

# a Chef

THE PROOF BEHIND THE CONCEPT

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Interaction Design

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## Abstract

As the consequences of (over) consumption are entering the spotlight in first world countries, the concept of food quality does not only refer to healthy and safe foodstuffs anymore, but now also considers issues such as culture and lifestyle, animal welfare, local produce, and the influence of food production on the environment. Society's current response is to apply labels and certificates to products that are produced according to certain guidelines. However, a problem occurs with this response: there is a lot of confusion about the many different labels and certificates that appeared over the last few decades and consumers do not know what they mean or stand for. More problems occur. Consumers could be interested in a product that has a specific label or certificate, but have no idea if it is available in the retailer they are currently at.

The proposed solution is to divide all labels and certificates into five categories: Animal Welfare, Climate Change, Health, Environment & Ecosystem and Fair Trade (the ACHEF categories) and allows better alternatives to be found for these categories. However, there are theoretical and practical challenges ahead that must be overcome before this proposed solution

can work effectively. For example, there is a major practical limitation concerning the provision of information. Whilst there are different systems that could provide the missing information, the best solution is to use a web 2.0 information system.

There are more theoretical challenges ahead that, once solved, would contribute to a more successful solution. For example, if the system is designed so that it becomes more attractive to consumers, or if the proposed better alternatives could appear more desirable, then it would benefit the underlying purpose of the solution.

The practical challenges of the proposed solution appeared during the development of a proof of concept. Before the proof of concept could be created, it was important to know which platform would be most suitable. After the best platform for the proof of concept was determined, the findings from the research were implemented. Finally, time constraints did not allow all researched functions to be implemented into the proof of concept but should be implemented in the future. The end result is that a proof of concept was sufficiently developed so that it could perform as a tool to conduct further field research.

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# 1 Introduction

According to “Voeding Nu” (2007), society is increasingly more interested in the way that food is produced and the effects of food on humans and on the environment. Now that there is an abundance of food available in first world countries, food safety is no longer the only important issue. As the consequences of (over) consumption are entering the spotlight the concept of food quality does not only refer to healthy and safe foodstuffs anymore, but now also considers issues such as culture and lifestyle, animal welfare, local produce, and the influence of food production on the environment.

What motivates consumers to purchase any particular product is subject to change, depending on the current societal values. In order to appeal to the consumer’s motivation, this requires that increasingly more information regarding the product be available to the consumer. Society’s current response is to apply labels and certificates to products that are produced according to certain guidelines. For example, in research conducted by the research institution Motivaction commissioned by Dutch health centre Voedingscentrum (2009), 63% of the Dutch 1.024 subjects explained that it is not possible to see on the product packaging if the product has a negative impact on climate change. It was also found that almost 50% of the Dutch population surveyed stated that it would be important for them to know such information, and that they would adjust their buying habits if the required information was available. In the United Kingdom, the retailer Tesco has already responded to this consumer demand, by starting to provide all of its products with a label that highlights the volume of CO<sub>2</sub> emission arising from the entire lifecycle of the product or service (Leahy, 2009).

This supportive narrative will begin with defining the problem of the confusion and the imperfections that are caused by applying labels and certificates to products and will then propose a solution. However, there are challenges ahead that must be overcome before the proposed solution can work effectively. For example, there is a major limitation concerning the provision of information. Therefore, Chapter 2 will then explore different systems that could provide the missing information, with one web 2.0 system explored in detail in Chapter 3. The supportive narrative will then consider the other theoretical challenges facing the proposed solution in Chapter 4 and 5.

The practical challenges of the proposed solution will become visible through the development of a proof of concept- this is one of the main objectives of the graduation project. Before the proof of concept could be created, it was important to know which platform would be suitable for use. These possibilities will be explored in Chapter 6. After that is known, the findings from the research need to be implemented into the proof of concept, which is explored in Chapter 7. Finally, time constraints do not allow

all researched functions to be implemented into the proof of concept. Chapter 8 will explain how it should be implemented in the future.

The final Chapter concludes that the confusion and imperfections of the label and certificate system can be solved, and that this project acted as a first step towards such a solution.

## 1.1 PROBLEM DEFINITION

According to G. Spaargaren, a member of the Environmental Policy Group and professor at Wageningen University, there are a few problems that arise with applying labels and certificates to products<sup>1</sup>.

First, because the logo is the only visible element of the certificate when the consumer is at a shop, a consumer unfamiliar with such certificates will not understand what the particular certificate stands for and what guidelines have been satisfied.

Secondly, there are many different labels and certificates available, and some of these may have overlapping rules, which results into a lot of confusion amongst the consumers. The Deloitte report "Consumentenonderzoek: De ontwikkelingen in het consumentengedrag" (2008) confirms this problem, stating that 42% of the 2500 Dutch subjects agreed with that they "couldn't see the forest through the trees" anymore because of the many different certificates, whilst only 19% of participants disagreed.

Thirdly, if a consumer inspects all similar products that are present in a shop, the consumer will be able to know if a similar alternative exists with the certificate that the consumer is interested in. However, the alternative products available in the other shops will remain unknown to the customer.

This project provides a solution that addresses all of these problems: a digital system that could automatically find better alternatives for any product based on their labels and certificates. The same system will also explain the meaning of these labels and certificates by linking them and their level to five dimensions: Animal welfare, Climate change / CO<sub>2</sub> emission, Health, Environment & ecosystem and Fair trade (ACHEF)<sup>2</sup>.

However, the following problems occur with the proposed solution:

- The majority of the products available do not have a label or certificate. There is no other source of information available on which the system could base finding better alternatives.

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<sup>1</sup> These problems were defined through personal e-mail conversations (2009, July 4th).

<sup>2</sup> The exact definition of the different ACHEF categories can be reviewed in Appendix A

- The greatest influence on consumers' purchasing decisions is price. However, the alternatives that score better on these five dimensions are usually more expensive.
- Only consumers who are already aware of the consequences of their shopping habits might consider using the system.
- It is not known how this system should function or look like.

## 1.2 OBJECTIVE

Based on the solution and the problems defined above, the objective can be divided into a project goal and the aims of the research.

The primary goal of the project is to create an easy-to-use system that could find better alternatives for any product before a purchase. Secondary goals are to provide relevant product information and to clarify the confusion about the various labels and certificates.

### *The aims of the research*

- A. The first aim is to explore the different possibilities that could provide the information that the system needs, and then to describe the best system
- B. The second aim is to find out how the system should function to attract users or how to convince users to buy the proposed alternative.
- C. The third aim is to explore the different platforms on which the system could function while still conforming to the project's main objective.
- D. The fourth and final aim is to explore how the proposed research outcomes should be implemented in a functioning proof of concept. The questions of how this proof of concept could be realised and how it should be functioning in the future will also be explored.

## 1.3 METHODOLOGY

All research examples used in this supportive narrative will use the ACHEF category of "environment & ecosystem" as the reference category. To use the other ACHEF categories as well is superfluous as all functions that are explained using this category also works with the other ACHEF categories.

Most explanations are based on literature on influence psychology. Additional research has been done by reading reports, online research and conducting interviews (in person, by e-mail and by phone). Useability research on the development of the proof of concept was mainly conducted through observation and interviews. These findings have been summarised in a design log which can be found in Appendix B.

The conclusion is simply advice for the overall functioning of the system based on the outcomes of similar scientific experiments that have been previously conducted by others. To be sure of the exact implications of the individual types of interaction suggested, a profound field research should investigate the proposed functions individually. Nevertheless, the project will integrate the findings into the system, assuming that the functions work as the evidence suggests. However, the finished project could serve as an excellent investigative tool to execute this field research.

## Part A

## 2 Obtaining information

The project requires a significant amount of information. Since the goal of the project is to be able to finding the best product alternatives, the scores for each ACHEF category must be summarised into digital numbers. Computer technology could search for the name or type of product that is most similar to the original product and that has a better score. This requires the information to be or to become digital.

Today, most organisations, universities and other create their publications in digital form and have converted old hardcopy publications into digital versions. Only very few organisations or institutions would not publish their information digitally. The globally connected network that is the internet is one of the advantages of living in the 21<sup>st</sup> century. Information can be sent from one place in the world to another in a matter of seconds, as long as it is digital and connected to the network.

Since the use of digital information is necessary for our system to find and compare information, use of this global network of information is necessary for the success of the system. However, in order to make the comparisons possible, a score for each of the relevant dimensions must be derived from the product information.

### 2.1 A SEARCH SCRIPT

One of the possibilities to search for product information could be a script that searches the entire internet. When it has access to all restricted areas, there would be a good chance that it would find a lot of information about many products.

The advantage of such a script is that all of the information can stay where it is and no one has to put any extra effort to move or store information elsewhere. The only need would be to place the research results online. However, the present day technology does not yet allow a computer to read and understand all different kinds of research results to generate a unique score from it. The best that the technology today could do is to search for information that related to the product, its packaging, its ingredients and the relevant ACHEF category. However, a person would still have to interpret this information and allocate a suitable score. The main disadvantage is that it does not encourage new information to be created from knowledge that is not digital or online. For example, there could be relevant information stored in a handwritten document that is not available on the internet because there has never been a need to. A solution should be defined that encourages this information to be placed online.

## 2.2 A PRODUCT DATABASE

Another solution is to create an independent database that contains all of the necessary data based on scientific evidence. A panel of scientists will need to search for all of the scientifically proved information (the abovementioned search script would be very helpful in this regard) about as many products as possible, as well as to conduct scientific research themselves. The panel would then derive a score for the product based on the information found. This is exactly what the American website GoodGuide<sup>3</sup> has done. With over 70.000 products in their database, they strive to provide the world's largest and most reliable source of information on the health, environmental and social impact of products and companies. Furthermore, they also have a mobile phone application which allows the user to search for products. The GoodGuide website displays many similarities with this project.

However, GoodGuide admits on their website that there is one relatively important obstacle in their system:

It is important to note that for many products and product categories there is a significant gap in public disclosure due to the lack of U.S regulation around many products commonly sold on U.S. store shelves. This lack of transparency and disclosure make it extremely difficult to perform a comprehensive health, environmental and social issues evaluation of specific products and companies. The most extreme example of this problem is household cleaning products, where there is almost no disclosure of product ingredients. (Goodguide, 2009)

## 2.3 WEB 2.0

The definition of web 2.0:

The use of World Wide Web technology and web design that aims to facilitate creativity, information sharing, and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based communities and hosted services, such as social-networking sites, wikis, blogs, and folksonomies. (Anvil Media Inc., 2009)

By having the information found by an independent panel *and* by making use of the collaboration of others who could contribute their knowledge easy and at any time, we would have a higher chance that the information required would be made available, despite the lack of disclosure requirements in legislation. As the project does not have the use of a research panel that could create a database as impressive as that of GoodGuide's, the project will focus on the information available on the packaging and the contribution of others.

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<sup>3</sup> Goodguide: <http://www.goodguide.com>

In order to obtain information from the users, they will have the ability to rate a product out of 5 for each of the ACHEF categories. For example, in relation to the environment and ecosystems dimension, a score of 5 would mean that it is environmental friendly, whilst a score of 1 would mean that it is very harmful to the environment. This score can be calculated based on the number of ratings, or the score can be one rate which can be infinitely replaced by a new rate. Wikipedia<sup>4</sup>, the online encyclopedia, works this way with its content.

If the score can be changed by anyone, it has the advantage of saving a lot of database space and the score is ready for comparison. The downside is the lack of control, unless a log can keep track of the changes and the registered users who made them.

We require only one score to work with for the comparison. If the rates add up, we have multiple of these scores. A logical choice would be to calculate the average of the scores given to the particular ACHEF category. However, as discussed later in the supportive narrative, each rate does not carry the same value.

It is difficult to conclude which of the above systems is the better one without further research. For the proof of concept, the project will add up the rates based on an equation to find the resulting score. The main reason why this method was used is that it allows more transparency and also allows the information to become more reliable for reasons that will be reviewed in chapter 3.

## 2.4 CREATING CREDIBILITY

By looking at the information that could be derived from what is already present on the products (eg. labels and certificates) and assuming that a research panel could provide some of the information for the system based on their scientific research, the remaining information could be contributed by users by making use of the web 2.0 principle. However, before this web 2.0 environment can be realised, there are quite a few challenges ahead.

When comparing products and showing the list of alternatives with their respective scores, it is not in the users' immediate interest to see the entire evidence because this evidence could be quite extensive and complicated. People would have to accept that the rating is *reliable* before they could trust the scores shown and consequently the best alternative product displayed. To get people to decide that the ratings are reliable, the underlying source of the information must be reliable, which may be information contributed by other users. Apart from the question of why these other users would contribute their knowledge in the first place, we would also have to know how people would perceive such contributed information. This in turn is necessary to determine how the score should be calculated. That is, the users' perception decides the weight of the

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<sup>4</sup> Wikipedia: <http://en.wikipedia.org/wiki/Wiki>

contributed source in calculating the final score for each of the relevant ACHEF categories.

It is hoped that the system will help the collaboration of individual sources to appear most credible collectively.

## 3 Web 2.0 information system

In this chapter, the theory of influence and perception behind the web 2.0 environment will be examined. First, the principle of social proof will be explored to see what it can do for the system. The different source types will then be compared and their credibility, and hence value, will be determined. Thirdly, psychological credibility enhancements will be examined together with their ability to be implemented into the system. Fourthly, the theory of reciprocity will be explored on its application to user contribution. Finally, the theory behind comparison will reveal why comparisons would work.

These are the questions that will be answered in this chapter:

- How should the dimension score be assembled from multiple completely different sources?
  - o What could the system do to determine whether a source is valid or not?
  - o How credible are the single sources perceived by the user and what are their underlying ratios?
  - o What could the system do to increase the perceived reliability of the user's submitted data?
- Why would people contribute their knowledge?
- How can comparison be made possible?

### 3.1 INCREASING THE RATING'S CREDIBILITY BY ACTIVE USER PARTICIPATION

More than two centuries ago, the German writer Johann von Goethe published a book entitled "Die leiden des jungen Werthers". In this book, a boy called Werther commits suicide. Many of its readers also committed suicide, causing a wave of suicides across Europe. It was so overwhelming, that several countries banned the novel (WHO, 2000).

Professor David Phillips, sociologist and professor at the University of California at San Diego has traced this "Werther effect" to modern times. He pointed out that immediately after a suicide story has been published on the front page of a newspaper, the suicide rates increase dramatically in the geographical area of publication. Phillips argues that certain troubled people who read of other people's suicide would kill themselves in imitation. He also noticed that it especially affects those who showed similarity to the victim. When the suicide of a young person was detailed in the newspaper, more young people would commit suicide afterwards. If the suicide of an old person was detailed in the newspaper, more elderly people committed suicide (Phillips, 1980).

Professor Robert B. Cialdini at Arizona State University writes in his book "Influence: The Psychology of Persuasion" (2007): "The principle of social proof states that one means

we use to determine what is correct is to find out what other people think that is correct. Usually, when a lot of people are doing something, it is the right thing to do." This psychological effect would be particularly strong when the person is subject to uncertainty, or when the other person shows similarities.

The examples are abundant. Discotheques and club owners would manually create long waiting lines outside their club to create visible social proof for their clubs' quality. Many commercials have 'the average normal person' talk about their positive experience with the advertised product. Salesmen love to inform consumers when a product is the "fastest growing" or largest selling" because they don't have to convince consumers directly that the product is good, they need only say that many others think so (Cialdini, 2007).

The rule works because it helps human beings with many actions in their daily lives. When humans are in an unfamiliar situation, the rule would help them determine which behaviour would be the correct behaviour. Whether the question is what to do with an empty bottle in a cinema, how to eat chicken at a restaurant, how to walk from the train station to a big festival or how to dance at a club, the actions of those around them will be important in defining the answer. The next example will show how strong this principle is.

Three scientists, Leon Festinger, Henry Riecken, and Stanley Schachter (1956) went undercover in a small sect who prophesised that the earth would soon be flooded. The cults leaders assured that those who believed in the Lessons would be picked up by spacemen on the night before.

When the night arrived, no spacemen showed up and no earth was flooded. As the cult's beliefs had been undercut by physical proof, there was but one way out of the corner for the group. They had to establish another type of proof for the validity of their beliefs: social proof. Before the night of the flood, they had always remained in secrecy and ignored the interest of the media. Now for the first time, they actively searched for attention and called the newspapers to spread the word that one of the leaders had just been send through by the spacemen. The group had emitted so much light that God himself stopped the flood from happening.

It is especially in times of uncertainty that people look at what others do. The more people there are, the truer it must be. In the example of the cult, at the time they were most uncertain about their beliefs, they actively tried to convince others to believe (Festinger et al., 1956).

This would mean that if a lot of people say that a certain product is harmful to the environment, it must be harmful to the environment. This is particularly the case when the consumer has no idea of its environmental impact and is therefore uncertain about

the subject. Even though those people might not be experts, one would still follow the principle of social proof.

However, this does not mean that a system should be created where anyone can say anything about a product, whether true or false. The rule of social proof simply says, the more people that do or say the *same*, the truer it must be. So if one hundred people say that a product is environmental friendly, and no one disagrees, one would believe that the product is environmentally friendly. But what if 59 out of these 100 people say that a product is environmental friendly and 41 say that it is not. If the principle of social proof is relied upon, this would mean that the product is somewhere in the middle of environmental friendliness. Suppose that amongst those one hundred votes, there was one respected ecologist who has studied the impact of that product on the environment and found out that it is extremely harmful. It would be unfortunate if his expertise was not recognised and this one vote disappeared amongst the many.

Therefore relying on the principle of social proof alone is not enough, and there must be some sort of distinction between people who have knowledge and credibility about the subject and those who have not.

However, the principle of social proof could be used to check the validity and credibility of each single vote, whether it came from a respected ecologist or from a neighbour's gardener. When every vote is accompanied by a short description or explanation, viewers could express their thoughts about whether the explanation given sounds reasonable or whether the source does not seem valid at all. If this can be done with the mere effort of a single click, this could produce a digital number that would visualise the vote's credibility. Why does this express the principle of social proof? Suppose that the ecologist had posted some of his research alongside the vote and included a link so that interested parties could read the entire study. It is likely that if people vote for his credibility, many would vote that he is credible. Suppose that 200 users voted positive and one negative. The resulting number of credibility votes would therefore become 199. The hypothetical neighbour's gardener might also have a story. He might say that the product is bad for the environment because when he threw it out of the window and into the garden bed, the next day all the flowers in the garden were dead. Suppose 100 users voted negatively on his story whilst 20 voted positively, then the resulting number of credibility votes would be -80.

By simply looking at the numbers behind the votes, and without having read the names or descriptions, the system has to define which vote would seem more credible to the user. According to the principle of social proof, it would be the one with 199 positive votes. That is because 199 people voted for the same thing: *this is credible*.

This is a very interesting fact for the project. The principle of social proof would allow a vote to become more credible if more people vote it as credible. Therefore, a vote with a

high positive number of credibility should increase in value, as opposed to a vote with a high negative credibility number, which should decrease in value.

The value of a rating can fluctuate by using a system of social proof. If many people agree with a vote, the value of the vote should **increase**. If many people disagree with a vote, the value should **decrease**. Therefore the system can determine how valid a vote is and adapt its weight accordingly.

### 3.2 DERIVING THE SCORE FROM DIFFERENT SOURCE TYPES

Which vote would be considered as more valuable: that from the respected ecologist or that of the neighbour's gardener? The odds are high that the vote of the ecologist would be considered more valuable - this is the principle of authority.

According to Cialdini (2007), the rule of authority says that we are trained from birth that obedience to proper authority is right and disobedience is wrong. The essential message from parental lessons, and childhood rhymes, stories and songs is continued in the legal, military and political systems that people encounter as adults. An accepted system of authority is necessary to allow for the development of sophisticated structures for resource production, trade, defence, expansion and social control that would otherwise not be possible.

The strength of this authority can be shown in Milgram's (1974) experiment. The experiment consisted of 3 people: a researcher, a subject from a standard cross section of ages, occupations and educational levels within society, and the victim. The victim was attached to electrodes, which were controlled by the subject. The subject is led to believe that the electric shocks are real and that the victim was a real participant, but the victim was in fact an actor who was hired by the research team. The researcher would ask the victim a set of questions. If the victim's answer was wrong, the researcher would then ask the subject to deliver a shock to the victim. The shock's voltage would increase gradually from 15 to 450 volt.

The results were astonishing and even surprised Milgram himself. Not one of the forty subjects in this study stopped executing volts even when the victim began to demand his release; nor later when he began to beg for it; nor even later, when his reaction to each shock had become, in Milgram's words, "definitely an agonised scream." Not until the 300 volt shock had been sent and the victim had "shouted in desperation that he would no longer provide answers to the questions" did anyone stop, and even after the 300 volt, it was a distinct minority who did. The remarkable thing, when the victim/actor and the researcher swapped positions, all of the subjects refused to give one additional shock when it was merely the fellow victim/actor who demanded it and not the researcher.

How can these alarming patterns be explained? Milgram says it has to do with a deep seated sense of duty to authority within society. According to Milgram, the real cause in the experiments was the subject's inability to defy the wishes of the boss of the study—that is, the researcher who urged and, if need be, directed the subjects to perform their duties, despite the physical and emotional mayhem they were causing. One outside observer to the experiment wrote:

I observed a mature and initially poised businessman enter the laboratory smiling and confident. Within twenty minutes he was reduced to a twitching, stuttering wreck who was rapidly approaching a point of nervous collapse. He constantly pulled on his earlobe and twisted his hands. At one point he pushed his fist into his forehead and muttered: "Oh, God, let's stop it." And yet he continued to respond to every word of the experimenter and obeyed to the end. (Milgram, 1963, n.p.)

Information from a recognised authority can provide a valuable shortcut for deciding what the truth is and how to act in a certain situation. As Milgram himself suggest, conforming to the dictates of authority figures has always had genuine practical advantages for society. Early on, these authority figures (such as parents, teachers and doctors) knew more than a child does and people find that taking their advice proved beneficial—partly because of their greater wisdom, but in the case of teachers and parents, also because they controlled rewards and punishments. As adults, authority figures still control reward and punishment, though the authority figures now appear as managers, judges and government leaders. Because their positions have superior access to information and power, it makes sense to believe anything an authority figure says or implies.

There are several kinds of symbols that can trigger people's compliance in the absence of genuine authority. One of these triggers is the title that a person bears. Two pharmacology professors, Michael Cohen and Neil Davis from the Temple University examined the power of the simple title of "doctor" in a hospital. In their book entitled "Medication Errors: Cause and Prevention" (1981) they wanted to see if they could physically remove the authority figure from the scene and replace it with an unfamiliar voice on the phone, with only one piece of evidence for authority – the title "doctor". One of the researchers then made an identical phone call to 22 separate nursing stations on various surgical, podiatric, medical, and psychiatric wards in which he identified himself as "doctor". In the same phone call, he directed the nurse to give 20 mg of Astrogen to a specific patient. There were several reasons why the nurse should refuse to comply with this order. First, 20 mg is an obviously and dangerously excessive dosage. The drug containers clearly stated that 10 mg is the maximum daily dosage. Secondly, the medication itself was unauthorised as Astrogen had not been placed on the ward stock list and it had also not been cleared for use. Thirdly, the prescription was

directed by phone, which is in direct violation of the hospital policies. Finally, the prescription was given by a man the nurse had never met or heard of.

Yet, in 95% of the instances, the nurses went directly to the ward's medicine cabinet where they secured a 20 mg dosage of Astrogen and started for the patients' room. It was only then that they were stopped by a secret observer who was part of the experiment.

A sense of authority, simply by someone wearing a lab-coat or by naming a title, could have people listen and accept things from someone that they would otherwise refuse. But what does this have to do with the project? By making the distinction between the different sources, we should be able determine which vote would be considered as a higher authority, and thus would be considered as more credible.

The following sources will be examined below:

- Governments
- Certificates
- Labels
- Scientists (universities/scientific institutions/professors/doctors)
- Organisations (environmental organisations/health centres)
- Companies (suppliers/employees/retailers)
- Private investigators (everyone else)

The former three sources are system defined, whereas the latter four sources are user defined. Which of the above groups would be perceived as being of a higher authority than the other, and would thus get a higher value than the other in calculating the score? To find the exact answers, more research investigating user perception of the above groups is needed. However, predictions can be made with the research already obtained.

### 3.2.1 GOVERNMENTS

Companies are forced to comply with many government laws and regulations. In the Netherlands, these include the general environmental law such as the General Rules for Establishments (Environmental Management) Decree (also known as the Activities Decree), Environmental Management Act (Wm) and also the conditions stipulated in an environmental permit if the company has one. The European Union is also becoming increasingly involved with laws and regulations in the area of product regulation. An example is the use of E-numbers, which are additives that are permitted by the EU-government. Additives that are not approved by the EU are not allowed to be used in products that are sold in the European Union (Wikipedia, 2009). Another example is the legislation of free range chicken eggs. In 1999, an EU directive was created that lays down minimum standards for the protection of laying hens (EU, 1999).

Among the things subject to environmental regulations are: noise and vibration; waste; odour; air pollutants and emissions; water discharge; transport management; soil protection and hazardous materials. The fact that companies are regulated by the government supports our assumption that retail products conform to these rules.

There is a belief that the products sold cannot be too dangerous or damaging if its sale is permitted by the government. As Cialdini said, people have learned from their childhoods to obey authority, especially those who execute governmental functions, such as policemen, the military and judges. Therefore the government would be considered to be the highest authority. Particularly, if the government considers a product to be harmful, it would not be sold in the first place -this is a power that only the government wields and that no other institutions have.

For example, the environmental friendliness of a product must conform to certain government laws and regulations before it can be sold. This would mean that if a product has not been rated yet, one could assume that the product conforms to a minimum level of environmental friendliness, according to how stringent the governmental standards are. But what if the product is allowed for sale here, but prohibited in another country? Therefore the system will check if the product is also allowed for sale in other countries. If the system finds another government that has not allowed this product to be sold for environmental reasons, the value will be changed to 1 (the worst), and it would be accompanied by the name of the country where the product is prohibited for sale. If there is no other government who prohibits the product from sale, the score value is 0 (that is, there is no score).

Is there is another country where the government prohibits the product? If **Yes**, the category gets the worst score (ie. A score of 1). If **No**, there is no score and the product should conform to minimum laws and regulations.

### 3.2.2 CERTIFICATES

To ensure that a certain product has been developed and produced according to certain rules and regulations, a supplier could apply for a label or certificate. As the supplier pays a fee to the organisation that supplies the label or certificate and as extra costs have been involved to produce according to these regulations, this could translate into a higher price for the consumer. However, differences in prices could fluctuate enormously. Organic potatoes for example, only cost a few cents more than non-organic potatoes, the price of organic chicken is two times as much as the price of conventional chicken (€/kg)<sup>5</sup>.

<sup>5</sup> At the time of writing, organic potatoes (AH Biologisch Aardappelen 3kg) at the Dutch supermarket Albert Heijn were 1.10 €/kg. Non-organic potatoes (AH Vastkokende aardappel) were 0.93 €/kg. Organic chicken fillets cost 24.90 €/kg and non-organic chicken fillets cost 12.48 €/kg.

The advantage of acquiring such a certificate is that these certificates are usually well known and carry a name and logo which the customer can recognise. This way, the customer can instantly know that it contains a controlled product and that it meets the minimum requirements in order to obtain the certificate.

Products that carry a certificate are controlled by the certificate-issuing organisation. For example, the organisation SKAL checks the products carrying the Dutch EKO certificate at least once a year (EKO Keurmerk, 2009). If the certified product no longer conform to its rules, the certificate-issuing organisation can prevent the product from being sold. As the certificate-issuing organisations in The Netherlands are controlled by the governmental institution "Raad voor Accreditatie" RvA (Skal, 2009), it can be considered that applied certificates are the second highest authority.

If a product has a certificate, the new minimum score would become the score that the certificate represents. It is noted that this is a minimum score, because the product simply has to meet minimum standards in order to obtain the certificate and the product may in fact exceed those minimum standards. This means that for every certificate, the system needs to know how strict the rules and regulations are in comparison to other certificates in order to determine the scores for each certificate.

If a product cannot possibly be produced and transported in a more environmental friendly way than the certificate states, then the value of the certificate would receive the maximum score of 5. In such cases, the minimum score of that category would be 5, and as 5 is the highest score possible, the product would always come up as the best alternative product on this category when compared to other products.

Does the product have a certificate and is the product not banned in another country? **Yes**, the minimum score for that category increases to the number that is defined for the particular certificate. **No**, the score remains unchanged.

### 3.2.3 LABELS

Some retailers apply labels to their products as guidelines for their customers. These labels are controlled by the retailer and usually conform to the standards set by official organisations, which are in turn controlled by the government. Since they are executed by a retailer and not by an independent organisation, labels are likely to be perceived as having less authority than certificates.

Does the product have a label but no certificate and is the product not banned in another country? **Yes**, the minimum score increases to the number that is defined for the label. **No**, the score remains unchanged.

As governmental controlled information is considered high authority, it is not necessary for these sources to be open to alteration through the use of the social proof system.

### 3.3 USERS

Users should always be allowed to rate a product unless the score for the category has been determined by a higher authority. If a product has a certificate that applies to the category that the user would like to rate, the certificate has already established a minimum score and only higher user ratings can be taken into consideration for calculating the end score. But the question is which of these remaining users would be perceived as more credible and thus would have more weight in calculating the end score. It is hard to say what the exact weighting should be without further research. However, as relative measures are needed for the proof of concept, therefore temporary guesses have been made per user type.

Users can only rate a dimension with a label or certificate applied if their rate is higher.

#### 3.3.1 SCIENTISTS

Scientists are usually a good source of information for reasons that are almost superfluous to mention; they usually earned their expertise through many years of study and research.

The good news is that a lot of research has already been conducted and is still being conducted about many products, ingredients and production processes. The bad news is that there are many more products where the environmental impact is not (publicly) known. Further, for those products that have been the subject of research, the results of such research are not stored in an easily accessible and central location, but rather the digital and online information is spread over various sites. Also, these results are not always consistent with each other. However, until the project has the resources of a comprehensive scientific database at its disposal, scientists can rate a product, and/or provide additional text and website links referring to the relevant evidence.

As noted earlier, the deference to authority means that a simple title can control nurses in hospitals. This implies that people who demonstrate a certain level of expertise, whether it is by having a title or by wearing special clothing, could receive immediate obedience by the subject. Therefore scientists are considered to be the highest authority amongst the users that could rate the product.

Scientists have the highest authority amongst the users. Therefore the value of their rating will weigh most. Weight: **100/100**

### 3.3.2 ORGANISATIONS

There are many environmental organisations that publish research findings. For example, research commissioned by the World Wildlife Fund (WWF) stated that the Bluefin tuna is heavily endangered and would be extinct by 2012 at current rates (WWF, 2009). They also publish guides to find 'good' fish that are not endangered. Other organisations, for example Greenpeace, publish guides to find companies that produce products that do not contain toxic chemicals in their products which are harmful to the environment. Nokia has been near the top of the list for many years. Greenpeace also maintains a black list of companies that urges consumers not to purchase fish from for reasons like illegal fishing (Greenpeace, 2009). Although there are a few organisations in the field, the research regarding products covers only a small spectrum of products available. Similar to the problem faced when using scientific research, there is no central location to obtain these findings.

There are also television programs that research the background of food products. For example the Dutch Keuringsdienst van Waarde (2009) examined in one particular show the question of why a corn chicken looks yellow. This gives the chicken a special look and some people believe that it gives the chicken a sweeter taste. At first, companies would explain the yellow colour by saying that the chicken simply eats a lot of corn which turns their skin more yellow. After further questioning, it seems that the corn does not cause the chicken to change into a yellow colour, but an additive called xanthophyll is used for that purpose. Although the corn chicken is 2 euros more expensive than a normal chicken and the extra corn in the chicken feed only costs 4.5 cents more per chicken, its flavour does not change. This kind of information would be also useful to the project.

These organisations are not controlled by the government, nor do their members automatically get a title simply by being a member of the organisation. However, they can still be considered as the next highest authority. The principle of social proof can partly explain this high level of authority. The fact that Greenpeace alone has 538.000 private donators or that the WWF has 925.000 in the Netherlands alone, means that a lot of people believe in the credibility of the organisation. If so many people do, it must be true what they say. They also claim independency and their financial statements may be inspected by the public.

Organisations have the second highest authority amongst the users. Therefore the value of their rate will be worth less than the scientists, but higher than the other users. Weight: **40/100**

### 3.3.3 COMPANIES

Although management may know their business production processes, it is often the case that not all employees of the business will be aware of the entire production process. Nevertheless, if every employee in the production process, regardless of geographical location, had the possibility to share their work experience or the environmental policies of their company, then in theory a lot of information could be revealed. Although the question of whether they would like to make use of this opportunity to share their knowledge, remains unanswered.

If a company uses wood from scarce rainforests, or has dumped chemical waste in the waterways, it would be unlikely that one could obtain such information from the product packaging as it is unlikely that the company would share this information. However, when a company invests in positive development processes, they are quite keen to expose this information to the customer as they know that it will appeal to the consumer's ethics and thus improves their corporate image. When a normally conservative Dutch chocolate brand introduced fair trade chocolate, all of their advertisements stated in big capital letters "Heerlijk en 100% eerlijk", which is a rhyming slogan meaning "deliciously fair" in Dutch. Other examples include Volvo, whom are advertising their car's sustainability and green labels, and McDonald's, whom are advertising that they use free range beef.

An important goal of a company is to make profit. A distinction is made between two companies: Companies who endeavour to promote sustainability and companies who don't. As explained earlier, those companies who do promote sustainability like to inform consumers of such as it attracts the people who interested in sustainability and ethics. This information is irrelevant to the other consumers, as long as it does not influence the price they are used to paying or cause additional inconvenience to obtain such product.

As a company would know more about their production processes and whether this complies to the various ACHEF categories than the average user who does not have a title of authority or is not a member of an organisation. Therefore, a company investing in moral or environmental values is placed on the next level of authority.

But what about the companies that do not care about moral or environmental values but still would like to make profit and give their own product a good vote? In the end, the system would not know which company has the right intentions and which company has not. However, this is not a significant problem as false company votes can be overruled by the governments, by scientists and by organisations. Secondly, the social proof system would mean that their value would be voted into oblivion if many people disagree with the arguments or if people vote the product poorly due to the failure of the company to provide any support to their company's vote for their product. Finally, as votes add up, many votes added by private investigators (the lowest level of authority)

could also overrule the company's vote. The company would simply end up with bad publicity for the company.

Companies have the second lowest authority amongst the users. Therefore the value of their rate will be worth less than the scientists or organisations, but higher than the other users. Weight: **10/100**

### 3.3.4 PRIVATE INVESTIGATORS

Since private investigators do not have any titles, nor have any other easy proof of being an expert, they will have the vote with the lowest value. But, since the social proof support system is in effect, this vote could still increase in value and overrule other votes depending on how much support the vote gets.

Private investigators have the lowest authority amongst the user types. Therefore the value of their rate will be the lowest. Weight: **1/100**

## 3.4 INCREASING RATE CREDIBILITY

### 3.4.1 NAMES

When a participant decides to place a vote, there are several reasons why his or her real name should be posted alongside the vote, instead of a self chosen name (a nickname) or no name at all. First, it is likely that people would become more careful when their real name is publicly connected to their arguments as they cannot hide behind a fake ID when they post incorrect information. Secondly, it is easier for the administrators to track abuse when votes are not made in anonymity. Thirdly, it displays a form of professionalism and therefore increases the value of the vote, which is likely to be considered desirable. The disadvantage is that it might hold some people back from voting on the ACHEF category of a product because of privacy considerations as they do not want their real name to be exposed on the internet. However, anecdotal evidence suggests that sometimes participants are happy to disclose as much information as possible to as many people as possible. It is not unusual to find profiles on sites like Friendster or Salon Personals that list personal email addresses or links to personal websites in violation of the recommendation or requirements of the hosting service itself (Gross & Acquisti, 2005).

There should also be consideration of how names should be displayed. According to social scientists Adam Alter and Daniel Oppenheimer, people tend to have a "greater affection" for words that are easy to pronounce – words or names that have a high degree of fluency – than for those that are hard to pronounce. They argue that people feel more positively towards company names and stock symbols that are easier to read and to pronounce (KAR, Tanley) than those with more difficult names (RDO, Sagxter).

Dr. Noah J. Goldstein, Steve J. Martin and Dr. Robert B. Cialdini (2007) argue that one consequence of this psychological tendency is that the easier a company name or stock symbol is to read or pronounce, the more valuable it should seem, leading the stock prices to increase.

Although nothing can be done about people who have difficult names to pronounce, the situation can be alleviated by avoiding unnecessary abbreviations and the use of unpronounceable nicknames. Because the use of abbreviations for names would decrease their fluency in pronunciation, each vote would be liked less and the vote will decrease in value. Therefore, the unabbreviated names will be shown, along with the name of the organisation, company, university or institution they are related to.

The full name of the source should be displayed.

### 3.4.2 STORIES

When a scientist, a member of an organisation, or a company places a vote, it is easy to assume that they have evidence to prove why they gave that score. Therefore the option of having space available for research findings and links to such research would be sufficient to turn their vote into a credible and valuable vote. However, this is not as easy for a private investigator. Anyone could register as a private investigator, including for example, the villager whose village was severely affected by pollution dumped by a certain company. It would be unlikely for this person to show any scientific evidence.

To test the credibility of stories, one of the authors of the book "Influencer" (2008), Dr. Ray Price and Dr. Joanne Martin provided three different groups of MBA students with the same information. One group of students were given a verbal description that contained facts and figures, another group was given the same information presented in charts and tables, whilst the final group were provided with the details as presented in the story of the old wine maker. To the researchers' surprise, those who had heard the story found the same information more credible than the other students who had not heard the story. One of the researchers explains:

Concrete and vivid stories exert extraordinary influence because they transport people out of the role of critic and into the role of participant. The more poignant, vibrant, and relevant the story, the more the listener moves from thinking about the inherent arguments to experiencing every element of the tale itself. Stories don't merely trump verbal persuasion by disproving counterarguments; stories keep the listener from offering counterarguments in the first place. (Patterson et al., 2008, p. 61)

In this way, people who have less credibility to start with, perhaps due to a lack of a title or degree, could still provide a credible vote by including a personal experience. That is why storytelling must be encouraged when there is a lack of scientific facts to confirm

the vote. The ability to post a photo should be included in the system, as one photo could tell a thousand words. In the case of the villager, a story could be posted about how the company dumped the chemical wastes into a river near his hometown, and how his family's health was affected. Supported by photos of the chemical residue in the river, this could become a moving and invaluable story.

The input fields are not the same for the different source types; whereas the input field for the scientists encourages scientific evidence and links to research results, the input field for the private investigator encourages personal stories and experiences.

### 3.5 CONTRIBUTION BY USERS

The rule of reciprocity says that we should try to repay, in kind, what another person has provided to us.

It is so widespread that after intense study, sociologist Alvin Gouldner can report that there is no human society that does not subscribe to the rule. The archaeologist Richard Leaky describes it as: "We are human because our ancestors learned to share their food and their skills in an honoured network of obligation." A widely shared and strongly held feeling of future obligation made an enormous difference in human social evolution, because it meant that one person could give something (eg. food, shelter, care) to another with confidence that it was not being lost. For the first time in evolutionary history, someone could give away any of a variety of resources without actually giving them away. Human societies derive a truly significant advantage from the rule, and consequently they train their members to comply with it. Every person in society has been taught to live up to the rule, and each of them knows about the social sanctions and derision applied to anyone who violates it. The labels we assign to these persons are loaded with negativity. Because there is general dislike for those who take and make no effort to give in return, people will often go to great lengths to avoid being considered one of their numbers (Cialdini, 2007).

A university professor tried an experiment by sending Christmas cards to a sample of random strangers. Although the professor expected a few cards in return, the response he received was overwhelming – holiday cards addressed to him came pouring back from people who had never met nor heard from him. According to Cialdini, this study shows the action of one of the most potent of the weapons of influence around us- the reciprocity rule.

The Hare Krishna Society was a sect active in the 1970s in the United States. Its devoted members would canvass a city street, chanting and bobbing in unison while begging for funds. The average American was reluctant to provide money to support them. They came up with a brilliant solution: they would give the unsuspecting passer by a flower as

a “gift”. The target person was not allowed to give it back, but afterwards the target was asked to provide a small contribution to the society. This benefactor-before-beggar strategy has been wildly successful for the Hare Krishna Society, producing large scale economic gains and funding the ownership of temples, businesses, houses, and properties (Cialdini, 2007).

Many seemed to have discovered this rule and how it can be used on the world wide web. There are music bands who offer their entire album free to download on only one condition: They ask the downloader to pay the amount of money that they think that the album was worth after they have listened to the album. Also, there is much software available that is free to download legally, although there is always a big shiny button that says “donate”.

Without the contribution by others, there is no web 2.0 system. How could the system get people to contribute their knowledge? If the system would provide them with a favour first, according to the reciprocity rule, that would mean that they feel obligated to provide a favour in return.

For the project the favour would be that the system finds a better alternative product for the consumer, the system clarifies the meaning of the labels and certificates if present and the system has all of the information the consumer needs about any product. If this first service is provided at no cost, the reciprocity rule applies and people would also contribute their knowledge.

To help achieve user contribution, the service will be completely free.

However, this favour can only be provided if the project contains useful information from the beginning so that the system could provide the user with better alternatives from the start. The more information, the more alternatives the system can find. The more alternatives that the system can find, the higher the chance that it can find the best alternative for the user. Therefore it is important to find a way to find better alternatives without depending on user input first. If the labels and certificates could be digitalised, the system will always find an alternative which has a label or certificate for a non-labelled or certificated product.

The system requires the digitalisation of the products’ labels and certificates so that better alternatives can be found from the start.

### 3.6 MAKING COMPARISON POSSIBLE

*"There is no expedient to which a man will not resort to avoid the real labour of thinking."* - **Sir Joshua Reynolds**

From Cialdini's book "Influence: The Psychology of Persuasion" (2007):

Once we have made a choice or taken a stand, we will encounter personal and interpersonal pressures to behave consistently with that commitment. Those pressures will cause us to respond in ways that justify our earlier decision. ... Like most other forms of automatic responding, it offers a shortcut through the density of modern life. Once we have made up our minds about an issue, stubborn consistency allows us a very appealing luxury: We really don't have to think hard about the issue anymore. (pp. 57, 60)

In the same book, Cialdini mentioned an example of how this theory is understood very well by toy manufacturers. Toy manufacturers always have huge sales with Christmas. However, after these holiday months, the sales go into a terrible slump. They found an ingenious solution. Right before the holidays they advertise one particular toy on all children's TV commercials. The child would then tell their parents that it they want that particular toy for Christmas. The parents then promise their children that it is this particular present that they will get. However, the toy manufacturers undersupply the toy before Christmas. When the parents go to the store to purchase that particular toy and cannot, they would buy other toys for the same amount of money.

Then in January and February when sales are usually low, the manufacturers will again heavily advertise that same product. When the kids see the toy on TV for the second time, they will remember that it was this toy that was promised to them by their parents, and not the other toys that they had received. The parents will then go back to the store to buy the present in order to remain consistent with their earlier commitment. In this way, the toy manufacturer doubles their profit by understanding the rule that people stay consistent with their decision to buy that particular toy.

Social psychologist Steven J. Sherman (1980) called a sample of residents from Bloomington, Indiana, in the US, as part of a survey he was taking and asked them to predict what they would say if they were asked to spend three hours collecting money for the American Cancer Society. Of course, not wanting to seem uncharitable to the researcher or to themselves, many of the people said that they would volunteer. The consequence of this commitment procedure was a 700% percent increase in volunteers when, a few days later, a representative of the American Cancer Society did call and ask for neighbourhood canvassers.

If a person says or thinks something that he or she would, the person will stick to this commitment, even though the context might change. If a person believes that an

ACHEF score gives a reliable representation, the person sticks with this decision, even though the context (that is, the product) might change.

Now it becomes possible to create a summary showing a list of alternatives which can replace the entire evidence per product with just one simple score. People do not have to check the evidence for every single product every single time, as they have made the decision that the score alone is reliable enough. However, products should still have access to the evidence until the user decides that the score alone is considered reliable. Therefore all products should have the ability to have their source inspected upon request. Of course when the user checks the evidence, the evidence must be considered as a reliable source.

With this system, the more sources that are present and the higher the authority of the sources, the greater the system will be perceived as trustworthy by the user. This means that the system should contain as many sources as possible that are perceived high in authority.

A single score can replace the evidence in the comparison list.
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## Part B

The web 2.0 system has been invented so that the underlying psychological goal of the project could become possible- to get consumers to buy the better alternative proposed by the system. This goal could be divided into two. First, the project hopes that people would use it. Secondly, the project hopes that the users will buy the best alternative.

# 4 Attracting users

## 4.1 ENJOYMENT

Usually, I am the last person to leave our small office at university. I share the office with four other classmates. Every time when I intended to leave the office, a noise would come from one of my classmate's desk, as the computer was still downloading movies, games and the like. In my opinion, this is a waste of power and keeps many computers rattling non-stop all over the world. A solution could be to only download when the computer is already being used for other activities. So every day, I turned off my classmate's computer, until I decided to confront that classmate about this waste of energy. I was quite surprised by his reaction. He said "Do you know how much power costs? Almost nothing. I don't have a car and I travel by train. I separate rubbish for recycling. I'm doing enough already for the environment. You should leave the computer on next time." I tried to explain that when someone is motivated to help creating a better environment, it would never be 'enough'. It did not help and I continued to turn the computer off myself until this day. Although at first his answer might seem harsh, I was still quite happy with what he said. I didn't have to explain *why* we have to take care of the environment. Therefore the moral value was already present, and the only thing left is how to connect this moral value to actual behaviour.

Often humans react to their immediate environments as if they are on autopilot. They don't pause to consider how their immediate choices reflect their ideals, values or moral codes. The connections between their actions and personal standards are "rarely top of mind". Renowned psychologist Dr. Stanton Peele (2004) argues that taking a broader moral perspective enables humans to face and overcome some of their toughest life challenges. He has found that individuals who learn how to reconnect their distant but real values to their current behaviour can overcome the most addictive of habits- cocaine, heroine and gambling. So how does this reconnection of actions to real values work? Delancy Street is a rehabilitation centre for mainly (former) criminals where everyone walks into the gates with zero-self esteem. Dr. Mimi Silbert teaches these residents how to regain their sense of worth by connecting to a broad moral mission. The challenge was how to make 'ratting out their buddy' part of a behaviour in which it had a new positive meaning- helping each other out. She explains:

I don't like the word *self-esteem*. Ultimately if you don't *earn* your own self-respect, you'll tear yourself apart. No one else can give it to you. It doesn't come from sitting in a group and having someone say, 'I feel good about you.'... *You* convince *yourself* over time that you're good, and it takes hard work.

But you can't do it alone. You don't get it by you helping someone else. It's being the helper that makes you like yourself. So will you confront people who screw up? Yes, you will. Will you take responsibility for someone else's problems? Yes, you will. And when you do, you'll respect yourself. Because you matter when you matter to someone else. (Patterson et al., 2008, p. 99)

Dr. Silber connects behaviour- in this case, behaviour that is originally cast in ugly terms ("ratting out") – to consequences, values, and an overall sense of morality. Does it work? Delancy has no guards, no locks and no restraints, and yet has thousands of success stories (Patterson et al., 2008).

Dr. Don Berwick, clinical professor of pediatrics and health care policies at Harvard Medical School, and head of the Institute for Healthcare Improvement's 100,000 lives campaign, recognises that people have a powerful desire to do what is right. Harnessing that intrinsic desire is a far more powerful influence tool than using extrinsic rewards or exacting punishment. Instead, for example by talking with them about what they want allows them to discover on their own the links between their current behaviour and what they really want. "The biggest motivators of excellence are intrinsic. They have to do with people's accountability to themselves. It's wanting to do well, to be proud, to go home happy having accomplished something." (Patterson et al., 2008)

Therefore, for people wanting to find alternatives that are better for the environment, it has to come from the inside. When they have made the decision that they want to connect their behaviours to a higher moral value of improving the environment, they will want to find better alternatives. This seems like a tough job for an Interaction Designer to accomplish solely by design. Nevertheless, the project found a seemingly obvious method of how it could get people to use the tool by solely making use of design- that is, by making the tool *enjoyable*.

Mihalyi Csikszentmihalyi (1990), a researcher at the University of Chicago, has devoted his career to what he has come to call "flow" or the feeling of enjoyment that comes from losing yourself in an engrossing activity. He has discovered that almost any activity can be made engaging if it involves reasonably challenging goals and clear, frequent feedback. These are the elements that turn a chore into something that feels more like a game. Therefore the system should keep track of the products bought by consumers. Charts display scores of how environmentally friendly the user has been shopping for the last days, weeks or months. Keeping scores produces clear, frequent feedback that can transform tasks into accomplishments that, in turn, can generate intense satisfaction. If these scores could be compared to friends, an extra element of competition could intensify the pursuit to the next level of achievement.

This could also encourage users to contribute to the system by voting for a product if these are also being recorded. With clear feedback after every vote placed, showing their new total vote number or by having a page showing the list of all products they contributed to, a game is born. These 'vote totals' could also be compared to others within their organisation, university or institution. However, it should not become *too* enjoyable because the game element should not become the only reason to place vote.

The system could attract more users by becoming enjoyable. This can be achieved by keeping track of the purchased products and their influence on the different ACHEF category charts. These charts could be compared with friends.

## 4.2 PRICE

Although the project's aim lies with these people for the time being, it must still be accepted that people would simply refuse to spend more money for a better alternative than their budget allows. Price is considered as the most important aspect of the supermarket. 68% of the 2500 subjects in Deloitte's (2008) report do not buy organic products because they think that it is too expensive. However, 14% of the subjects would still buy Fair Trade products even if they were 10% more expensive than its similar conventional product, an increasing 33% would buy the Fair Trade product if it was only 5% more expensive.

This was realised based on the results of a questionnaire the project conducted. Participants were asked if they would like to buy environmentally friendly, buy fair trade or buy products in which the animals used were treated well. If the answer for any of those questions was yes, then the next question was to find out which aspects of the product they currently pay attention to. The aim of the question was to find out whether people were satisfied with the current information available. The result of the questionnaire was that they would like to buy environmentally friendly, fair and with care for the animals. However, they were not currently paying any attention to these aspects of products. The reason: price. Although they care about those characteristics, they still do not want to spend more money in order to purchase goods that satisfy such characteristics.

Attracting users is also about conforming to the users' interest. Therefore an option should be implemented such that the user can specify the price limit of the better alternatives so that this is more useful to consumers in making purchasing decisions.

The system should implement a function that allows the user to determine how much more expensive the better alternative might be.

## 5 Influencing users to prefer the better alternative

With the help of the principles of authority and social proof, it is possible to find out how valuable a vote per source type is. If these values are known, the score can be calculated for the particular ACHEF category. Now the question is, in what way should this value be visualised? For example, it could be simply a number between 1 and 10, or a percentage bar visualising the score. It is important to note that the tool should provide a quick and easy way of showing which alternative is better.

If the values are rounded up or down into increments of two (for example, a score of 5.1 will be rounded up to 6, whilst a score of 4.9 will be rounded down to 4), and then displayed in a bar chart increasing in increments of 2, this would mean that the visualisation of the worst value (that is, a score of 1) would take up a greater area than if smaller increments are used. Similarly, the visualisation for the best value (that is, a score of 5) would also take up a greater area. This makes the process of seeing whether a product is good or otherwise is clearer.



**Fig. 1** The above chart has been divided into 5 sections, whilst the lower chart has been divided into 10. Although less accurate, the first chart gives a stronger impression of the score.

How does this help with getting a user to prefer the better alternative? This is where the contrast principle comes in.

The contrast principle states that the same thing can be made to seem very different, depending on the nature of the event that precedes it. For example, retail stores behave in accordance to what the contrast principle would suggest: Sell the expensive clothing piece first, because when it comes time to look at jumpers or shirts, even the prices of the expensive ones will not seem as high in comparison. A man might not be willing to spend €85 for a jumper, but if he has just bought a €545 suit, a €85 jumper does not seem excessive anymore. As sales motivation analysts Whitney, Hubin, and Murhpy (1965) state, "The interesting thing is that even when a man enters a clothing store with the express purpose of purchasing a suit, he will almost always *pay more* for whatever accessories he buys if he buys them *after* the suit purchase than before." It is much more profitable for salespeople to present the expensive item first, not only because to fail to do so will lose the influence of the contrast principle, but to fail to do so will also cause the principle to work actively against them. Presenting an inexpensive product first and following it with an expensive one will cause the expensive item to seem even more costly as a result. This is why the tool will *not* display prices in the comparison screen,

because there is a fair chance that the better alternative would cost *more* money than the searched product would cost.

We could also use this principle to make scores of better alternatives look better in comparison to products that score not so well. If we narrow the score even further down into 3 values, red (1), orange (2) and green (3). Red often stands in digital design for warning, danger, low status, cancel or to stop at the traffic lights. Green usually stands for full status, or to go at the traffic lights, with orange somewhere in between. By narrowing down the scores into 3 categories, about 1/3 of the products will fall into the first category. This way, there is a 1/3 chance that a person would see a red coloured product (that is, the *worst* status) when he or she searches for it. The tool will search for better products and it is likely that it will find a product which has a green colour behind it (that is, the *best* status), which the product wants the user to buy. Now that the project has divided the products in only 3 categories, the contrast will look substantial. There is a *best* status and a *worst* status, even though the *real* scores could be much closer together (for example, with the scores 3.32 and 6.67 out of 10, the former would have a worse status whilst the latter will have a better status). Since the contrast is artificially increased *and* the red value is shown first, the green status automatically seems as a much better product, even though the score of 6.67 might not be that much of a difference from the score of 3.32 when this number is displayed as a real score. In this case, the real score could have seemed too low to encourage the user to make the extra effort of purchasing the alternative product.

It is noted that the comparison of ACHEF category scores is not aimed to persuade people to buy the better alternative, but to inform in a clear and simple way.

The scores behind the products in the comparison screen will be divided into 3 colours: red, orange and green.

## Part C

# 6 Potential mediums

The primary goal of the project is to create an *easy-to-use* system that can find better alternatives for *any product before a purchase*. Secondary goals are to provide relevant product information and to clarify the confusion about the labels and certificates.

As one of the goals of the project is to operate prior to a purchase, this has a few consequences and could limit the possibilities. For example, the consumer has to make use of mobile technology or technology that is already present in the retailer. However, this might also create a user experience which can be unique and outweigh the limitations. One does not have to go home first to access a personal computer, or find an expert or ask the salesman questions that they do not have the expertise to answer. As noted in chapter 2, the system needs to function digitally in order for comparisons between products to be made possible. This means that the user must have access to a computer to be able to find a better alternative. The following items are possible mediums to implement the project:

## 6.1 STATIONARY BARCODE SCANNERS

Some supermarkets have price-check stations that display the price of a product after a customer holds the barcode of the product in front of the scanner. These could also provide additional information and assist in finding better alternatives. It would require some usability and technology upgrades, such as a bigger multi-touch colour display and an internet connection so that it could make use of the web 2.0 data. Users could upload information from any computer connected to the internet and make use of such information whilst in the retailers. However, there are few disadvantages, such as the need to invest in technology upgrades by retailers, the possibility that retailers would use this opportunity to promote their own branded products, and the stations, depending on the popularity of such a service, might not be easily accessible to all as there may be a long queue to use the station.

## 6.2 HAND HELD SCANNERS

Some retailers offer the service of handheld scanners (according to Deloitte, 19% of the subjects said that their supermarket offered handheld scanners and 56% of this group actually make use of them). These scanners allow the customer to scan each product themselves without the assistance of a cashier. The inventory of products and the cost are displayed digitally on the screen, and the customer can then pay at the self service cash register. This has the advantage of avoiding long queues at the checkout and to save the time spent removing products from the basket simply so that the products can

be scanned by the cashier. The handheld scanners at Dutch retailer Albert Heijn retrieve their price information by making use of a wifi network connection. Therefore, it is technically not a significant challenge to make these scanners communicate with the internet. However, it would be a challenge for the interaction designer to balance the visualisation of the price, the list of groceries and the better alternatives. Unless it receives a technology upgrade, there is very little space available. The advantage is the ease of use, as the consumer simply holds the barcode in front of the scanner and the information is displayed. However, the handheld scanners are usually available in only Albert Heijn supermarkets in the Netherlands and not at any other chain of supermarkets. Furthermore, the issue remains that if the system needs to operate in concert with the retailer, it is likely that they would only like to find better alternatives within their own range of branded products. The aim of the project is that the possibilities of finding better alternatives that could be present in *other* shops is not restrained.

### 6.3 MOBILE PHONES

The research institute Multiscope (2008) examined the use of mobile phone internet by the Dutch population in 2008 by questioning 19.000 subjects. Of these subjects, 54% has access to the internet via his or her mobile phone.

Assuming that every Dutch person who owns a mobile phone is a customer (if they are old enough to own a phone, then they are likely old enough to be a consumer) and that most of them carry their phones with them to the shops, then this would mean that about half of these customers would have access to the internet through the use of their mobile phone. However, this does not mean that they are always happy to use it. In the same study conducted by Multiscope, it seemed that only 20% of those 54% with access to internet actually make use of it.

The following mediums could transfer the better alternatives to the users, if connected to the internet: Stationary barcode scanners, handheld scanners and mobile phones.

## Part D

# 7 Proof of Concept

The aim of the proof of concept is to integrate the research findings in a usable system that could be used for further field research. It should also conform to the primary project goal of being easy-to-use and would therefore enhance the possibility of the interaction flow subject to useability research at the same time. In this chapter, the research outcomes are being examined for how these could be practically implemented into the proof of concept. This chapter will also cover how the proof of concept could be technically realised and how it should function.

## 7.1 ENTERING DATA

The system's content partly depends on human input. Before we can make any conclusions on which medium would be best to use, we should first consider the environment that is likely to be used by the users that provide the content. These users could be scientists, members of organisations or home users. For them, it would be easiest to digitally enter their knowledge from wherever they prefer as long as an internet connection is available. In my experience as an Interaction Designer, with present day technology, the personal computer consisting of a monitor, a keyboard and a mouse offers the best experience when it comes to entering data.

The primary research questions questioned the functions behind the web 2.0 environment. The research partly addresses the interaction of the contributing user with the input fields. These field inputs should be developed for the medium that the contributing user is most likely to enter its knowledge: that is, the medium of the personal computer. The most obvious and easiest choice is to develop a website on which users could contribute their knowledge.

It would be illogical if someone could upload data, but not immediately retrieve the data from others or review his or her own data. Therefore the website should also have the ability to do exactly what the mobile system can do: that is, to find better alternatives, provide additional product information and to clarify the confusion regarding the various certificates.

## 7.2 RETRIEVING DATA

Although it is possible for all of the above mentioned mediums to access the information and calculate the better alternative.

However, the challenge is to come up with a proof of concept within the available amount of time for the graduation project. The following reasons explain the decision to develop the proof of concept for the mobile phone:

- Modern mobile phones have relatively big screens, strong calculating capacities and some of them have additional useability functions such as touch screens that open new possibilities for interaction design choices.
- Many modern mobile phones have built-in cameras. Open source technology allows the camera to function as a barcode scanner and therefore have the useability advantage of the Albert Heijn handheld scanner.

The ideal situation would be to develop individual applications for every phone which could retrieve the information and find better alternatives. Unfortunately, the amount of time available for the graduation project does not allow a website *and* an application for a mobile phone to be developed as the proof of concept.

As the development of a website was found to be necessary to implement the research findings, a solution within the time restriction was to develop one website for entering and retrieving information which could be loaded on both the computer and the mobile phone. This would save a lot of time in programming a separate application and does not affect the aim of the proof of concept. Therefore the proof of concept is a website that could be loaded both onto the personal computer and also onto a mobile phone connected to the internet. This website will contain all research outcomes found in part A and B of this supportive narrative.

The proof of concept is a website that can be loaded onto both the mobile phone and also onto the personal computer.

### 7.3 MOBILE PHONE TYPE

It is not of direct importance to determine which phone the website should be running on because the goal of the proof of concept is to create a tool that could be used for further research. If it works on *one* phone, that would be sufficient. In a report from the Nielsen Norman Group called "Useability of mobile websites" they asked users to use their phones to visit random websites and perform small tasks. They divided the type of phone used into 3 categories: featured phones (normal GSM phones with access to the internet), smart phones (phones with bigger LCD screens and smaller keypads) and touch phones (phones with a touch screen). Using the featured phone, there was an average success rate of 38%. The smart phone had a success rate of 55% and the touch screen phones had a success rate of 78%. As the success rate using a normal PC is 80%, the success rate of the touch screen is almost as high as that of the normal personal computer (Brackel, 2009).

According to research institute Net Applications, most websites (66%) were visited by Apple's iPhone in the month of February 2009 (Nu.nl, 2009). Therefore, the project chose to design the proof of concept for the iPhone.

The proof of concept is designed to function on Apple's iPhone.

## 7.4 THE WEBSITE

### 7.4.1 IMPLEMENTATION OF THE RESEARCH FINDINGS

As seen in the research conducted, all of the environmental information of a product is combined into a score that summarises the environmental friendliness of the product. Integrating the other categories of Animal welfare, Climate change / CO<sub>2</sub> emission, Health and Fair trade could clarify the confusion about the different labels and certificates. Why? Suppose that these five scores are listed under a product name and the labels and certificates are recognisable, then each logo of the label or certificate can be shown next to the ACHEF category score that it applies to.

If this is the only source present, then the user can immediately see how the certificate affects the score. That is, how strict the label or certificate's regulations are. If the ACHEF category score is the maximum score possible, there are probably few certificates that have more strict regulations applying to that ACHEF category. If the score is only one or two, then unfortunately the label or certificate's regulations are still very soft. In this same overview, the logos of other sources can also be shown so that the user can immediately see the credibility of the individual scores. For example, five scientist logos behind the Fair Trade ACHEF category could give a different first impression than one private investigator logo.

The five ACHEF category scores are listed in a product overview, with small logos of their sources behind it that represent their value.

By further clicking on the separate ACHEF scores, a list of all sources that determine the ACHEF category score can be shown, including the rating they gave to the ACHEF category and the rating they got from other users. The user can also see how this rating is included in calculating the ACHEF category score by looking at the number of social proof. See chapter 9.2 for the corresponding images.

By clicking on the individual ACHEF categories, a list of its sources is shown with their full names, organisation, university or the like and their social proof score.

The primary goal of the project is to find better alternatives, but we have five ACHEF categories to work with. Here is how the proof of concept takes it into account:

According to the primary goal of finding better alternatives, the first thing that should come up is the product and its best alternative. In chapter 5, it was explained why the scores should be divided into colours behind the product names. A simple filter button allows the user to choose how the system should find better alternatives based on which of the ACHEF categories. If there is no ACHEF category of interest, the default will simply calculate the average of all five ACHEF categories.

As seen in chapter 4.2, the price is often the most important deciding factor to the customer. A price slider could limit how much more the better alternatives might cost and could be set by the consumer. If it is set on zero, it would only find better alternatives that are cheaper or better alternatives with the same price.

The proof of concept has a slider that allows the user to determine the price limit of the better alternatives found.

After having clicked on an individual ACHEF category, the user can decide to participate and contribute their knowledge. After registration and log in, the user will be allocated an authority category. The registration is a one-time process, and the user can login with their name and password afterwards.

The following user details are required for the system to work accordingly:

Scientists:

- University name
- Full name
- Full title
- Expertise

Organisations:

- Organisation name
- Full name
- Function within the organisation

Companies:

- Company name
- Full name
- Function within the company

Private investigators:

- Full name

The following input fields should be available depending on the category the user belongs to:

Scientists:

- Summary of the research outcomes
- Links to the research
- Possibility to upload a paper/article/thesis

Organisation

- Short explanation
- Links to the source

Company

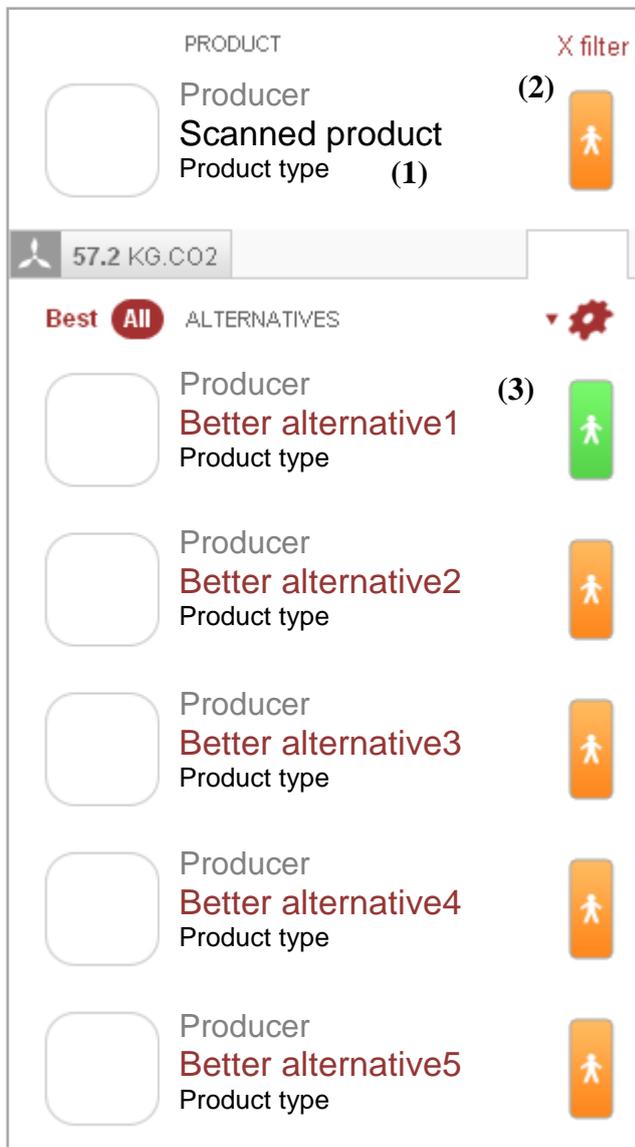
- Short explanation
- Links to the source

Private investigator

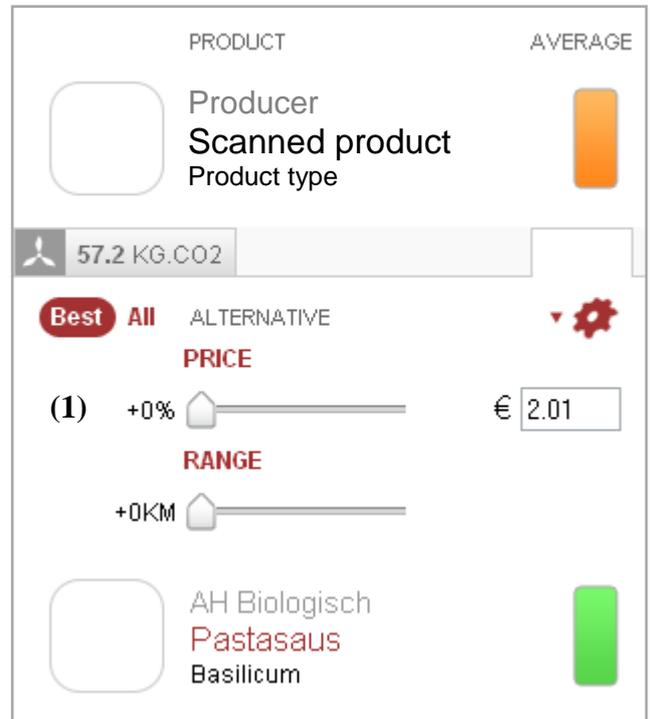
- Personal experience
- Photo upload
- Links to sources

The following images are screenshots of the proof of concept as at the time of writing. These will show the visual implementation of the research findings. However, the images may differ from the proof of concept as submitted for the purposes of the

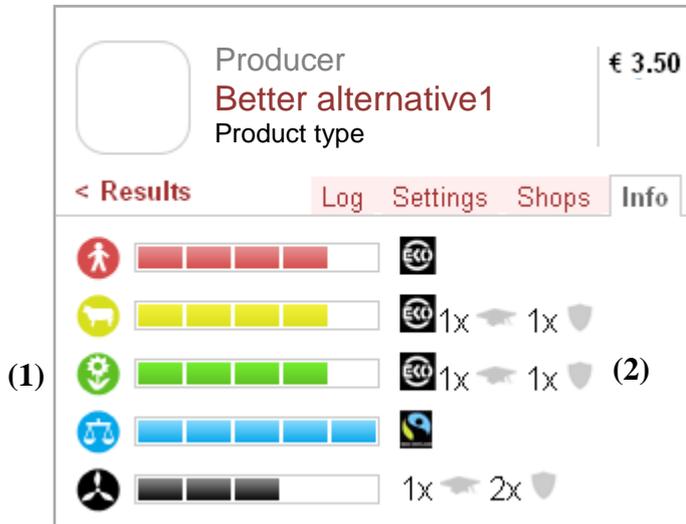
graduation project, since it is a work in progress. All products, names and prices are fictional and the product scores do not represent realistic values. For a working demo, please visit the website listed in Appendix B.



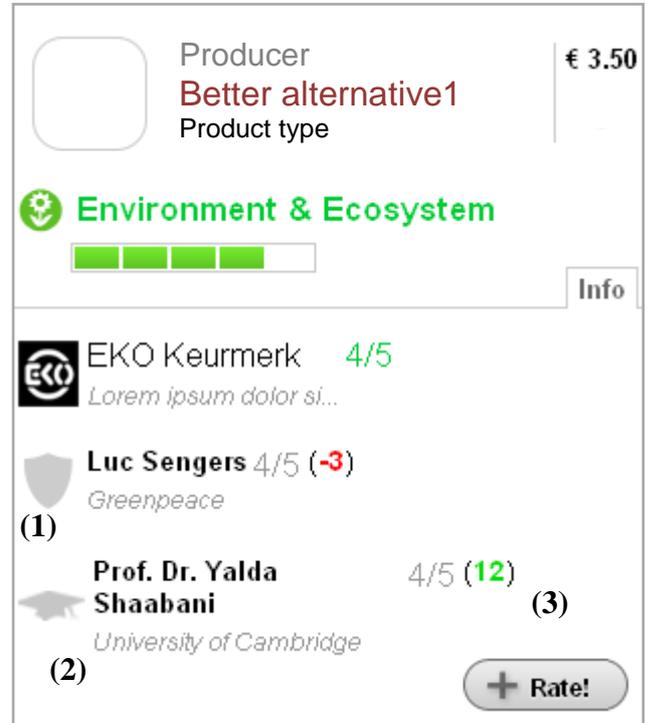
**Fig. 2 Results** (1) The scanned or searched product. (2) The scores are divided into 3 levels: green, orange and red. (3) The comparison field, set on the ACHEF category of Health.



**Fig. 3 Results** (1) The price slider allows the user to determine a maximum price for the better alternatives found.



**Fig. 4 Product overview** (1) The score of the ACHEF category. (2) Behind the score are the logos of the sources that determined the score.



**Fig. 5 ACHEF Category details** (1) Icons represent the user's level of authority. (2) Full names are used. (3) The social proof number could increase or decrease the weight of the rating on the ACHEF category score.

Producer **Better alternative1** € 3.50  
Product type

**Environment & Ecosystem**

**Name:** Yalda Shaabani

**Score** 4

**Source summary:** Enter your text here..

**Links:** (1)

Add

Find alternatives | Request

**Fig. 6 Adding a source** (1) The title of the input fields changes depending on the authority of the user. Yalda Shaabani is registered as a Professor, therefore the input fields encourages her to submit scientific information. If someone logs in as a Private Investigator, "source summary" becomes "Personal Experience" and "Links" becomes "Photo upload".

Producer **Better alternative1** € 3.50  
Product type

**Environment & Ecosystem**

**Prof. Dr. Yalda Shaabani** 4/5  
University of Cambridge

**Research summary:** (1)  
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus a augue dignissim massa porttitor aliquet at eget justo. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Praesent eget nibh tortor, ac semper metus. Aliquam luctus consequat lorem vel sagittis. Morbi tincidunt hendrerit rhoncus. Integer rhoncus nisl eget elit commodo volutpat.

**Links:**  
<http://example1.com>  
<http://example2.com>

(2) 12 up down

**Fig. 7 The source page** (1) By clicking on a source name in the ACHEF categories details screen, the specific information belonging to this source is shown. (2) As people must first read what the source is about, people can only vote for the source's credibility on this page. Each registered user may vote once per source.

#### 7.4.2 TARGET AUDIENCE

In order to perform effective useability tests, it is important to know who are expected to use this first version of the proof of concept. However, the target audience of the final version would depend on future stakeholders and on more research investigating which medium would appeal most to the customer. If this will eventually use the medium of the mobile phone, based on research that there *is* a market for it, what kind of people would fall in the category that would use this system? Only speculation can be made that this would be the knowledgeable younger generation of customers, who actively seek for ways to improve the world and who do not mind to use technology for it. However, better alternatives could also mean better quality and/or healthier food. The 2009 report “Voedselkwaliteit, veiligheid en gezondheid van biologische producten” by the LBI and RIKILT found many health advantages of organic food above non-organic food (Biologica, 2009). This could open the possibility that consumers looking for better quality or healthier food could use the system as well, and not just the ethical consumers in society.

#### 7.4.3 TECHNICAL REALISATION

Before a website that can be loaded on both the mobile phone and on the computer could be realised, some technical limitations should be taken into account. Programming language such as Adobe Flash will work on almost any web browser for the personal computer but it is still in development for the mobile phones. The programming language Ruby on Rails would be a possible platform for the subject but requires installation on a server first. PHP, MySQL and JavaScript will function on most modern mobile phones, just as they function on all web browsers on the personal computer. Theoretically, all of the necessary functions of the proof of concept that came out of the research can be programmed using the above suite of tools. However, different programming languages should be considered for future versions of the application since PHP and MySQL are likely to have trouble handling thousands simultaneous requests to find better alternatives amongst thousands of products. However, this is not a concern for the proof of concept, since handling approximately 100 products should be sufficient for conducting further field research.

The proof of concept is programmed in PHP with MySQL as the database language.

#### 7.4.4 PRACTICAL REALISATION

To provide the service of finding better alternatives by the use of labels and certificates, the digital system of retailers should be understood.

Every product has a unique barcode number and therefore could function as the 'id' of the product. This is particularly helpful when the camera could translate the barcode image into a barcode number. However, these barcode numbers are not as unique as they might seem. Barcodes change as soon as the packaging changes, so the one product could have different barcodes attached. For example, wine could have different barcode numbers for each different year that it was made. Retailers solve this problem by linking the different barcodes of the same product to the one article number. All of the information such as price, price/kg and description are stored internally and only linked to this article number, which is shop unique.

Products also display their name and the name of their supplier and contact information. Then there are also ingredients listed with their nutrition and allergy information. This information is accessible from the outside, but what is essential to know is what information is digitally stored. After questioning some retailers, it is remarkably disappointing of what is actually stored digitally<sup>6</sup>. In supermarkets, the only data they have linked to their products that could be useful to the project is the short description of the product and its price. However, for the project to function, product names and their corresponding certificates and labels are needed.

Even official Dutch institutions such as the Voedingscentrum claim that they don't have a list with product names and their according certificates or whether they are forbidden in other countries or not. There is no place that the project could find that has such information about products.

However, the Dutch barcode organisation GS1 provides the possibility to find out which company belongs to which product by merely typing in the product's barcode on their website<sup>7</sup>. The organisation SKAL, which controls the Dutch organic EKO certificate, has a list available online of companies that produce according to the organic standard. This list could be linked to the GS1 website to determine whether the product has an EKO certificate or not. Although this is far from perfect, it would be start.

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<sup>6</sup> Albert Heijn, Plus and Jumbo, Utrecht, July 2009

<sup>7</sup> GS1 Nederland: <http://gepir.gs1.nl/>

## 8 The future

The functions described in section 8.1 are part of the research findings and should have been implemented in the proof of concept if time permitted. Section 8.2 outlines ideas that are not part of the research findings but have already been incorporated into the proof of concept. However, further development in this area is required.

### 8.1 GAME ELEMENT

In chapter 4, it was suggested that there should be a game element present in the system with clear and frequent feedback to encourage usage. However, the solution requires the system to store the users' purchases. With barcode scanning technology, this would require the user to scan every product that the user plans to purchase. However, there is speculation that Radio Frequency Identification (RFID) tags might be integrated into products in the future, which would create the possibility to instantly scan all products selected in a shopping basket.

The next step in developing the game element could be to give points per product purchase, so that the personal buying habits based on the five ACHEF categories can be visualised. Apart from being able to see which ACHEF category is been most popular (whether consciously or unconsciously) over a period of time, goals could be set to achieve certain scores. The competition element could be implemented by comparing these scores to friends on networking sites like Facebook, MySpace or Hyves.

To provide clear and frequent feedback, there could be a score chart of a user selected ACHEF category on the "Better Alternatives" page. This would visualise the current status of how much points are needed to achieve the next level. Simple icons with catchy titles (eg. Eco-pirate, fair-fairy) could act as rewards.

Charts should keep track of the users' buying habits. The system could then provide feedback on their habits in relation to the ACHEF categories.

## 8.2 FUTURE IDEAS

These ideas have already begun to make their way into the proof of concept.

### 8.2.1 COMPARISON ON EACH OF THE ACHEF CATEGORIES

If the scores of the five ACHEF categories are known, the system could easily display each of the scores in a table behind the products. The user would be able to quickly determine, for each of the ACHEF categories, which product conforms to certain standards and which product does not.



**Fig. 8** Showing individual ACHEF scores allows the user to compare products on each of the ACHEF categories.

### 8.2.2 ANIMALS THREATENED WITH EXTINCTION LIST

The International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species is the world’s most comprehensive inventory of the global conservation status of plant and animal species<sup>8</sup>. If this list could be linked to the products, it should be able to give a warning once it detects that the product contains animals or plants that are threatened with extinction. Other systems, like the Dutch Viswijzer could link their fish database of which fish is threatened with extinction and which fish is okay to buy<sup>9</sup>. This information could automatically influence the score of the animal welfare ACHEF category.



**Fig. 9** A warning sign pops up when a product contains an endangered species.

### 8.2.3 LISTING THE INGREDIENTS AND LINKING THEM TO EXTERNAL HEALTH RESEARCH

Once digitalised and available to the system, a list of ingredients could be integrated with their according Recommended Daily Intake (RDI) percentage. Additives (Eg. E-numbers) could be linked to a digital version of the book “What is in your food?” by Corinne Couget. The Frenchwoman conducted 14 years of research and created a long list of the most well known E-numbers and included their effects on human health with an

NAME	WEIGHT (G)	RDI (%)
<b>Tomato</b>	<b>50</b>	<b>20</b>
<b>E-203</b>	<b>0.5</b>	<b>90</b>

**Fig. 10** A list displays the weight and the Recommended Daily Intake (RDI) of the products’ ingredients.

<sup>8</sup> IUCN Red List: <http://www.iucnredlist.org/>

<sup>9</sup> Viswijzer: <http://test.goedevis.nl/Englishpage/view>

accompanying score. This information could automatically influence the score of the 'health' ACHEF category.

#### 8.2.4 CO<sub>2</sub> EMISSION AND MAPPING ORIGINS

If a list with ingredients and their origin is available to the system, these origins could be visualised on a map. The origin of the product itself could be visualised if there are no ingredients present or when it is not known where the ingredients came from. This way the user could see how far the ingredients had to travel from their origin to the retailer. Currently, 64% of the consumers do not look at the products origin (Deloitte, 2008), and



**Fig. 11** On the left, a chart visualises the product's footprint as the amount of hectares of trees (ha) that is needed to transform the emitted CO<sub>2</sub> gas of the production process into O<sub>2</sub> (oxygen). One human being has a maximum of 1.8 hectares to its availability (Wackernagel, 2002). On the right, a map visualises the distance travelled by the product and/or its ingredients.

mapping the origins might help users to realise how far some products travelled and to influence product purchases. For example, Royal Gala apples from Dutch retailer Jumbo in Utrecht might appear the same as those from Dutch competitor Albert Heijn, however the former's apples had travelled all the way from New Zealand to the Netherlands, whilst Albert Heijn's Royal Gala apples came from France<sup>10</sup>. If the type of transport is known (or if reasonable guesses can be made), the exact CO<sub>2</sub> emission of the transport can be calculated.

There is also some information known about general production processes. The German report "Klimaretter Bio?" from Foodwatch (2008) calculated how much CO<sub>2</sub> was emitted during the production process of various foodstuffs. Organic beef emits most CO<sub>2</sub> of the food types: 13494.6 grams of CO<sub>2</sub> per kg of organic beef. However, with every other food type, organic products emit less CO<sub>2</sub> gas than conventional products. This information could automatically influence the score of the 'clean energy' dimension.

#### 8.2.5 SEND REQUEST TO THE RETAILER

Dutch retailer Jumbo carries the slogan "If we don't have it, let us know and next time we'll have it". If the system comes up with a better alternative and is set on finding all products and not only products from the current retailer, a simple button could send a request to the retailer for adding the better alternative to its assortment of products stocked. This could be of interest to retailers as well, as the requests could show which product is popular but not yet in their current inventory.

<sup>10</sup> Albert Heijn XL Roelantdreef, Jumbo Eurpedreef, Utrecht, 2009 August

### 8.2.6 GEOGRAPHICAL RANGE SLIDER

In the Deloitte (2008) report, the distance to the supermarket is seen as the 7<sup>th</sup> most important aspect of the supermarket. With a range slider, the user could determine how far the better alternative could be located from the position of the user. If set on zero, it would only find better alternatives from the retailer that the user is currently at. Further values could be set in kilometres from the users' current position and more products would be found that fit within the new geographical range.



**Fig. 12** A range slider allows the user to determine how far the better alternative could be located from the position of the user. If the slider is set on 0, it would only find better alternatives that are located in the same shop.

### 8.2.7 FINDING THE CLOSEST RETAILER OR THE RETAILER WITH THE CHEAPEST PRICE

If the prices of the same product in other retailers are known, it is easy for the system to display a list of all retailers within the range set. In this same list, the user should be able to sort on price. If the user clicks on the cheapest retailer, a map could display the fastest route. In the same list, the user should also be able to sort on distance and therefore find the closest retailer, although this might not be the cheapest.

SHOP	DISTANCE	PRICE
 Albert Heijn Roelantdreef	0 KM	2.70
 Plus Voortstraat	3.3 KM	2.90

**Fig. 13** The list displays the product's retailers within the user-defined area. By clicking on "Shop", "Distance" or "Price", the system can sort the list based on these categories.

### 8.2.8 SHORTCUT DASHBOARD

A dashboard below the searched or scanned product could show the most important information from a user-defined ACHEF category. One section acts as the link to choose the ACHEF category, whilst the other section acts as both a summary of the ACHEF category and as a shortcut to the information page of the category.



**Fig. 14** The wind turbine icon acts as a link to choose a different ACHEF category. On the right, the KG.CO<sub>2</sub> number acts as both a summary of the "Clean Energy" category and as a shortcut to the "CO<sub>2</sub> emission" page.

## 9 Conclusion

This supportive narrative examined many different aspects of the project. First a problem was defined and solution proposed. Then, different systems that could gather the necessary information and different mediums to implement the system were explored. The project chose the medium of the mobile phone and created a proof of concept that could be used for further research. Finally, we looked at the possibilities of the created proof of concept for the future.

The question of whether the designed proof of concept would work or not can only be answered after further field research over a longer period of time. As far as time and capacity allowed, the proof of concept implemented almost all of the research findings. That is why the proof of concept could function as an excellent tool for further field research. It could also function as a demonstration tool to show potential investors its capacities.

However, one of my personal aims was to encourage consumers use the designed system by the end of this graduation time period. The research indicated that the system has to provide a free service first; unfortunately this would require more time and perhaps a monetary investment before such a free service to manage several thousands of products can be realised. These investments might come from the retailers themselves. To explore the possibility, I visited several retailers. All of them showed enthusiasm, although on one condition: that it would only work for their products.

I certainly believe that there is a bright future ahead for the concept once it can detect the product name and its certificates. Once this is possible, then the system can always find better alternatives, solely based on which product has a certificate and which does not. Displaying the certificate logos for the ACHEF category and their scores clarifies the confusion of what any particular certificate means. Over time, user contributions will help the content to grow, which in turn would mean more better alternatives will be found on more ACHEF categories and the system will perform better to achieve its aims.

In the future, additional functions would increase the enjoyment of the system, and which would further encourage more users. More users would result in more awareness and sales of better alternatives. If more better alternatives are sold, then this also means that less ethical or unhealthy products are sold, and the project and all of its users would have contributed to a better world.

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# Appendix A

## ANIMAL WELFARE

The Animal welfare category examines the five welfare principles: The freedom from thirst and hunger, freedom from discomfort, freedom from pain; injury, and disease, freedom to express normal behaviour and the freedom from fear and distress (Wikipedia, 2009). Other factors such as the space available, the type of food and the amount of sunlight and fresh air are also examined. The more the production conforms to these factors, the higher the score.

## CLIMATE CHANGE / CO<sub>2</sub> EMISSION

The Climate change / CO<sub>2</sub> category examines the amount of carbon dioxide that was emitted during the production process. It could also be possible that the company plants trees to compensate. The less carbon dioxide emitted during the production process, the higher the score.

## HUMAN HEALTH

The Health category examines how healthy a product is. However, there are more factors that determine how healthy a product is besides the product itself. For example, how much a person consumes is also an important factor. Therefore the ACHEF category will compare the product to similar other products. The product that is least bad for a users' health, receives the highest the score.

## ENVIRONMENT & ECOSYSTEM

The Environment & ecosystem category examines the impact of the production process on the environment and ecosystem. There are many factors that could influence this ACHEF category, for example, the use of pesticides, genetic modification, noise and vibration, air and water pollutants. However, the logging of trees could also influence the category negatively. The less impact the production process has on the environment and ecosystem, the higher the score.

## FAIR TRADE

The Fair trade category examines the payment and conditions of the producers of the product. Some products are produced in countries where there are poor working conditions and low wages to employees. The fairer the wages and the working conditions are, the higher the score.

# Appendix B

Proof of concept: a Chef.

## **Download:**

<http://rubenrekker.nl/other/graduation/download/achef.zip>

## **View on:**

<http://rubenrekker.nl/achef>

## **Technical specifications:**

Language: PHP, Javascript  
Database: MySQL  
Version: See *.zip*  
Size (.zip): See *.zip*  
Date of compilation: See *.zip*

## **Design log**

<http://rubenrekker.nl/other/graduation/download/designlog.zip>