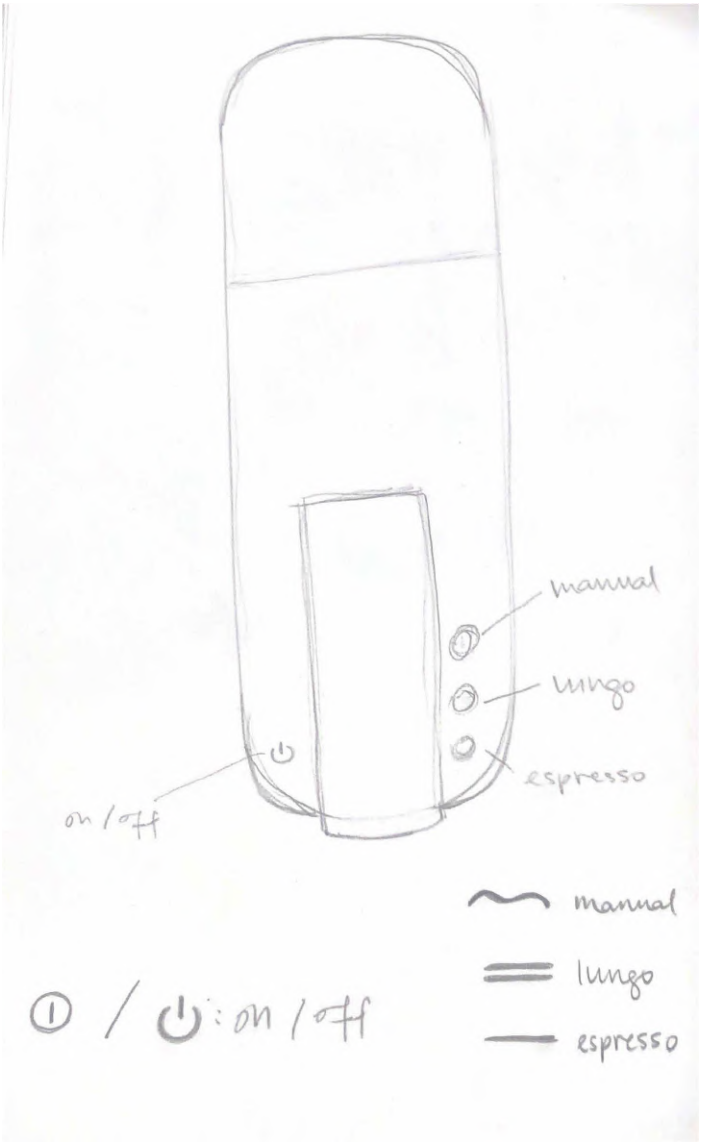


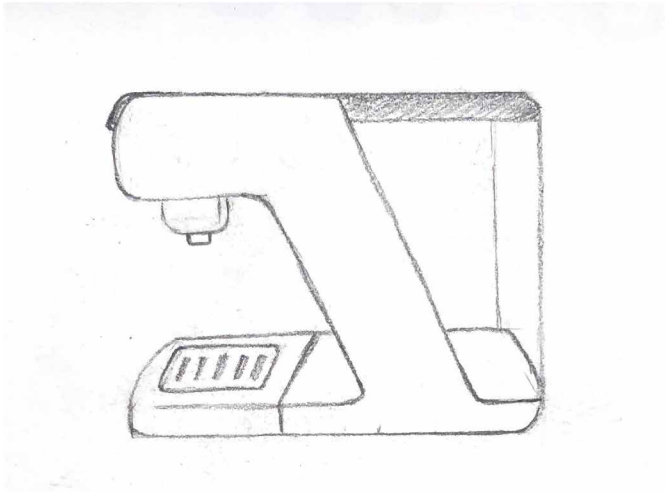


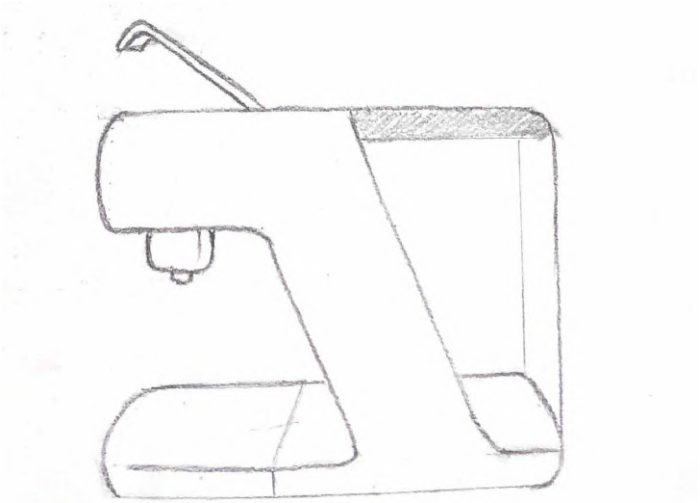


Sketches for Final Solution









Client Brief – Team Hometech

Current Situation

Hometech has created a plain coffee machine in the lower price range section, so the coffee preparation can be affordable, easy, quick and uncomplicated for the common household.
The device is intended for use in all kinds of indoor environments, ranging from classical kitchens to student apartments and office spaces. Hometech has put emphasis on the technical standards and basic functionality.

Product Description

The Hometech coffee machine "Sjostrand" is a classic, utilitarian coffee machine. It is made out of thin, chromed stainless steel and different kinds of polymers, surrounding the inner technical parts. The handle on the right, that is used for a loading mechanism, is not user-friendly for a variety of users, e.g. disabled and left-handed people. The two buttons for an espresso and lungo coffee are limiting the customer experience as well. The coffee machine has a capsule system, which creates unnecessary waste.

Project Goals and Objectives

Our goal is to create a robust product that includes the following things:

Improved visual appearance (more homey and friendly, less bulky)
Improved functionality (adding e.g. something to prevent it from getting dirt stains, container, a larger variety of programs/ functionalities, additional elements for improved usability)
User friendliness (noise reduction, usability, maintenance, accessible)
Smart use of space (top and sides, how can these become more useful?)
Sustainability (use of renewable and recycled resources?)

Hometech wants to reach clients of any age that have a high appreciation for beauty, quality, multifunctionality and practicality.

Style Preferences

Elegant and simple shapes (Maybe other forms than classical boxes?)
Consistent and coherent visual expression of the shapes
Fit well into different living and working environments
Distinguishable from competing products

Time Frame

October-December 2018

Assignments

#4 Client Brief, Project Brief, Research Brief and Research performed in the Discover Phase

- Organize your team – once as client and once as design agency and give yourselves a name.
- As client define a product to be followed as Major-Project. Thereafter, each client group is required to find an example or a relevant similar and preferably used device of the product, so that the design agency may conduct a product autopsy
- As client prepare 'Client Brief'.
- As client meet with design agency and discuss it.
- As client prepare 'Project Brief' and send it to design agency.

#5 Research Brief and Research performed in the Discover Phase

- Decide what 6 research methods would be sensible to conduct. These methods can be from Milton & Rodgers list of 'Looking', 'Learning' and 'Asking'.

#6 Research performed in the Define Phase

- The focus will be on analysing all the data gathered in the previous phase (sensemaking), and to focus on a problem definition with the precise requirements prepared for the next phase.
- This phase will conclude with a requirement definition.

#7 Research performed in the Develop Phase

- Get the agreement and the explicit green light from your client.
- Put together a Research Brief, before engaging into the ideation process – or concept creation.
- Analysis of 'product language' by its three functional levels (practical, aesthetic, symbolic).
- This phase will conclude with the concept selection.

#8 Tasks performed in the Deliver Phase

- Get the sign-off (agreement) from your client.
- Put together a Solution Brief, before working out the solutions.
- Based on the selected concept, verify your concept decision and your solution brief.
- This phase will conclude with the final solution specification.

Studio Terra
Vivian Perämäki
Sahar Koloushani
Thierry Fehr