

HEBE



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INTRODUCTION

Hebe is a system that will help companies increase the overall health of their sitting employees. By creating a regular moment in which they will stand and walk to get a drink the chance to catch a number of conditions will lower significantly. Hebe works by using the scent of coffee as a trigger that is not as intrusive as current methods. The form of the cup is also considered to be comfortable to grip but also impossible to carry more than 2 cups. This to cause that every person has to get a drink for themselves.

In this report a background of the problem will be given after which I will state my design pillars and go into my final design. I will discuss the tests that I have done and the business case of Hebe. At the back you can find a reflection on this project.

Acknowledgements

I would like to thank my parents who were a constant mental support. Also I would like to thank Ruud van Seggelen whom offered me an outsider's perspective when I needed it most.

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PROJECT DESCRIPTION

“People spent more than half of their productive life at work. This ‘work’ once was named ‘labour’, but has shifted in recent years to a sedentary activity, mainly behind a computer screen.” [Megens, 2017] 18 to 64 year olds sit 9.6 hours on average during a workday [RIVM i.s.m. VeiligheidNL en CBS, 2015]. “In recent years a lot of emphasis has been put on the importance of having a vital work force and environmental interventions (e.g. the introduction of sit-standing desks) were introduced. In this project however, we do not want to focus on general interventions. The aim is to create differentiated concepts (profiling based) that attract people to include physical activity (and the reduction of sedentary behavior) in their everyday life.” [Megens, 2017]

WHY THE OFFICE

This project lies very close to me personally. I have become less healthy over time, because of a very sedentary lifestyle. In the last year I have been trying to turn this around, both in my working life as well as becoming more active in my free time. I have had struggles with my motivation to get up from that chair and to become active and from a designers perspective I am interested in the challenges this project provides. So I would like to look at how to improve the work environment.

During the course of the project I became more aware of the risks and when I am in a low stress situation I am able to act healthier. When in high-stress situations I revert to old practices.

BACKGROUND

VITALITY

In current 'modern' society 32.1 percent of the dutch population sits more than 7.5 hours a day. On a workday this is 9.6 hours on average, 6.5 of these hours are spent at work [RIVM i.s.m. VeiligheidNL en CBS, 2015][Peeters, Megens, 2014]. The human body is not made for sitting long periods at a time has both physical and psychological effects. The most immediate problems are back pains and joint pains with increased risk for diabetes, cancer, aging, depression, and stress related diseases [Wilmot, E.G., Edwardson, C.L., Achana, 2012].

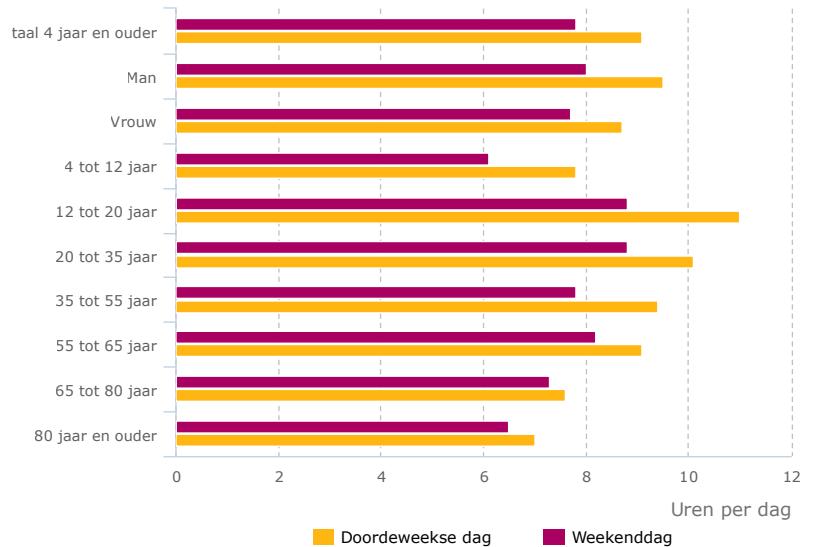
Because sitting limits the amount of calories a person burns there is also a risk of gaining weight which can lead to other health risks. And if someone spent a whole work day sitting the health risks it brings are not reduced by one hour of intense exercise.

If regular exercise is not the solution then what is? Gretchen Reynolds [2012]

suggest in her book 'the first 20 minutes' that standing up every 20 minutes will reduce the risks. But every time you stand up after sitting for a longer period and walk around this will also reduce the risks. For every 30 minutes that you sit you should stand for 5.

Aantal uren zitten, 2015

Bevolking 4 jaar en ouder

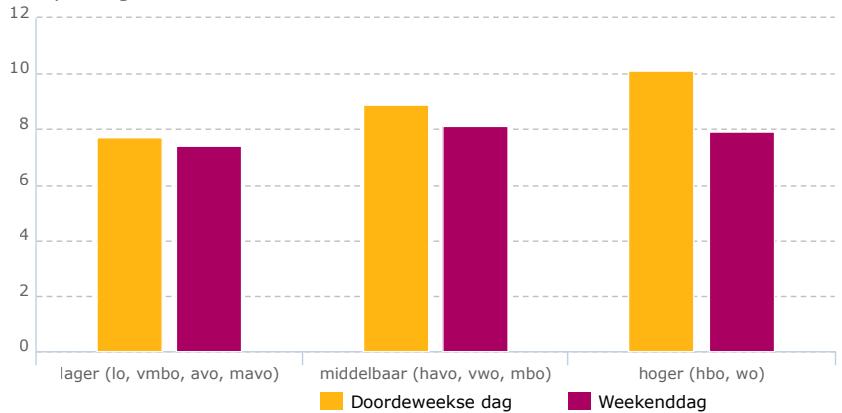


Bron: Leefstijlmonitor, RIVM i.s.m. VeiligheidNL en CBS, 2015

Aantal uren zitten naar hoogst voltooide opleiding 2015

25 jaar en ouder

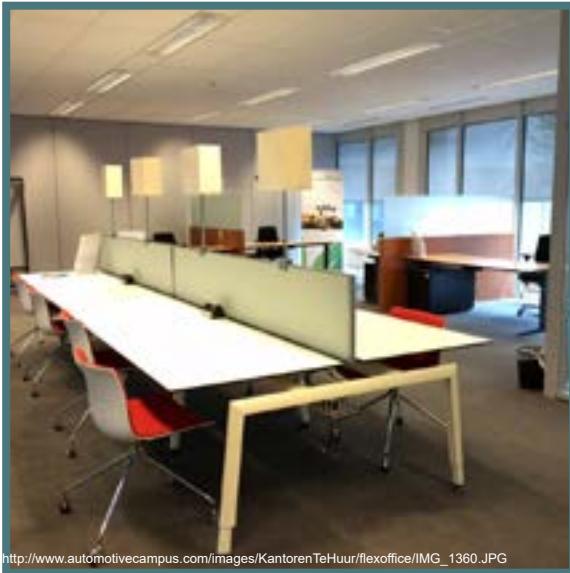
Uren per dag



Bron: Leefstijlmonitor, RIVM i.s.m. VeiligheidNL en CBS, 2015

CURRENT SITUATION

Office environments differ wildly between type of building, age of the building, structure in the company, and the size of the company.



Flexible workplaces often have less desks than employees and nobody has a permanent place.



These workspaces are designed to house permanent spaces in which people can place their own belongings.

CURRENT SOLUTIONS

A lot of businesses are actively trying to keep their employees happy and healthy. They do this in various different ways.

They partner with local sports centres to give employees a discount, to financial incentives to cycle to work, to software that reminds employees to take a walking break. All of these solutions have their advantages and disadvantages. [Damen e.a., 2018]

A sports membership for example requires extra motivation on the part of the employee to sport. A financial incentive to bike to work requires proper infrastructure and employees living relatively close by, and a pre-programmed break scheduler can be found intrusive and annoying.

The solution that lies closest to Hebe is a piece of software that warns the user that she needs to become active. This can be via a pop-up on the screen or even freezing the PC completely for a number of minutes.

These programmes are experienced as annoying and even disruptive to the work process. This is why people will often find a way to remove them as soon as possible or they just ignore the pop ups.



Another very effective solution is the sit-stand desk. This desk can be adjusted in height and encourages employees to stand for periods at a time.

A sit-stand desk lessens time spent sitting between 80 min to two hours. [Gardner e.a. 2015]



WALKING MOMENTS IN THE OFFICE

4 people in fairly traditional office settings (same desk every day, rooms with 4 to 10 people in them) were asked to record when they stood and the reason that they stood up over a period of 2 days. The participants all had work that required sitting down for prolonged periods of time.

Reason	Drink/Food	Toilet	Meeting	Talk to Colleague
Amount on average	5	4	2	4

The most common reasons for getting up were to speak to a colleague, go to the bathroom, go to get a drink and go somewhere else (to a meeting or to get lunch).

Making one of these moments the focus of the design would create the least disturbance in the workflow of a business and the employee while still creating more activity in the work day.

DESIGN PILLARS

Non-disruptive

Minimal extra actions for the user

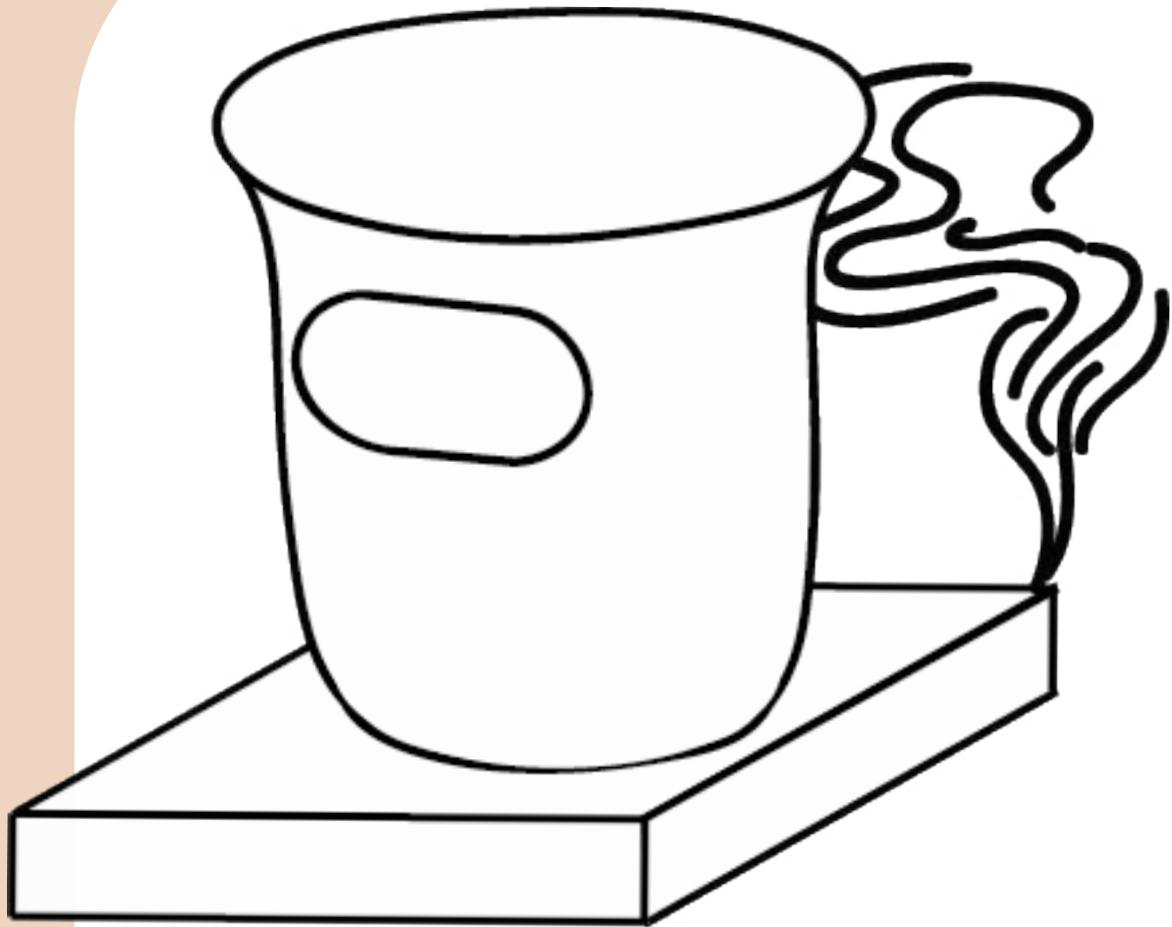
Ideally every 20-60 minutes

Use existing opportunity

CONCEPT



This is the final prototype of the cup. On the bottom a small layer of silicone with an RFID chip in it. This to prevent sliding and to create a space for the chip.



Hebe works with 2 main parts. The base from which the scent is released and which checks where the cup is and the cup itself. The bases are spread through the office, one at each desk and with every beverage dispenser. In this way it is easy to check how much and how often someone gets up.

SCENARIO

In the morning you check in at your workspace and start working.





After 90 minutes a coffee scent starts to release to remind you to get a drink.



You get up to get a drink and walk to the coffee machine.



You check in at the coffee machine



You make your coffee and walk back to your workspace.



You check in at your desk and enjoy your coffee.

CONCEPT CREATION

Using the previously stated design pillars another look was taken at the current activity in the office space. Searching for a moment in which every 20-60 minutes an intervention could take place to increase physical activity. Looking at typical walking moments during the day the drinking moment stood out. This because of its flexibility and independence of other factors.

It is flexible because it is a moment that the employee decides for themselves, maybe together with some colleagues but that is not necessary. It is a moment that happens multiple times during the day and does not have a set frequency. This means that it could be linked to a trigger so that it happens at a regular interval and if the distance is too short it could be possible to increase the walking time.

After deciding on the drinking moment it was necessary to find the right way to implement a solution. How does someone

convince another person to go for a drink every 20-60 minutes and how to measure the physical activity? Very soon it became apparent that even 60 minutes was too short an interval. 90 minutes was found to be more ideal because of 3 reasons. The first was that it would fit in the more traditional working day from 9 to 5 because it meant that you would have a break at 10.30, at 12, at 14, and at 15.30. The second was that 8 drinks in 8 hours would be a bit much. And the third and most important reason was that an hour proved to be too short to get a lot of work done.

The simple answer to measuring the activity is that you let the user do it. She checks in and out at her desk and the beverage dispenser. To achieve this without a lot of extra user actions and to become more sustainable. The idea is to use a permanent cup made out of glass or ceramics and by using a barcode or RFID chip you can use the cup to check in and

out at your desk or beverage dispenser.

Triggering a person to get a drink proved to be more difficult. The trigger should not be disruptive to the work flow or that of any co-workers. This meant that sound and similar seemingly 'alarm-like' signals are something to be avoided. This because it was proven in current solutions that these triggers are likely to be found annoying and therefore unsuccessful. Then because scent has been proven to be subjective to interpretation and very closely linked to memory. There are a number of designs in which scent has worked. Most famous the scenting of all gas that flowed into homes to signal gas leaks.

FORM ITERATIONS

Because the cup would become the centre of the design its shape and the way a person interacts with the design, the form and material of the cup is crucial. It has to have value for the user. It is also an opportunity to create a more sustainable cup instead of the paper or plastic cup that are prevalent in current offices. The cup should also have a shape that makes it difficult to carry multiple cups and should be hard to stack. Because if they are stackable or multiple easy to carry by one person alone only that person would get exercise because they fetch drinks for the others “So that they don’t have to get up”. This counters the goal that I want to reach with my design.

Glass or Ceramics would be the best materials for the cup. They are known to be impervious to water, very durable, and they isolate heat well. In the end Ceramic was chosen because of the higher durability and better isolation.

In the next few pages the shape iterations will be shown with an explanation for the choices that were made.

FIRST SHAPE EXPLORATIONS

The first shape explorations were done to explore shapes that were very comfortable to hold but hard to hold multiple forms in one hand. This was done in clay because clay is close to ceramic and easier to form. On this page I will describe every form and its advantages and disadvantages. You can find images of these explorations on the next page.

1. This shape was based on the hand and how it curves around a shape when creating a loose grip.

2. This was to try folding the clay into a cup shape, to see if this would help with a form with ears that is not as easily picked up.

3. This shape was a more exaggerated form of the first cup to compare the 2 when holding it.

4. This was an exploration into a normal mug shape but then without the ear.

5. An exploration to the very traditional tea cup combined with greek influences of the amphora (the 2 handles).

6. This is based on the form of a dover teacup only without the ear and with a more pronounced “belly”.

7. This was an exploration into materials with coffee ground through the clay and a traditional japanese/chinese tea cup form.

From these seven cups 3 were useful going forward number 1, 6 and 7. 1 had a very comfortable shape but was harder to drink from, unless the rim from shape 6 was used to make it easier to drink from. the combined ground clay with coffee from 7 was useful in creating a trigger for the design. Sadly ceramics need to be glazed to create a watertight seal between the clay and the drink or the clay will slowly release particles into the drink.



1



2



3



4



5



6



7

CREATING THE FINAL SHAPE

From the first exploration shape 1 and 6 were used as inspiration to create another range of clay from these shapes (image A) it became apparent that a gap to fit a thumb in and a rim that would create an easier drinking experience were the most important features of the shape.

With these features a 3D model was created that was printed out (image B). This version proved to be too small and too narrow to function as a cup. The gap for the thumb was perfect.

The previous realizations led to the second 3D model (image C). This version was almost perfect. The only thing was that it took away from the organic shape because of the straight bottom. This was fixed in the last and final model (image D)



A



B



C



D

THE FINAL SHAPE

The final PLA shape needed to be turned into a form in actual ceramics. For this I went to an expert for advice on how to create that form in ceramics. He had two options for me; try and create a positive mold from a 3d printed shape or create a new shape out of wood to use that as positive mold.

It was easier to create a 3d print because of the asymmetric shape of the cup. The only problem was that it was unknown if that shape would be fit to create a negative mold. The 3D model was printed out 5% bigger because ceramic shrinks that amount when you bake it. The model was filled with sand and a plaster lid was fitted on top (image 1).

From this positive mold a negative mold was cast in plaster. Using dense liquid plaster the mold was placed in it halfway to create the bottom half of the mold. This was left to dry. When the plaster was solid but not completely dry the edges were

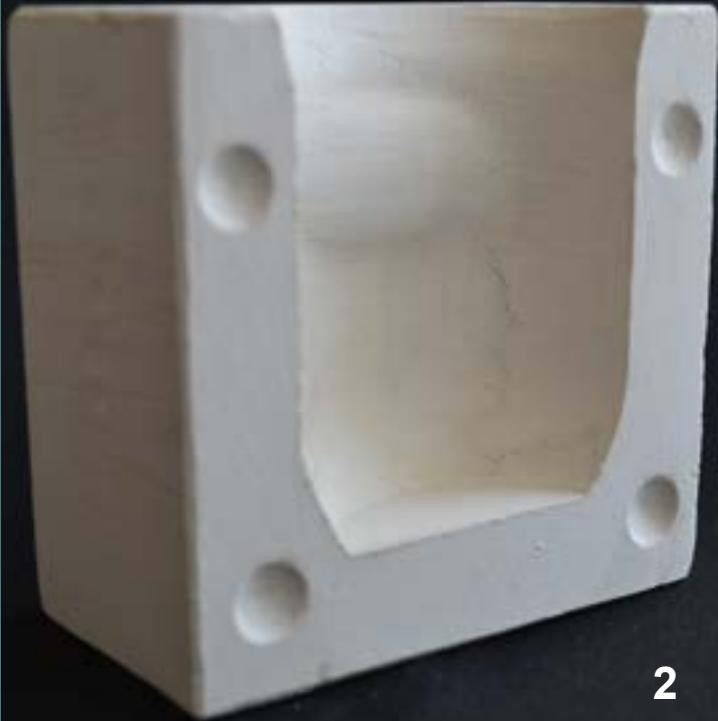
sanded smooth and 4 holes were created so that the 2 halves of the mold would fit perfectly together. On top of this mold the second half of the mold was cast. (image 2)

To cast the cup liquid clay was poured into the mold. This was left to dry for 15 minutes after which the clay on the edges would have dried and the excess clay could be poured out. The mold was left to dry until the clay from could be removed. After this the cup was baked for the first time at 950 degrees Celsius. After this first baking process the cup is called bisque baked (image 3).

After this a glaze can be applied. A glaze creates a glassy surface upon the cup to make it easier to clean and most of the time dishwasher resistant (that depends on the glaze). The cup is coated in the glaze and baked at 1100 degrees Celsius. (image 4)



1



2



3



4

TRIGGER

As was stated earlier the trigger for people to get a drink needed to be as unobtrusive as possible. The trigger needed to be subtle but noticeable at the same time. From a discussion with Hans Brombacher on his masters research it became clear that people dislike it when others can see with one glance that you need to become active. From there the conclusion could also be drawn that the same could be said of sound triggers. This meant that a different solution was in order.

To achieve this the other senses had to be considered and scent seemed to be a logical next step. Scent is closely linked to taste, therefore to eating and drinking, and memory [Source]. This means that due to the memory of a person drinking a certain drink the scent of that drink could invite a desire to drink it. Because this is a rather big assumption this needed to be tested.

To test this an office with 10 employees in 2 rooms was used as the location for

this small study. During a period of 30 minutes a record was kept of how often the employees drank in normal conditions. After letting the scent of coffee spread for 15 minutes another period of 30 minutes was started in which the scent kept being spread. This was done in 2 sessions each in a different room. The participants knew there was a test but not what it was about.

Afterwards an interview was conducted with the participants. In this interview the following questions were asked:

- Is coffee your drink of choice at the office?
- Why is it/is it not?
- How often do you drink it in a day?
- Who gets the drinks in the office?
- Did you notice a difference between period 1 and period 2?
- What was the difference?
- Did your desire for a drink increase?

From these base questions more in depth questions were asked.

Coffee as the drink of choice.

Yes	7
No	3

“On average 3 cups a day.”

“One person gets the coffee and we alternate.”

Period 1 Vs. Period 2

“It smelled good.”

“The smell was the biggest difference”

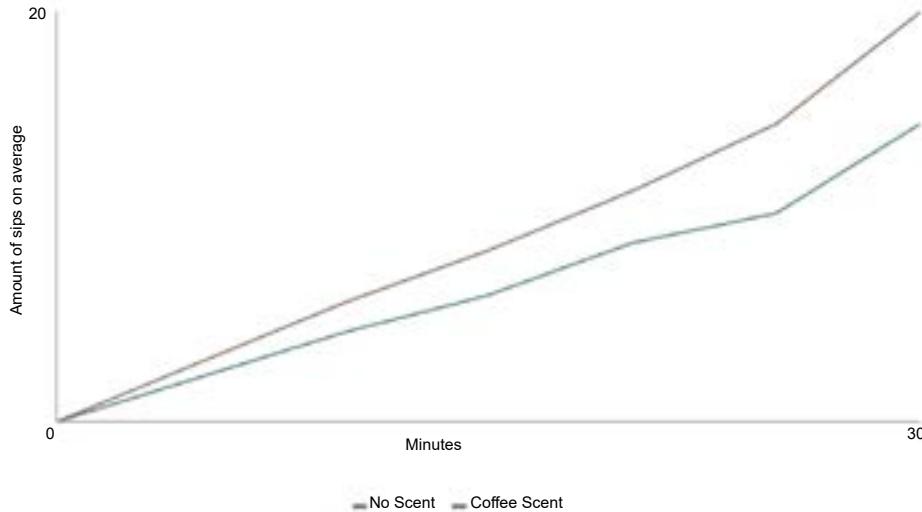
Desire for a drink.

“No, not that I noticed”

“I wanted coffee but did not feel thirsty”

“He was already getting a cup so he got one for me too”

Effects of the scent of coffee



Results and Discussion

The graph above shows that people drank more when they smelled coffee. On average they took 5 sips more than without the scent. You can also see the effect of the scent is slow but there. This could also be caused by a social aspect or by the spread of the scent even though there was a 15 min window to spread. From the interviews afterwards the social aspect of drinking also played a role as well as a desire for coffee instead of thirst.

Despite the results there needs to be further research into this part of my design. The office consisted of mostly regular coffee drinkers, so the scent of coffee could have influenced the results. The same could have been said of the size of the research. 10 participants are not enough for concrete results, but are enough to give an indication. Testing at different locations would also be preferable. It also needs to be researched if the scent of coffee is the best scent to use and if other scents could achieve the same or even better effects.



The best way to spread the scent was to create small pellets made of clay with ground coffee or tea. In the foto at the top there are 3 pellets with different amounts of coffee ground into them. In the photo at the bottom 2 pellets with tea. They do not smell when cold but when heated to 50 degrees Celsius they release the smell.



BUSINESS PLAN

For this product based design it is best to work together with a company that specialises in beverage machines. For this business model I used van Tienen as potential shareholder. Van Tienen leases beverage machines to companies to use in their space. In this model van Tienen is responsible for maintenance and repairs and the company pays rent for the machine. This makes Hebe just an addition to the existing machines. Van Tienen operates under a combination of the Customer Intimacy model and the Operational excellence model.

The Target Group

Hebe is meant for one specific group of people. Companies with employees with a sedentary job. Companies want to keep employees healthy and happy to ensure that they are as productive as possible. Sitting for prolonged periods of time can cause back pains and joint pains with increased risk for diabetes, cancer, aging, depression, and stress related diseases

[Wilmot, E.G., Edwardson, C.L., Achana, 2012]. These people need a push to get up and walk more. That is where Hebe comes in.

The Business Model

Hebe will be offered as an extra option next to the beverage machines as an original Dutch Design. Through conversations with the dedicated sales people of van Tienen companies will come in contact with Hebe, during one of the exhibitions that van Tienen attends or via the website of van Tienen. When you have ordered a beverage machine with Hebe a employee will discuss the type of office that you have and how Hebe can best be embedded into your office space. Technicians will install everything for you and will perform maintenance when needed. If you later have any problems you can always contact Van Tienen who will come personally within 3 workdays to solve any problems you might have.

	Startup Costs	Financial per Unit	
			Totals
Materials			1
Cost per hour		5 euro	
Hours work		0.1 hours	0.5
Logistics		0.1 euro	0.1
Customer Service		0.25 hour	1.25
Software	10000 euro		
Intellectual property	6654 euro		
Subtotal			2.85
profit margin		1.5	
Total			4.275

Financial

To start Hebe there are a few significant start-up costs. Mainly the intellectual property and the costs to develop the software needed. The price of the software I based on a discussion with a software developer in which we discussed several options. We came to the conclusion that at least a 100 hours had to be put in and that there should be time left for bug fixes. So I estimated the app on 125 hours for 80 euros per hour.

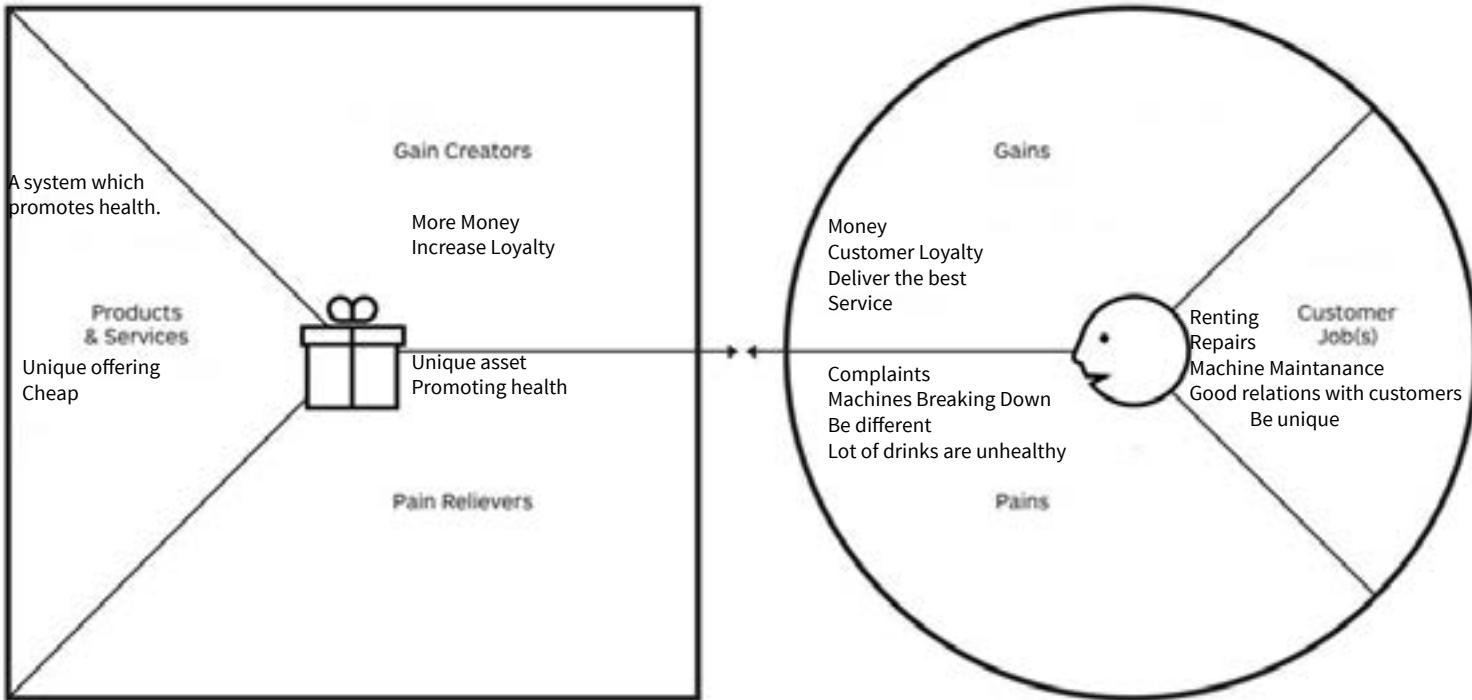
For Hebe I would like to apply for an BeNeLux patent. If that is not possible

I would like to start with a dutch patent. According to the RVO (Rijksdienst voor Ondernemend Nederland) a BeNeLux patent would cost 6654 euro for the first 10 years [Octrooicentrum Nederland]. Furthermore I would need to pay a certain amount at the start for storage and logistics for production in China.

VALUE PROPOSITION

Value Proposition HEBE

Customer Segment Van Tienen



BUSINESS MODEL CANVAS

<p>Key Partners </p> <p>Van Tienen Nescafe Software Developer</p>	<p>Key Activities </p> <p>Customer Service Exhibitions Production Logistics</p>	<p>Value Propositions </p> <p>Healthy Employees Happier Employees Sustainable Quality Ease of Use Dutch Design Aesthetics Custom Made</p>	<p>Customer Relationships </p> <p>Dedicated Personal Assistance Speed</p>	<p>Customer Segments </p> <p>Companies that need beverage machines for employees</p>
<p>Cost Structure </p> <p>People Software Logistics Unit Costs</p>	<p>Revenue Streams </p> <p>Asset Sale</p>			
<p>Key Resources </p> <p>Intellectual Property People Production Investment</p>	<p>Channels </p> <p>Phone Internet Exhibitions Events</p>			

REFLECTION

This project has been an important learning experience for me. It had its ups and downs and for me it started with a major down. At the start I needed to overcome a number of issues. First the disappointment of failing a project yet again, second a very low self esteem and third finding the motivation for a project that does not really fit with you. These things made it hard to start with a fresh look. Thanks to Carl and Daniel I was able to find some motivation to start.

Looking back on my deliverables this time fills me with confidence. This is a product and report that for me is the best I have delivered until now with my previous project Aurora coming in second. I was able to go through multiple iterations and create a design with a watertight story and a high end prototype. Of course there are some things that I would like to have done better, the main example being the trigger or on which I would have liked to spend more time (the business plan).

Communication with my coach I could have also done better.

I believe that this project represents what I can do and what I am strong in. For now I want to say bye to designing for a while. But it is something that I will go back to within short time, I just need a break. For me this project has proven that this is what I want to do, if I graduate or not.

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