Cross-Cultural Web Design for a Rule Based Marketing Tool

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Abstract

While flying today the customers will receive static advertisements on the screens placed in front of every seat. Hence, the advertisements do not differ depending on the flight's duration or personal interests. Our goal was to develop a marketing tool where the marketing team at different airlines could specify under which circumstances a certain advertisement would be displayed onboard. The design was based on a rule building tool, where every single advertisement is constructed as a rule with different criteria. Furthermore, we were interested in investigating if it was possible to create a cross-cultural interface in order to satisfy and meet the requirements for four different regions around the world: Europe, Japan, the Middle East, and the United States. A literature study was conducted to get an understanding of different cultural aspects as well as an investigation of existing rule building tools that are available on the market. Our prototype was iterated through five different phases which included both Low Fidelity and High Fidelity prototyping. Each phase was tested and evaluated before further development. Our last test session included three participants from each of the four regions and was performed with an online service for user interface testing. Our final conclusion was that it is possible to create a cross-cultural marketing tool since none of the regions struggled more with our prototype and all performed the test cases with none or minor problems. The created prototype was a web based interface with a drag and drop approach which were familiar to the vast majority of the test users. Almost all of the test users thought the system was intuitive and easy to use, and they could consider using the system frequently.

Keywords: Cross-cultural design, rule building tool, in-flight marketing, prototype, user behaviour, user centered design

Sammanfattning

När flygresenärer reser möts de idag av statisk reklam på de skärmar som är placerade på sätet framför dem. Därmed förändras inte reklamen under flygresans gång eller efter personliga preferenser. Vårt mål var att skapa ett marknadsföringsverktyg som marknadsförare på flygbolag skulle kunna använda för att specificera under vilka omständigheter som en viss reklam ska vara synlig för en resenär. Designen var konstruerat som ett regelverktyg där varje erbjuande var uppbyggd som en regel med olika kriterier. Vi var även intresserade ifall det var möjligt att skapa ett tvärkulturellt gränssnitt som var tillfredsställande och uppfyllde behoven i fyra olika regioner: Europa, Japan, Mellanöstern och USA. Arbetet inleddes med en litteraturstudie för att få en djupare förståelse för kulturella aspekter samt en undersökning av befintliga regelverktyg som finns på marknaden. Vår prototyp itererades fem gånger med både Low Fidelity- och High Fidelity-prototyper, där varje fas testades och utvärderades innan fortsatt utveckling gjordes. Den sista användartestningen inkluderade tre försökspersoner från var och en av de fyra regionerna och genomfördes med hjälp av en internetbaserad tjänst för testning av användargränssnitt. Vår slutsats blev att det är möjligt att skapa ett tvärkulturellt gränssnitt för marknadsföring, detta bygger på att ingen region hade större problem än de andra, alla testpersoner utförde även testen med få eller inga problem. Vår prototyp var ett webbaserat gränssnitt som använde sig utav drag and drop-tekniken, vilket var bekant för de flesta av testanvändarna. Nästan alla testanvändare tyckte att systemet var intuitivt och enkelt att använda, och hade kunnat tänka sig använda systemet regelbundet.

Nykelord: Tvärkulturell design, regelbaserade verktyg, marknadföring på flygplan, prototyp, användarbeteende, användarcentrerad design

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Lund, May 2019
Annie Önnered and Erica Karlsson

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1 Introduction

In today's society, people constantly travel to different places. One of the frequently used mode of transportation is airplanes, which is used for both business and vacation. Onboard the airplanes, passengers are presented with different advertisements for beauty products, food, drinks, clothes and more. However, these advertisements are not adjusted for the passenger's interests or destination. This is something that could be improved by introducing a marketing tool. The purpose of such a tool should be to handle when different products should be advertised to the passenger. This thesis will examine how a marketing tool could be created in an iterative design process.

1.1 In-Flight Entertainment Systems

Tactel is a Swedish IT-company which was founded in 1995 and have offices in Malmö, Stockholm and Umeå. They focus on getting businesses closer to their customers, by helping them with everything from initial idea to implementation. Each step of the process is always created with the human in mind [1].

One area that Tactel is working on is in-flight entertainment systems. These systems consist of the screens in front of every seat onboard airplanes. The development of the in-flight entertainment system has grown a lot during the years. Most of it is being driven by advanced technology. A passenger can sit on their airplane seat and watch movies from dozens or even hundreds of different alternatives in some airplanes. They can listen to music, look at the menu or beverage list. The system is very interactive and a passenger can in some systems even swipe their credit card in a built-in unit to order whatever they desire. They can make car or hotel reservations in advance from the seats, view where the airplane is located and when it will be landing [2]. See figure 1.1 and 1.2 for overviews of how an in-flight entertainment system can look like.

Figure 1.1: Example of an in-flight entertainment system onboard airplanes [3].

Figure 1.2: Interactive in-flight entertainment system [3].

A new service that Tactel currently is working on is to combine the in-flight entertainment technology with a marketing tool, in order to improve the advertisements onboard the airplanes. The tool will specify when and under which circumstances a certain advertisement will be displayed. These criteria could be the flight's departure and destination or a specified date.

Tactel's customers are airline companies across the world, which includes a wide range of different cultures that potentially could get in contact with this tool. Hence is the cultural aspect an important matter when it comes to the user interface design [1].

1.2 Purpose

The flight industry is naturally global, thus does a marketing tool need a cross-cultural design in order to properly work in multiple cultures. The preferences in different countries need to be explored in order to create a successful user interface. The three main questions that the thesis will revolve around are:

- Is it possible to design an in-flight marketing tool?
- How should a cross-cultural tool be designed to get the best result?
- Which design choices are important to think of when designing an interface for users from geographical regions in Europe, Japan, the Middle East and the United States?

1.3 Related Work

Marcus Liljenberg has written a master thesis where he examined the differences between how Eastern and Western users interact with user interfaces [4]. His focus was to investigate how the Chinese users, who tend to process information holistically, differed from the Western's more analytical approach. One of the major factors that differed between the websites in the different cultures were the information density. Eastern websites had significantly higher information density than the Western websites.

In order to analyze their behavior further, he created two newspaper websites, one with each design pattern. He also created a few tasks that the test users from both cultures should perform on both of his sites. His study showed that both groups performed better when examined tasks on an F-shaped Western website compared to an Eastern site with a more parallel flow of information.

His research concludes that a cross-cultural interface for newspaper can be developed that suits a global target group. Hence, the design should be clean and sleek, since his questionnaire implied that Western users found the Eastern's high-density websites to be overwhelming. All of his conclusions were not applicable on our project, since we created a marketing tool and not an interface for newspaper. However, we kept in mind that Eastern people tend to be more comfortable using Western interfaces than the reverse.

2 Theory

There are different aspects that has to be considered when creating an interface. Therefore was a literature study made on user centered design and different usability attributes. However, the interface aims to not only be used in one culture. Therefore, an analyze was conducted to explore the differences that may exist among cultures. Two models that often are referred when it comes to cultural differences are Hofstede's model and Hall's model.

2.1 User Centered Design

It is important to design a system or product that is usable, however, user centered design (UCD) also emphasize the essential in having the user in focus during the process. Instead of only thinking about the technology and features of a product, the design team also have to consider the user experience, what the user will think when they use the product.

During the design process, UCD investigates how the target users will interact and work with the product instead of forcing them to change their mindset and action in order to successfully complete a task with the product [5]. A useful technique is to study the end users in their normal lives and natural environments, where the products is designed to be used. Observing them in their offices, schools or at home is important to understand the real situations of where the product will be used [6]. The basic principles of UCD can be categorized as:

- Early focus on users and their tasks
- Evaluation and measurement of product usage
- Iterated design process

The design team will learn and understand more about the users if they have direct contact with them throughout the whole development, instead of just categorizing and identifying them. However, the contact between the team and the users should not merely be to finish a check-off box on the user's performance. Instead, a structured and systematic approach is required to gather the necessary information about and from the users. Therefore, the design team requires coaching and training to be able to manage these interactions [5]. There are different ways to include users in the design process. Some examples for achieving this are done by observations, interviews and testing by using performance tasks. The knowledge from these studies are then interpreted in the ongoing design activities [7].

To manage measurement and evaluation of product usage the design team have to investigate ease of use and ease of learning. This is done early in the design process and is achieved through testing and development of prototypes with the target users [5]. Different users have different needs, therefore it is important to get a better understating

of the users. The design of the product has to fulfill these needs. An example is the expectations when children or adults wants to learn or play. Children might think that cartoon characters or interactive quizzes helps them to be motivated, while adults only find this distracting and annoying [7].

Iterative design is achieved by early testing of design ideas and conceptual models, not by simply doing a fine-tuning last in the development cycle. The iterative design will become cosmetic and minimal if the design team is not fully ready to adapt to it [5]. There are a lot of different steps in an iterative design process, some of these steps are to think over a design problem, comprehend the user's needs, creating possible conceptual designs, prototyping these designs, evaluate them based on user experience and usability and then make changes to the prototypes [7]. However, the four main activities are observation, idea generation, prototyping and testing. These activities are repeated multiple times and each cycle will get the product closer to the desired solution [6].

2.1.1 Usability Attributes

Usability often means that interactive products are effective to use, easy to lean and enjoyable for the users. It aims to optimize the interactions that people have with the products to facilitate for them when they are in school, work or in their everyday life [7]. Usability can be broken down into five goals: [5]

- Usefulness
- Efficiency
- Effectiveness
- Learnability
- Satisfaction

2.1.1.1 Usefulness

Usefulness is about how easy it is for a user to reach his or her goals, it also valuates how willing the user is to use the product. If there is no motivation then it will not be worthwhile to have any measurements since nobody would use the product. Even if a user finds a system satisfying, easy to use and easy to learn, it would still not be used if it does not achieve the goals for that specific user. Usefulness is often overlooked even though it is such a critical attribute.

The features that are necessary or desirable in a product or system is decided in the early stages. However, if the development team is under a lot of pressure they might simply guess what a user wants or compare the users to themselves. This creates a design where the main focus is on the system instead of the user [5].

2.1.1.2 Efficiency

A product's efficiency is referred to as the time it takes for a user to complete a certain task [5]. However, efficiency also consider the support a user gets from the system when a task is carried out. A system is considered efficient if the user can accomplish common tasks through minimal amount of steps [7]. The most commonly used measurement for efficiency is time, but it can also be measured by numbers of clicks or keystrokes. The collection of data could both be done manually or by external tools and programs. Clear navigation links should be used in order to achieve good efficiency, as well as commonly known shortcuts. As an example is Ctrl+C and Ctrl+V frequently used to copy and paste data such as text and images between different locations on the computer [8].

2.1.1.3 Effectiveness

The attribute effectiveness can seem similar to efficiency, but differ in the sense that it refers to the degree of accuracy in the user's task completion [5]. It is a very general goal which measures how well a system does what it is suppose to be doing [7]. Hence it is a factor of how well the user interface acts upon the user's intentions and expectations. Unlike efficiency, it is measured by quantitative data such as error rate. Important to keep in minds is to put the right level of language in the design and avoid technical coding terms. In some cases, an advantage might be to use redundancy in the navigation menu, thus there are multiple paths to a certain goal. This have to be weight against the possibility of reduced efficiency that may occur [8].

2.1.1.4 Learnability

Learnability, which is a part of effectiveness, concerns the user's ability to use a system after some time. This time can be a predetermined period of training or no time at all. Learnability can also mean how well an infrequent user can operate a system after he or she has been inactive for a period of time [5]. People do not like to spend time learning how to use a system. They want to start using it immediately and be able to carry out a task with limited effort. This is mainly for interactive products which are intended for everyday use, such as email and TV, but also for products which are used infrequently, such as videoconferencing. Users are often willing to spend a longer time learning a complex system that provides a range of functionality [7].

2.1.1.5 Satisfaction

Satisfaction has to do with user's feelings, opinions and perceptions of the product. This is usually measured through oral or written questioning. If a product meets a user's needs then that user is more likely to do better than on a product that does not, the same goes for the satisfaction that the product provides. Reasons and causes for problems are often revealed when a user rank and rate the product that they have tried [5]. It is important to focus on when things go wrong, since this is when most satisfaction can arise. If the system highlights what the problem is when something goes wrong then the user can take proper actions because they understands the problem, which will lead to the issue

being solved. The collaboration between the system and user will feel wonderful if all of this goes smoothly [6].

2.2 Cultural Design

There are several aspects that have to be taken into account when designing cross-cultural interfaces. The following section will provide different models which explain the differences between cultures and how this affects their interaction with user interfaces online. Two models that will be raised in this section is Hofstede's model based on five different dimensions and Hall's classification based on context and time. Furthermore, will the most commonly used elements on web interfaces be mentioned and how these elements vary between cultures. Adaptions are also made for the most fundamental and obvious aspects such as language, time format, date format, number representation, and currency.

2.2.1 General Aspects

Date representation can be made both in the order of year, month and day, the reversed order, and as done in the United States with month, day and year. The punctuation can also differ between the use of strokes and hyphenation. A standardization announced by the International Organization for Standardization (ISO) in 1988 [9] can be used in order to avoid misinterpretation of date representation. The standard defined the date format as the year with four digits followed by month and date, written with two digits each and separated with hyphens. It also defined the 24-hour notation as a standard time representation. The 12-hour notation is used in English speaking countries and former British Empires. When written it adds "am" or "pm" after the time to specify whether it is before or after midday.

The decimal separator in numbers also varies in different countries. While most European countries use commas are period used in the United States and in the vast majority of Asia. In some countries in the Middle East they use Eastern Arabic numerals, thus also an Arabic decimal separator, which looks similar to the comma.

2.2.2 Hofstede's Model

A cultural anthropologist named Geert Hofstede conducted a survey between 1978 and 1983 where he interviewed hundreds of employees at IBM in 56 different countries. He was able to detect patterns of differences and similarities by analyzing the large data sets he collected. He formulated his theory based on these results [10]. The theory can be defined as the rituals, symbols, customs, behaviours, values and norms that defines a society. Hofstede claims that everyone has their own patterns that they follow when they feel and think. This behavior have been formed during their lifetime, mostly from a person's childhood. The patterns of thinking, feeling and acting are, according to

Hofstede, mental programs which alters just as much as the social environments from where they were acquired [11].

Hofstede published a new version of his research, which was more accessible, in the 1990s. Five dimensions were identified and 53 countries were rated for all of the five dimensions. The scale goes from 0 to 100 [10] and his five dimensions are:

- Power Distance (PD)
- Individualism vs. Collectivism (IC)
- Femininity vs. Masculinity (MAS)
- Uncertainty Avoidance (UA)
- Long- vs. Short-Term Orientation (LTO)

2.2.2.1 Power Distance

Most societies consist of some kind of hierarchical structure or powerful governance. Power distance refers to less powerful individual's tolerance of unequally distributed power [12]. Countries with high PD usually have higher and stricter hierarchies, where the higher positioned people have the authority to make decisions regarding the less powerful people [13]. Employees in this cultures are often frightened of disagreeing with their bosses, and the bosses are often paternalistic and autocratic. Therefore, do most employees dislike a boss that is consultative [14]. Whereas in countries with low PD, people have more influence on the governing and often expresses their personal opinions [13]. This means that employees, within a company, can state their opinions without being afraid and the bosses are not paternalistic or autocratic. Before reaching a decision the boss consults with his or her subordinates [14]. These countries also tend to have more equal relations within different social structures, i.e. how teachers are related to students and parents toward their children [10].

This is reflected in web interfaces in countries with high PD like China and countries in the Middle East. The websites do not always provide the individuals with access to all information based on PD, hence restrictions are implemented in order to secure adequate access. The amount of national or religious symbols are often higher in cultures with high PD. Authoritative people and organizations are more frequently visible and the content provides a positive reflection of these authorities [10].

Countries with a low PD culture are Sweden and Germany. While the United States and Japan would be considered to have a medium PD. These countries tend to use less authoritative symbols and characters as well as official stamps and logos. The information is also more accessible and there is a transparent flow between different levels of power [10].

2.2.2.2 Collectivism vs. Individualism

This dimension refers to whether people are looking after themselves rather than being part of a larger group [12].

Individualism and collectivism have different areas which they prefer and think is the most important regarding work goals. For individualist it is *personal time*, having a job which gives enough time for personal or family life. Another important area is *freedom*, having considerable freedom which gives the possibility to adopt personal approach to the job. The last one is *challenge*, a work that is challenging and gives a sense of accomplishment. Meanwhile, collectivism prefer *training*, which gives opportunities to learn new skills or improving them. *Physical conditions*, good physical conditions at work such as lightning and adequate work space. Lastly is *use of skills*, having a job which gives fully use of abilities and skills [14].

People in individualistic cultures primarily look after themselves and their nuclear family. This includes countries like the United States, Canada and Sweden. They value successful achievements, freedom and personal time [13]. They also tend to value material matters and these values can even be reflected in the way the governments control their countries. The value of privacy, personal options, and individual economic interest are also important [10].

Collectivist cultures such as China, Saudi Arabia, and the United Arab Emirates priorities the well being of a large and strong group or community, which they are born into [11]. Generally, most Asian and South American countries are collectivist. Japan is also considered to have low individualism, even though it is a little bit higher than the majority of the other Eastern countries [15]. The model implies that you protect each other in exchange for valuable loyalty. Harmony is more valuable than telling the truth in relationships within the family. They want to protect their dignity, which is why they strive to avoid humiliation and embarrassment by sometimes restraining the truth [10].

The individualism will affect the web design in the way success is visualized. This would typically be presented as images showing materialism and individuals achieving their goal. An underlying factor with great importance is the user's willingness to protect personal information. Since they value their privacy, it is important to prove that the interface has a high level of security if personal data is required [10].

Within collectivist countries, the user interface will visualize success through common goals reached by a group, such as accomplish political changes. They are also more willing to provide personal information online, due to the less need for privacy [10].

2.2.2.3 Femininity vs. Masculinity

Masculinity and Femininity refers to the gender roles for a culture [11]. There are different areas which the two cultures consider more important. Masculine cultures aim for:

- Earnings, opportunity where there exist high earnings.
- Recognition, when a job is well done they want recognition for it.
- Advancement, opportunity were it is possible to advance to higher level jobs.
- Challenge, work that is challenging and give a sense of accomplishment.

Meanwhile, feminine cultures prefer:

- Manager, having a positive working relationship with superiors.
- Cooperation, good cooperation amongst people at work.
- Living area, a desirable living area for both them and their family.
- Employment security, the security to be able to work at a company for as long as they want [14].

Japan and Italy are examples of countries with masculine culture [10]. These cultures have retained the distinctions that exist between the gender roles. They place values on advancement, challenge, acquisition of wealth and social recognition [13]. The feminine cultures on the other hand are countries like Norway and Sweden [10] and these cultures do not often have any difference between the gender roles. They value security, quality of life, the environment and taking care of people [13].

Some aspects can be defined when creating a user interface and web design based on these interpretations. High masculinity cultures would focus on traditional distinctions on family, age or gender. The navigation can be oriented to control and exploration while games and competitions can be used to gain attention. Sound, animation and graphics can be used for functional purposes.

Feminine cultures would instead focus on dissolving the gender differences. Visual aesthetics and poetry, instead of games and competitions, can be used to gain attention for the feminine cultures [10].

An example to illustrate the differences on the web is that a country with high MAS would focus on a specific gender. While a country with low MAS would not make any distinction between gender or age [10].

2.2.2.4 Uncertainty Avoidance

Uncertainty avoidance measures to what extent a person attempts to stay away from a situation that is uncertain. This should not be mistaken as risk avoidance, since a person can actually take a risk to later prevent any long term uncertainty. Another way to avoid uncertain situation can be by establish strict rules [13]. People in a high uncertainty avoidance culture often experience nervous stress and a need for predictability, which means a need to have unwritten or written rules [14]. Portugal, Greece and Japan [10] are example of high uncertainty avoidance countries. They prefer regulations and rules to create certainty, and they are less willing to make changes [13]. Countries with high uncertainty avoidance often speaks with gestures, tend to be expressive and also show emotions. Countries with low uncertainty avoidance on the other hand, such as US, UK and Singapore [10], does not strongly show emotions and they are often less expressive [11].

These interpretations will reflect the user interface and web design differently. For high UA cultures it is important with simplicity, limited choices, clear metaphors and limited amounts of data. It is important to have a navigation system that prevents the

users from getting lost. "User errors" and ambiguity can be reduced by having help systems and mental models as well as distinct cues, such as color and sound.

For low UA on the other hand, the navigation is less controlled. For example a new window might open when links are clicked, which leads away from the original location. More choices and content can be shown on the web page. Their help systems and mental models focus on comprehending underlying concepts, instead of reducing user errors. Having color and sound is also typical for low UA interfaces to maximize information [10].

The differences on the web would then be that a high UA culture would have a web page with clean and simple images as well as limited choices. While a low UA might have popup windows, "hidden" content that can only be displayed by scrolling and different kind of interaction behaviours [10]. Example of interaction behaviour can be right clicking, dragging and swiping.

2.2.2.5 Long- vs. Short-Term Orientation

Hofstede established his model for cultural dimensions in the beginning of the eighties. Soon thereafter Michael Bond introduces a fifth dimension that Hofstede later on appended to his model [10]. LTO describes how much people value long-standing traditions and beliefs [12]. The addition was based on a philosophy that mainly applies to Asian countries such as China, Japan, and Vietnam [10]. Their common beliefs claim that a stable society is built on a hierarchic model rather than equality, which is practiced in most Western countries. The structure of the family is the model which organizations and companies are based upon. Hence older people have more authority and power then younger and men have more authority than women. This view will reflect the way Asian people use and interact with web interfaces. Due to Hofstede's and Bond's research about LTO, certain behaviors could be explained by LTO rather than MAS or UA [10].

Countries with high LTO focus on content which have practical value and virtuous behavior defined as hard work, frugal and patience. Good and credible sources are based on relationships, and results and goals should be achieved patiently. Hence Asian web interfaces do not have requirements for effective usability.

This approach differs from countries with low LTO, which is mainly Western countries. Sources of good credibility are rather based on rules than relations and have a higher desire for immediate results. This reflects the preferences on web pages since these countries tend to use clean and systematic interfaces, in order to quickly perform a selected task [10]. This can also be achieved by presence of search engines, site maps and FAQs [13].

2.2.2.6 Hofstede's Index for Europe, Japan, Middle East and United States

The corresponding index for each of the regions regarding Hofstede's five dimension can be seen in table 2.1. An average was calculated to get a representative index for Europe and the Middle East. This index was conducted from ten countries from each region.

Each index is placed within an interval which is: low (1-39), medium (40-60) or high (61-100).

The ten countries from Europe were: Denmark, France, Germany, Greece, Italy, Lithuania, Portugal, Sweden, Ukraine and United Kingdom.

The ten countries that represented the Middle East were: Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Qatar, Saudi Arabia, Syria and United Arab Emirates.

The exact value for these twenty countries can be found in appendix A.

Table 2.1: Hofstede's table. Where PD = Power Distance, IC = Individualism vs. Collectivism, MAS = Femininity vs. Masculinity, UA = Uncertainty Avoidance and LTO = Long- vs. Short-term Orientation. The number written within the parentheses is the index based on Hofstede's study and low, medium or high indicate their dimension value based on their index.

Location / **Dimension**	**Europe**	**Japan**	**Middle East**	**United States**
PD	Medium (49)	Medium (54)	High (75)	Medium (40)
IC	Medium (60)	Medium (46)	Low (32)	High (91)
MAS	Medium (40)	High (95)	Medium (51)	High (62)
UA	High (67)	High (92)	High (75)	Medium (46)
LTO	Medium (56)	High (88)	Low (24)	Low (26)

2.2.3 Hall's Model

Edward Hall proposed a cultural framework where he claimed that all cultures can be compared toward each other through the styles they communicate. Germans, Swiss and Scandinavians communicate explicit through statements in speech and text, which makes them part of the low-context cultures. While Chinese and Japaneses uses other communication cues such as silence and body language, which makes them part of the high-context cultures [16].

Besides from the distinction he made between high-context cultures and low-context cultures he also made another classification between polychronic cultures and monochronic cultures [17].

2.2.3.1 High-Context vs. Low-Context

Hall proposed that there is a different in context between cultures. To be able to distinguish among cultures he came up with the terms high-context cultures (HC) and low-context cultures (LC). To be able to understand communication he suggested that one should look at both context and meaning together with the code, which are the words themselves. The word context are referred to as the background, environment

or situation that is connected to an individual, an event or a situation. HC cultures communicate with variation in their pitch and nonverbal communication. However, they also take into account the situation and time in which the conversation takes place as well as the relationship between the partners in the conversation. HC communication is ambiguous, reserved, indirect, maintaining of harmony and understated. While LC communication in contrast is precise, open, direct, dramatic and based on true intentions or feelings. HC cultures have an extensive use of nonverbal strategies when it come to face-to-face communication. These strategies mean that HC cultures uses body language, gestures, symbolic behaviour proximity and silence. While LC cultures often are less physically animated, and the meaning is depending on the spoken word and content [16].

When people from HC cultures communicate they tend to speak harmonious and indirect, while LC cultures are more direct when they express themselves [11]. If a conflict occur, HC cultures often use non-confrontational and vague language and thereby rely on the reader's or listener's ability to understand the meaning from the context. LC cultures on the other hand, are more direct, and use an explicit and confrontational approach so that the listener understands the message.

The thought patterns are also different for HC cultures and LC cultures. Where the first uses non-linear discovery processes to manifest the truth, and this without having to apply rationality. While the later focus on rationality and logic, an objective truth can always be obtained through linear discovery processes. During a conversation, people in LC cultures will change between information that has already been stated to information that is about to be given. However, people in HC cultures will leave out details and jump back and forth, assuming that the missed details are implicit for the other interlocutor [16].

Example of countries from high-context cultures are Japan and Arab Countries but also Greece and Spain. Low-context cultures on the other hand are German, Scandinavia and North America. Therefore, Europe can not be classified as one context culture. Some are high and some are low, while others are somewhere in between like for example Italy, England and France [16].

2.2.3.2 Monochronic vs. Polychronic Time Perception

Hall's second classification regards different culture's attitude toward time. This can be divided into two groups where countries can be defined as either monochronic or polychronic. Since they differ drastically it is important to understand the differences in order to develop successful interfaces cross-culturally [18].

People in monochronic cultures find the concept of time very important. Germany, the Unites States and Scandinavian countries are examples of monochronic cultures. To complete things in time is essential, which is why they operate planning and scheduling [16]. Furthermore, they aim for organized work and advantageously plan ahead of time and focus on one task at the time [17]. Since they mostly work on one limited area at the time is linear navigation in user interfaces to prefer. This eases the flow and makes the user stay within the current area of interest [19]. To be punctual and finish a given

task on time is very important, which is why the planning and presence of schedules are necessary [20].

Polychronic cultures have a different approach toward time, and believe that everything will happen when the right times comes. Hence, they have a less stressful mind and do not need to make a lot of plans [20]. If plans are made, they can definitely be changed along the way, both easily and often [18]. The people also tend to be less organized and usually take on multiple tasks at the same time [17]. The parallel thinking can be shown by non-linear structured navigation that allows multiple thoughts at the same time and a higher number of links that allows new browser tabs to appear. People in polychronic cultures tend to frequently switch between different tabs and tasks, which is why the user interfaces are designed as they are. Spain and Portugal are example of countries with polychronic time perception. Countries in the Middle East are also defined as polychronic, but due to their high UA they have fewer links in new windows, in order to avoid loss of information and interruptions [19].

2.2.3.3 Hall's Model for Europe, Japan, Middle East and United States

Table 2.2 shows how the four different regions relate to the concepts of context and time perception. European countries can not be classified into one category since they have a variety of different viewpoints. The United States is a low context culture with monochronic time perception while both the Middle East countries and Japan are high context cultures with polychronic time perception.

Table 2.2: Hall's table. Context refers to whether the location have high or low context perception. Time refers to whether the location has monochronic or polychronic time perception.

Location / Aspect	**Europe**	**Japan**	**Middle East**	**United States**
Context	Both	High	High	Low
Time	Both	Polychronic	Polychronic	Monochronic

2.2.4 Design Attributes

In addition to Hofstede's and Hall's models, there are other essential design attributes which enable effective communication between a web page and the user [12]. The homepage for companies are often considered as a virtual gateway to the world [13]. Therefore, it is important that the design is appealing and understood by international users as well. The key design attributes to keep in mind are: layout, navigation, links, multimedia, color and text. These attributes will be investigated further as well as their impact in different cultures.

2.2.4.1 Layout

Websites that are easy to understand and access is often referred to as well-structured. However, how people view websites differs depending on the person's culture. Some people scan a website from the upper left corner, for example English user, meanwhile Arabic user scan from the upper right corner on Arabic websites. The preference also varies for monochronic cultures and polychronic cultures where the first prefer hierarchical and linear structures and the later prefer parallel structures [12].

Another thing that varies among cultures is the type of main menu, it can either be dynamic or static. When a user selects an alternative in the main menu it will show submenus, this is how the layout for dynamic main menu works. However, for static menus all alternatives and submenus are always displayed. Chinese websites uses more frequently static menus while Australian and Saudi Arabian websites uses dynamic menus. There will also be more hyperlinks in the main menu if it is static, this means that a user might be able to reach the target page with a single click. This can be compared to Hofstede's UA dimension where Chinese culture do not need so much control in navigation since their websites provides navigation freedom with this low effort to reach the target page.

Austria and Saudi Arabia, which are countries with high uncertainty avoidance, would rather have a navigation system with more control to avoid getting lost. Therefore, the number of hyperlinks on the main menu are limited, submenus only becomes visible when a menu option has been clicked [19].

The way a website is organized also differ between cultures. The page orientation can either be horizontal or vertical. Austria, Ecuador and Denmark are countries that prefer websites with horizontal design. Malaysia and Japan prefer the vertical design instead. However, Japan often has websites which required both vertical and horizontal scrolling. These five countries had websites that where asymmetrical, none of them seemed to prefer symmetry [13].

2.2.4.2 Navigation

The aim of navigation is to ease the user's ability to find a desired functionality or information on a website [12]. Although, the possibilities to solve this are endless, there are mainly three options which are more frequently used than others. These are vertically oriented menus on either the left or the right side of the screen or a horizontal menu bar at the upper part of the screen. Some websites also use a combination of multiple options in order to provide a complete navigation structure [21].

People from cultures with low UA such as the United States and the Scandinavian countries prefer a less controlled navigation structure. While Japan and Saudi Arabia with high UA require strict and clear navigation in order to avoid confusion and possibility to take the wrong path [12]. Thus, is an intuitive and plain navigation structure to prefer. Meanwhile, people from cultures with short-term orientation and low-context strive to aim for quick results, hence is simple navigation preferred. Unlike long-term orientated countries which have a higher tolerance for longer paths [22].

All websites that consist of multiple pages need to structure their content in order

for users to find what they are looking for. A hierarchy will be created by grouping all pages based on their category, which is the basis for the navigation structure. Depending on how the pages are organized the structure could be either flat or deep. A flat navigation structure contains of many links at the main menu, which each have a lot of options. Hence, all pages is just a few steps away from the main menu. In contrast to a deep navigation structure where only a few links are visible at the main menu and continuous navigation through subcategories are necessary. Figure 2.1 and 2.2 visualizes the differences between the two different approaches [23].

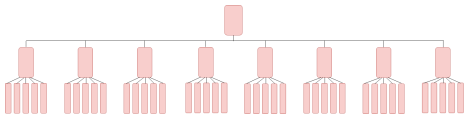

Figure 2.1: An example of a flat hierarchy.

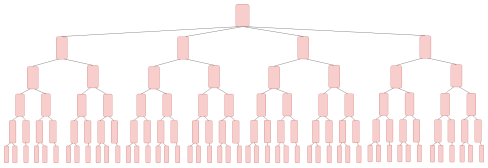

Figure 2.2: An example of a deep hierarchy.

2.2.4.3 Links

The navigation and organization of a web page is built in links, the path of navigation is provided by the correct use of links. China, which is a country with high-context culture, are comfortable with figures or images which are related to their local culture. However Germany, which is a country with low-context culture, might feel uncertain when a page has no logical connection between two elements. Therefore, they prefer the links in the navigation bar to be arranged in alphabetical order.

Links include both external and internal clickable links, as well as icons and links that open in a new window [12]. When the World Wide Web was introduced in the beginning of 1990, a few conventions were made regarding the links. Linked text should be underlined and colored, while already visited links should appear in a different color than the original one. Links should not be mixed up with buttons, since links are used to bring the user to a different page while buttons are used to preform an action [24].

Cultures also varies between the use of links opening in a new window. A reason for this might be because of a cultures monochronic or polychronic time perception. People with polychonric culture are multi-tasking and have a parallel problem solving approach, for example China. They consider multiple problems, explanations and reasons simultaneously. Chinese websites often feature a high number of links opening in a new window because of their multi-tasking ability as well as non-linear navigation. Polychronic cultures prefer non-linear navigation and often switch between different open pages. However, monochronic cultures, such as Australia like linear navigation patterns.

Another country with polychronic culture is Saudi Arabia. However, they might have a limited amount of links opening a new window since they have high UA. Therefore, they want to avoid information loss and interruptions [19].

2.2.4.4 Multimedia

The use of multimedia today includes a variety of different kinds of images, videos, animations, sounds, and many other graphics [20]. The reason for the high use of multimedia is to catch the user's attention [19]. With proper use, it can improve the user experience by clarifying data or simplify understanding. Multimedia can also become an obstacle in the user's search for information. Inappropriate use can result in distraction and misled users [20].

Animation is a feature that might be used heavily on Malaysian websites. This is mostly used by having animated text. The type of animation can vary from a simple "new" button, to a more extreme flashing, scrolling news as well as clickable menus that are moving.

High context cultures share a passion for this kind of visual media [12]. They have greater confidence in communication with non-verbal methods. Hence they use a lot of gestures and facial expression to improve the daily face-to-face conversation. These are brought into the web design by different multimedia components.

For low-context cultures, and particularly, cultures with high UA it is important to prioritize a functional interface with minimized attention requirements. Reduced amount of distractions will lower the error rate and ease the information search, which is highly valued in many Western countries [19].

2.2.4.5 Color

The meaning of a color may be contradicting between cultures and for some countries it might not have any meaning at all. The color red is an example of a color with many different interpretations. For Japaneses it might imply danger, risk and anger, for Chinese it might be happiness and for Egyptians it means death. For the French it stands for aristocracy and US user might also associate it with danger. However, there are occasions when a color means the same in all countries, for example traffic lights, they use red, yellow and green to present a specific meaning. This indicate that there are occasions when context-dependent scenarios deviate from cultural norms. Having the appropriate colors might reduce risk of errors as well as improve the users engagement [12].

Greek websites often use toned down colors and have a white background color. Malaysian websites also often use white background but, in contrast to Greece, they use vivid colors and the amount of different colors on a website is large. Ecuador is much like Malaysia where bright colors play an essential role. However, it is less common that a website use white as the background color. This is considerable different to how Swedish website is constructed. White background is strongly preferred and colors are used sparingly. The colors which are frequently used are blue and yellow, which is Sweden's national colors, as well as purple, gray, dark red and pink.

For Japan, the pastel colors are most dominated on websites and the background color is mostly white. Austrian also have white background color and otherwise mostly toned down colors. The same goes for the United States, where mostly white backgrounds are used. Meanwhile the color range for the rest of the site is wide, from toned down to

bright as well as light to dark [13].

Saudi Arabia is a high-context culture and should therefore prefer traditional colors. However, since they also are high UA cultures they like limited information and thereby moderate the use of bright colors. Having interfaces with high text-to-image ratios are preferable in low-context culture meanwhile soft colors are preferable on interfaces for high UA cultures [19].

2.2.4.6 Text

Research proves that users read up to twenty-five percent slower when reading on a screen compared to reading on a separate piece of paper. Thus, is the behavior to scan instead of reading commonly used during browsing [25]. There are multiple ways to bring out the important text to ease the searching such as bold text and the use of different font sizes and colors [12].

3 Method

We started our whole process with a literature study to get a comprehension of which cultural aspects that existed and to get an understanding of what a rule building tool was. After we felt secure enough in both aspects we commenced an investigation phase which consisted of identifying the users, concept and features. We also analyzed existing rule building tool as well as created a conceptual design. When this was done we begun creating and testing low-fidelity prototypes. We never got the opportunity to test our prototypes on the end users, i.e. the airline's marketing team. Instead, the tests were done in Sweden on people we knew. The test users had different gender and age, which also varies with the end users. We somehow do not think this have significant effect on the result. If our test users, who do not have any knowledge about marketing, manage to use the prototype correctly, it would also be used successfully by the marketing team. The test sessions were very simple and exploratory in order to identify the major difficulties. The first Lo-Fi testing aimed to test the menu traversing while the second Lo-Fi aimed to test the rule structuring, which is why different scenarios were needed.

Afterwards we created a high-fidelity prototype which was tested and improved twice. The first test phase was again done in Sweden, on people with different age and gender. We were sitting next to the test user and observed their approach to create rules. This tests were also very exploratory and aimed to find the major problems and possible bugs before trying the prototype globally. The second time we used a service called trymyUI [26] to get participants from different regions. In the service we specified that we wanted three participants from each of the four regions Europe, Japan, the Middle East and the United States. No further requirements were made regarding age, gender or occupation. The scenarios were very open since they intended to test the whole design and had different levels of difficulty. All of the tests were screen recorded with sound and presented to our account on trymyUI's web site. The service let us decide if we wanted the test users to answer questions after the test, as well as complete a System Usability Scale (SUS) [27]. We decided to use both of these assets to receive a wide range data about the user's preference and performance as well as quantitative and qualitative inputs. After the testing was completed we created a final Hi-Fi prototype based on the received feedback. An overview of all the steps can be seen in figure 3.1.

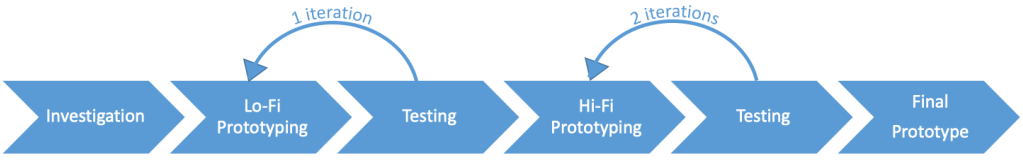

Figure 3.1: Flow chart showing the different phases of the development. Arrows indicate iterative phases.

4 Investigation Phase

After an airplane has departed and is up in the air, they usually do not have any internet coverage. This means that they can not change the advertisement they have on their products. Therefore, it is sought-after to create a marketing tool. Our approach was to make a rule based marketing tool to specify when advertisements should be displayed. Hence, all advertisements would be created as rules where the different criteria are specified. This would lead to the possibility to alter which products that should be displayed during the flight and thereby sell more of the onboard inventory.

Different investigations had to be made before the prototype of the rule based marketing tool could be created. A user investigation was made to get an understanding of who the target users were. Different aspects that were considered were in what environment the interface would be used, how often as well as the background and professional role of the users. The second investigation was an internal investigation, this focused on the interface that Tactel already had created. The desired features where explored as well as the layout and navigation. The last investigation reviewed existing rule building tools online, to analyze how other companies created their interfaces. No rule based tools that managed marketing were explored, rather tools that focus on connecting either applications or home devices such as lights, electronics and entertainment.

The basic concept of these tools is to connect several of the user's applications and create flows that will run automatically when a certain event occurs. The principle consist of triggers and actions, which is an easy method to define the working process. The user starts with selecting a trigger, which will be the first event that will generate a series actions. As an example could an incoming e-mail to the user's Gmail account be a trigger. The second step is to decide which actions that should occur upon this event. As an example could a document be created in your Google Drive application, where information from the e-mail can be used to customize the document. The subject of the e-mail could be used as document title and the content be copied between the e-mail and document. Hence, the two applications Gmail and Google Drive have been connected. It is possible to add additional specification by adding further requirements to the trigger. As an example can the trigger only set off if the sender has a certain last name.

The tools that rather make connections between devices at home work similarly. The triggers can either be set as specified days and times or a certain condition of a device. As an example can detected motion be a trigger and music from speakers be an action. Additional filtering can also be made by adding further criterion such as restricted areas for motion detection and only apply the rule on certain days.

4.1 Identifying the Users

The web interface to create the rules will be used daily in different offices around the world. It will be accessed primarily through a computer screen, however, there might exist an additional mobile version in the future. This version would be used for example

if any quick changes must be made, so only a limited number of functions would be available through the mobile. This project will however mainly focus on creating an interface used on computer screens.

The professional role of the employees who will be working with the interface varies for the different airlines. It will mainly be people working with marketing, ancillary revenue or logistics planning. However, some airlines might outsource this role to a third party which are in charge of the inventory, food or logistics on the airplane.

Both the cultural and educational backgrounds of the users vary among the airlines. Airlines in the Middle East often have a larger portion of western people amongst their employees, while employees in Asian airlines mostly have a homogeneous culture.

A rule can be structured in different order based on the employee's preferences and background. While some employees might prefer to first select the product, others might want to select the route instead. It is important that the user interface can handle multiple possible rule structures, since the purposes of an advertisement vary among the different employees.

4.2 The Essential Concept and Features

Tactel is currently working on a marketing tool named Marketplace, a prototype can be seen in figure 4.1. Creating a new rule consist of three steps where the user decides what to promote and under which prerequisites the advertisement will show. The first step allows the user to select which product or products the rule should apply for. This could either be done by selecting products one by one, selecting a category or selecting a collection, which is a group of products with a common theme. To ease the search can products both be filtered and ordered after certain criteria.

The second step is dedicated to customize the triggers, in order to create the scenario for when the advertisement should show. It is possible to mark for which routes, dates and times the advertisement should run. As an example can the time be based on the number of hours left to the destination or if the meal has been served, since these have an impact on the purchasing behavior. Furthermore, it is possible to make a dependency on the inventory, specify targets groups and certain behaviors. As an example, the advertisement can aim for travelers in business class or those who previously purchased any beauty product.

The third and last step settles the action on the product or products, which was selected in the first step. It is possible to decide whether it should be a promotion or discount that should apply upon the selected criteria from step two. Simultaneously, the user can get an overview of all selected options in a rule specification on the right-hand side.

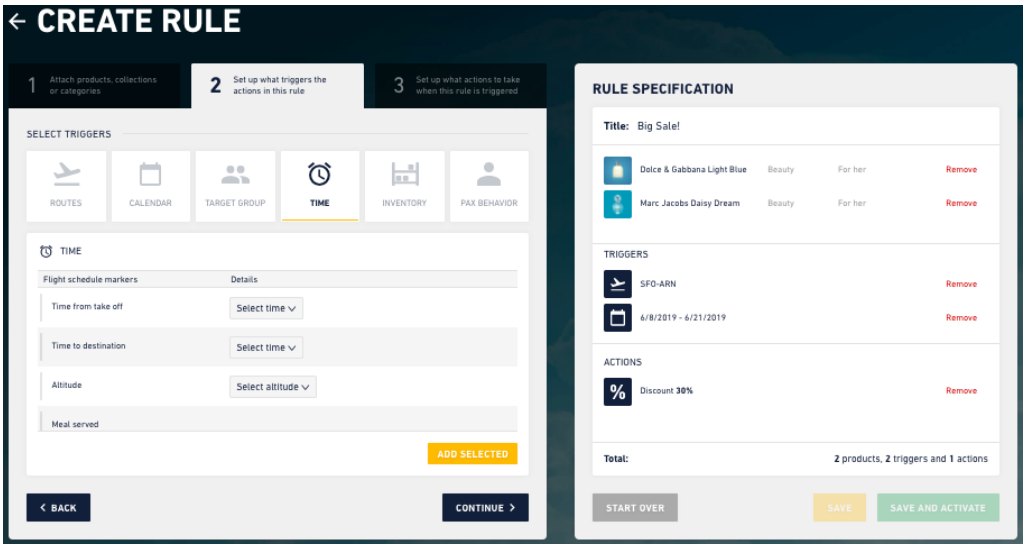

Figure 4.1: Overview of Marketplace's user interface. The left area shows the time menu and the right area shows a sidebar with all selected options. As seen to the right, this rule is valid for two products during one flight and one date criteria. The selected action is a 30% discount.

4.3 Existing Rule Building Tools

Four different advanced rule building tools where analyzed to see how other companies created and designed rules. None of them focused on creating rules for marketing, but their design and rule structuring could be useful for future prototyping. The investigated tools were:

- Zapier [28]
- Microsoft Flow [29]
- IFTTT [30]
- Home Center 2 [31]

We analysed the tools based on the five usability attributes mentioned in section 2.1.1, usefulness, efficiency, effectiveness, learnability and satisfaction. By investigating these rule building tools we got an insight on what was on the market today. It also gave us an intuition for which features and design attributes we would like to aim for in our prototype. The possibilities are many and vary between choice of tool, since they

have different capabilities and limitations. The user interface plays a big part in the user's ability to reach their goal. A great advantage is that they do not require any programming skills, since the chain of events are created through a user interface and not by coding.

4.3.1 Zapier

Zapier has a clean and simple layout, however, this results in limitations of the functionality. An overview of Zapier can be seen in figure 4.2. There is not much to click on except previous steps or the next step, it is not possible to skip a step in the process of creating a rule. The future steps are in a lighter gray color to make them look unclickable, which can be seen to the left in the figure for the text *Test this step*. This makes it clear for the users that they are not yet able to use these functions. On the left side there is always a bar that gives an overview of the current trigger, actions and eventual filters.

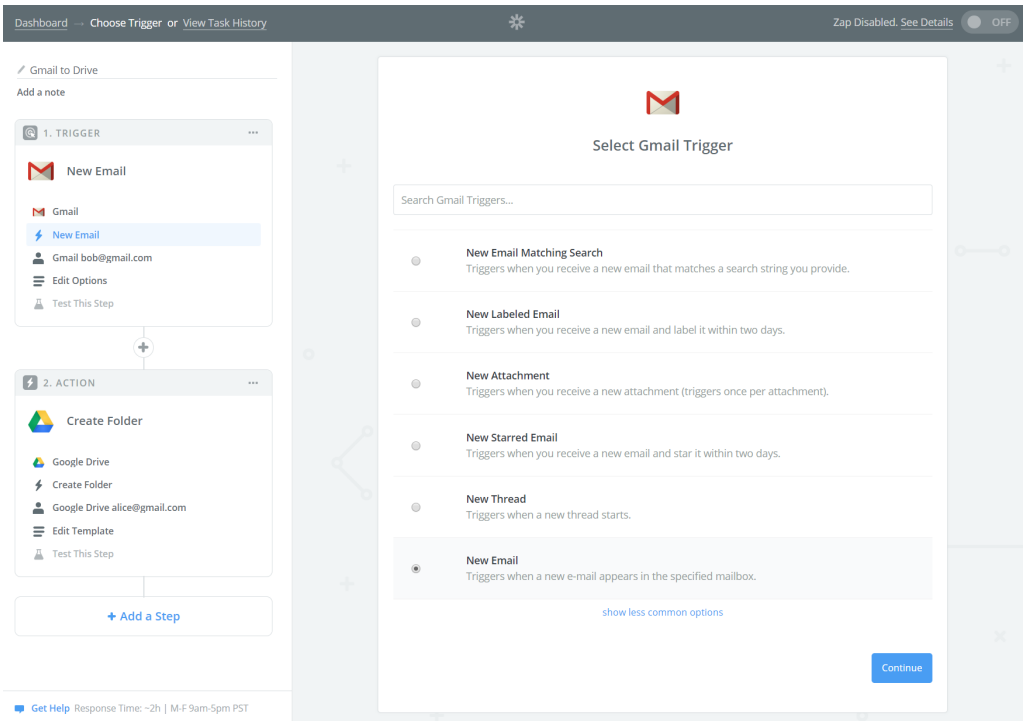

Figure 4.2: Overview of Zapier's user interface.

The simple layout, the limitation in functions and the overview menu increases the usefulness for the tool since it is easy to reach the goal of creating a rule. However, the overview does not show the details for every step. It displays the chosen event for the trigger or action as well as the corresponding application, but it does not show if any option has been selected. Instead, the user has to click on "Edit Option" in the side menu to see that information, see figure 4.3. This might reduce the efficiency since a user has to make an extra click to check that the option is correct.

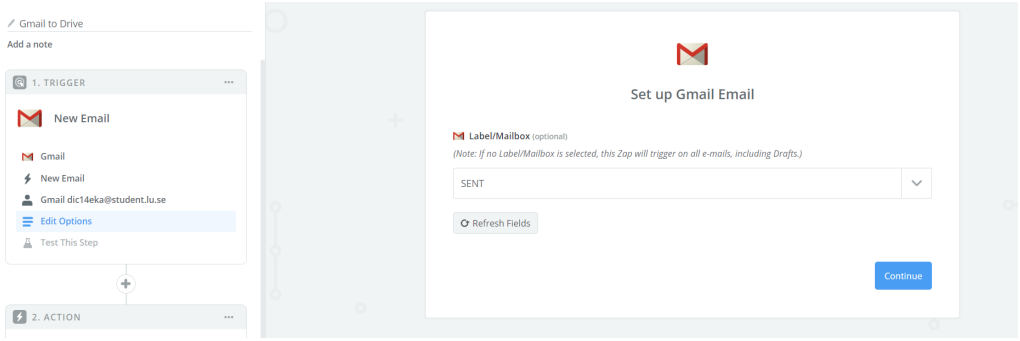

Figure 4.3: Overview bar with the corresponding information for edit option to the right.

The rule building tool provides many different applications to chose from as trigger or action. They are shown in a dropdown menu with both icon and text which makes it clear and easy to navigate in, see figure 4.4. It is possible to remove an action but not a trigger. This means that if a user wants to delete the trigger but keep the action he or she either has to go through all the steps for the trigger and change them or start all over. This does not affect the user that much since there are not many steps to go through in the trigger, and each step does not contain much data that has to be changed. Therefore it has only a minor impact on the efficiency.

When a user wants to delete an action, the tool always ask twice to check that the user is sure and did not accidentally press delete. This reduces the efficiency since an extra click has to be made to remove an action but at the same time increases the effectiveness since it prevent a user from unintentionally deleting an action. The toggle to turn a rule on or off is displayed clearly on the dashboard and the user is redirected to the edit mode by clicking on the rule.

There are some confusion when it comes to selecting an option to a corresponding trigger. It is not possible to manually erase a chosen option. Instead there is an alternative at the bottom of the drop down list which is named "clear current choice". This will decrease effectiveness since it might be difficult to find and because most people are used to manually erase text.

The learnability for the rule building tool is high, since the layout is simple and has

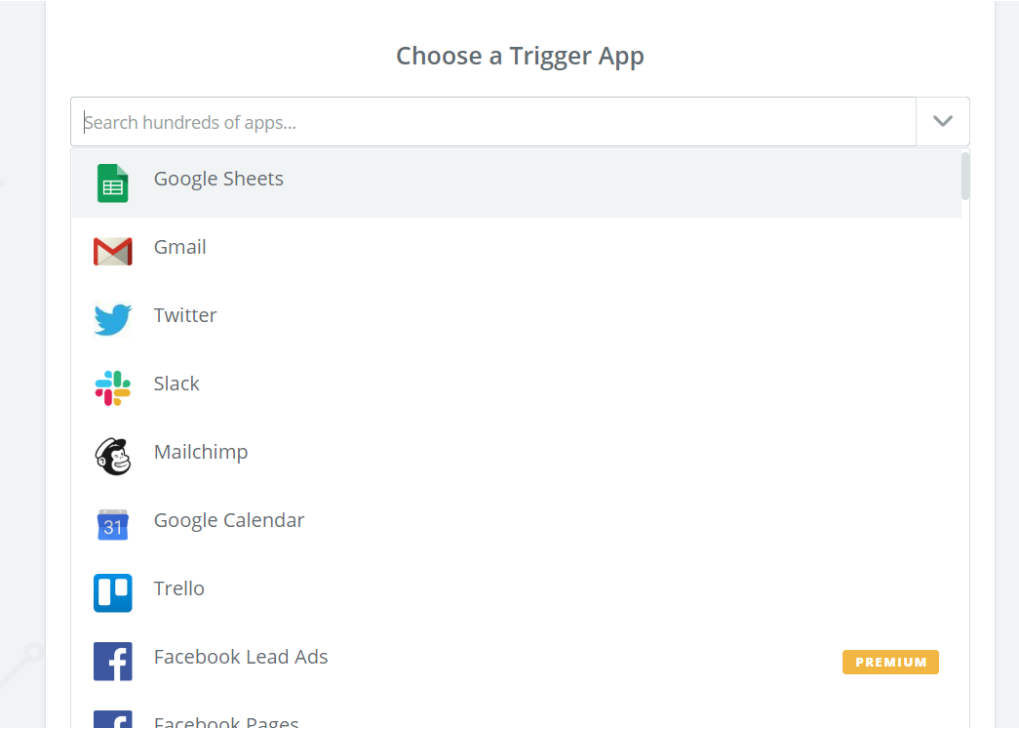

Figure 4.4: Dropdown list of selectable applications.

limited amount of freedom. It is almost impossible to make mistakes since the tool guides you trough all the steps. It is not possible to deselect the event for the trigger or action either, since the user has to select another alternative in the list. The tool's simplicity makes it hard to discover some of the more advanced features, which can be both positive and negative. Zapier does not overwhelm the user with functionality, but on the other hand, it might take a while before the user finds all the possible functionality.

The satisfaction for us was overall positive. It was easy to create a rule and we liked that the flow went from top to bottom instead of left to right. However, some icons were confusing and it was not possible to understand what they stood for unless the text was displayed next to them. As examples was testing symbolized with an Erlenmeyer flask, and action was symbolized with a flash. There is no drag and drop function implemented which means that it is not possible to rearrange the actions and that might be irritating for some users. It is possible to minimize the shown information for the trigger or action, but for us it was illogical where to press to minimize the information. It is done by pressing the title, which is "New Email" or "Create Folder" in figure 4.2, instead of

clicking on the bar above the title.

4.3.2 Microsoft Flow

When it comes to usefulness there are both advantages and disadvantages with Microsoft Flow. It offers plenty of functionalities, where the advanced functions are slightly hidden by default which ease the use for beginners. An overview of Microsoft Flow can be seen in figure 4.5. For more experienced users, the tool has lots of opportunities to build advanced and complex rules. The rule is created from the top with a vertical flow. However, if conditions are made that divides the rule into multiple paths, the rule will also grow in breadth. In case of multiple conditions is it almost impossible to get an overview of the rule, even on a larger computer screen, since it is too wide. Hence might both horizontally and vertically scrolling be necessary.

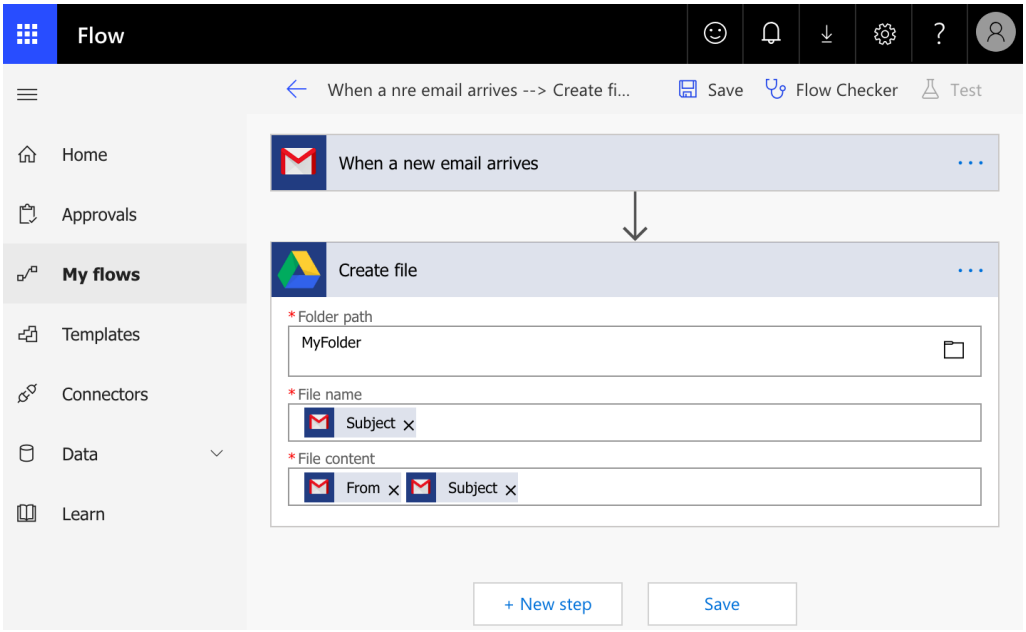

Figure 4.5: Overview of Microsoft Flow's user interface.

Compared to Zapier there is no strict pattern to follow. The user interface offers a lot of freedom when creating rules and there are few restrictions which requires the user to know what he or she is doing. There is a risk of making mistakes if the user is unsure about what the triggers and actions actually do. Errors due to incorrect rule structure could be hard to locate, but basic mistakes in text fields are giving automatic warnings,

an example can be seen in figure 4.6. However, the rules can be customized as the user desires since the tool does not require a certain structure.

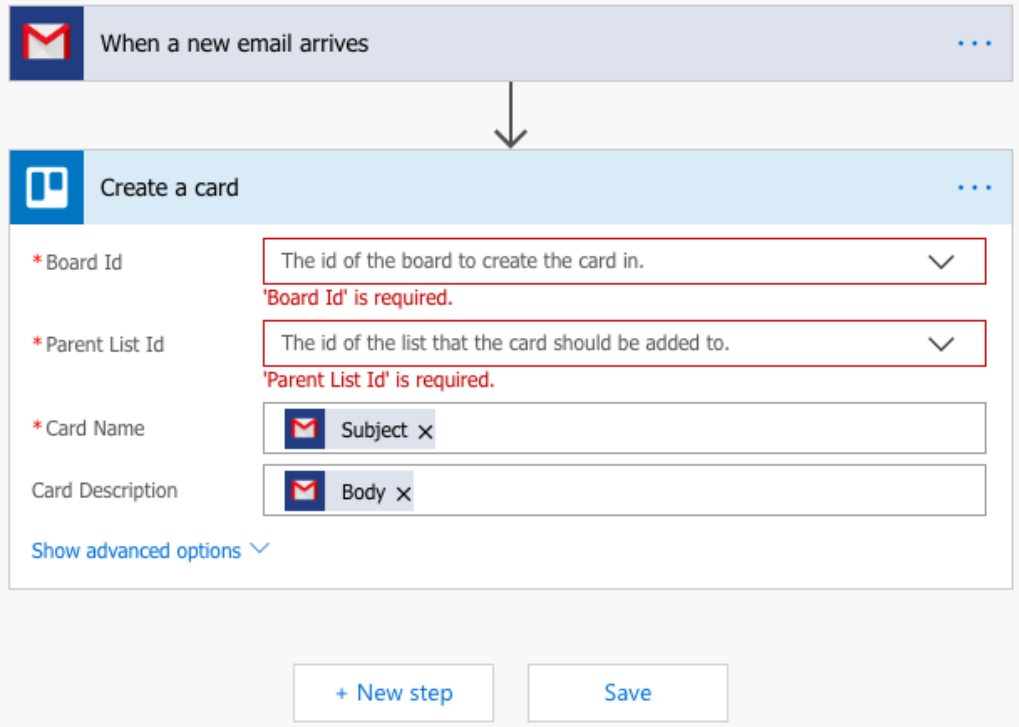

Figure 4.6: Microsoft Flow's error handling.

Microsoft Flow is not the most time efficient application. Completing tasks is time-consuming and some basic functionalities are sometimes placed in unpredictable spots or menus, which imposes the user to search for it. The application is easier to use if the user is familiar with other Microsoft programs since they all have a similar layout and placement of common functions. Some functionalities requires a few more clicks than necessary, while others are hidden, even though the functionality is important enough to be visible. As an example is the ability to toggle a rule between on and off only visible if the rule is hovered.

The learning time for Microsoft Flow is a little bit longer than the other tools, due to its complexity and the number of functionalities. Even basic rules are hard to create due to the advanced choices of words. The use of programming terms are frequently used and might frighten users that are not familiar with those terms. Some accessible

features actually requires basic skills in javascript programming, which is why this tool is suitable for professional use and advanced rules.

As previously mentioned, there is plenty of functionalities that makes this tool very advanced. Microsoft Flow is a little bit too technical in our opinion and increasing the number of icons would improve the user experience. The hidden functionalities are partly good, since it helps to create a cleaner user interface. It also prevents beginners from unintentionally reaching advanced options that requires more advanced technical experience. Unfortunately it is overused since even important functions are hidden in menus, which reduces the efficiency.

4.3.3 IFTTT

IFTTT stands for *if this then that* which reflects the core concept of triggers and actions. The process is presented with a separate page for each step of the creating phase with the current step number at the top of the page. Figure 4.7 shows the step for selecting a trigger in the user interface. However, it is not possible to provide an overview of the created rule and it is only possible to make a few changes in the action properties once it is done. On the other hand, is it easy to get an overview of all created rules and whether they are currently active or not.

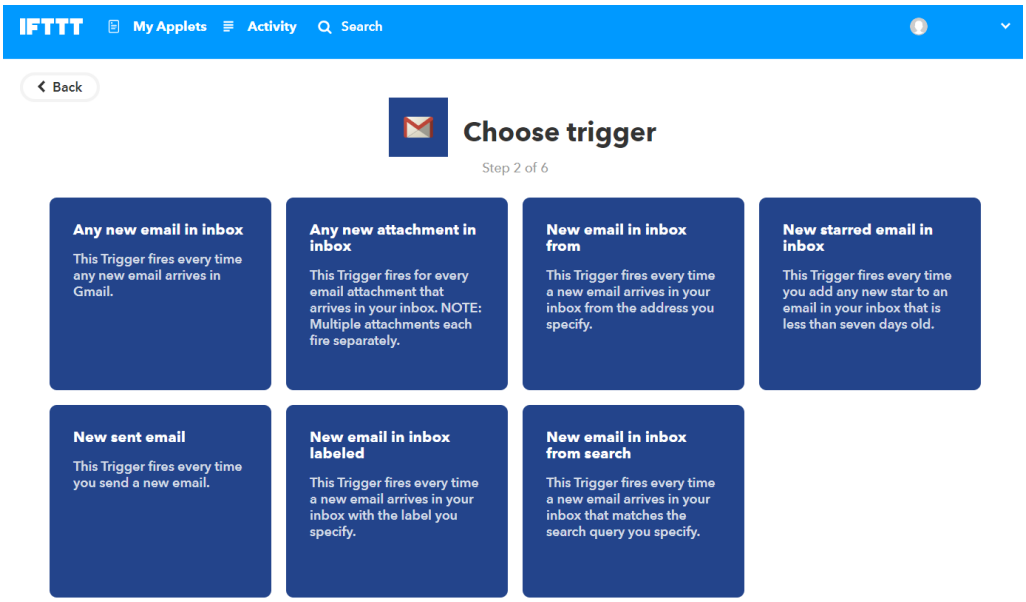

Figure 4.7: IFTTT's user interface for selecting a trigger.

There is some unnecessary use of programming language in the rule making process,

since double use of curly brackets are used to indicate an inherited variable from the trigger. As an example is Subject used to indicate the subject from a trigger while plain *Subject* corresponds to a text string with the word *Subject*.

The tool is not very time efficient since every single step in the flow needs to be stepped through in the right order. If the user would like to change a variable in a previous step it is only possible to do so by stepping back one step at the time. Selected choices along the way will not be saved, so each step needs to be redone from the current step. Though the ability to modify a created rule is very limited, it is necessary to create a new rule if changes in the trigger's behaviour are desired, which is not very time efficient either. Despite the simplicity, the usage of programming syntax can complicate the creation of rules and increase the number of errors. The given error messages might be obscure to a non-programmer, which reduces the application's effectiveness.

Compared to Microsoft flow does IFTTT have considerably fewer possibilities and connected applications, but the major benefit is its simplicity. It also contains descriptive information about how every trigger and action work as well as helpful information below fields that should be entered by the user. Therefore, it is quite easy to get started with this tool and it has high learnability. As soon as the user would like to customize the action parameters some basic understanding of programming syntax is necessary.

In our opinion does the tool have a very user friendly appearance with bright colors as well as big and clear buttons, which acted upon our expectations. Though there is a few exception. The classic, metaphoric cogwheel, that usually is an icon for settings, is in IFTTT used for editing. The whole interface appears to be developed for primary mobile use since all content are centered in a slim fragment in the middle of a screen. The consequence of this is a lot of vertical scrolling in order to view all information, hence it is a little hard to overview the whole rule.

4.3.4 Home Center 2

We never got to try Home Center 2 for ourselves, instead we studied different videos online to see how the rule building tool worked [32, 33, 34]. The tool is a collection of several features for a smart home solution. The rule building is a part of the more advanced features that a user can chose to apply. The tool differs a lot from the other three that have been investigated, both in layout and features. It has lots of possibilities to create different rules which also makes it complex. Unfortunately, the creation of rules are more complicated than necessary. Though the product itself is targeting house owners, it does requires some basic knowledge within math and programming syntax. The use of $<$, $>$, $=$ and several combinations between them as well as $==$ are frequently used within programming and the tool's rule building process. There is a major difference between a single equal sign and two equal signs since the first one refers to an allocation whereas the second refers to a comparison. However, this syntax is improper to the target group and complicates the learnability of the application. An example of the rule building process can be seen in figure 4.8.

To create a rule, the user can chose different options from a menu, this menu might

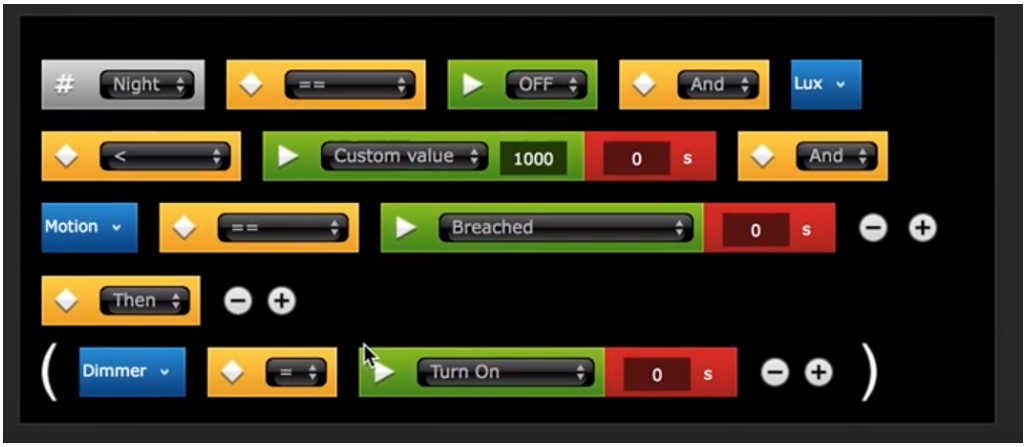

Figure 4.8: Overview of Home Center 2's rule building process.

in turn lead to more options to chose from and so on, see figure 4.9. This reduces the efficiency since there are a lot of menus to go through and even search through if the user is new to the product. There are also a lot of plus and minus icons to add or remove a feature, which might confuse the user. We were very unsure about these icons functionality and impact on the rule.

In the rule making phase, the user combines different kinds of components. Examples of components are devices, comprehension signs, actions or words like *and*, *or* and *then*, which combined with other components will make conditions. All components have been given a color as well as an icon to easily distinguish different components' functionality. However, the icon does not contribute to the understanding of the component's functionality, rather create confusion. The color do separate different components, but some additional information would have been helpful.

Figure 4.9: Multi-level dropdown menu of selectable components.

4.4 Conceptual Design

After processing the information from all the investigations we summarized our thoughts into a conceptual design, which we wanted to create our prototype upon. The purpose of the prototype is to create advertisements, which will be displayed on the screens onboard different airplanes and the user's role is to determine under which circumstances it will be displayed. Affecting variables could be what product that should be promoted, during which dates the advertisements should be visible and on which flights.

4.4.1 Scenarios of Typical Use Cases

- The airline wants to promote all their snacks by having a 20% discount on all their flights when it is less than two hours left to the destination.
- A famous perfume company wants an advertisement on one of their perfumes on the airplanes by giving it a 10% discount. They only want the advertisement to be shown on the route from London to New York and if they have more than ten products left in stock.

- The airline would like to create a Christmas offer on all their products from the Christmas collection, but they would like to have different offers on different dates. From the 1st to 25th of December they would like to put a 10% discount on all the products. After Christmas, from the 26th December to the 6th January, they would like to have a 30% discount.
- A company selling watches would like to advertise their new watch by adding a small discount on the new product. Since the watch will not be available on all routes at the same time, they would prefer the advertisement to be displayed at different date intervals on different routes. In May will a 5% discount be visible on all flights to New York and in June will the a 5% discount be visible on all routes to Tokyo.

4.4.2 Functionalities

This section lists the functionalities that were required for the prototype and were used as a simple specification for future development.

- Create a new rule
- Edit an already created rule
- Remove a rule
- Give a rule a title
- Select one or multiple products
- Select a discount
- Select requirements for the rule
  - Select one or multiple routes
  - Select one or multiple dates
  - Select a time restriction
  - Select an inventory restriction
- See all selected conditions
- Edit selected conditions
- Remove selected conditions
- Build rules with multiple parallel conditions.
  - Select one or multiple products with same discount and multiple different requirements

  - Select one or multiple products with multiple discounts with different requirements

- Toggle if a rule should be active or inactive.
- Save a rule

5 First Lo-Fi Prototyping Phase

When creating the low-fidelity prototype we both first drew our own interpretation of the interface on a piece of paper. After that, we compared our designs and concluded on one main design for the interface. Different placements of features and icons were discussed to achieve an easy and intuitive interface. We illustrated the Lo-Fi prototype with the use of a tool called *Moqups* [35] after we both had agreed upon the design. *Moqups* allows multiple users to simultaneously work on the same prototype in an online development environment.

5.1 Prototype

By examining several different tools for rule building we received many good ideas to develop our own prototype. One of the useful features was a sidebar with information regarding different parts of the rule. We thought this gave the user a great overview of the rule and embraced this feature to our prototype. It connects well to the fact that people from low context cultures have a linear way of discovering information and the subtasks will be completed in a top-down pattern. The adaption to high context cultures is explained in the section about navigation.

Homepage

Before getting started with creating rules, the user faces the homepage with a list of all previously created rules. Each rule is visualized by its name and a toggle button to quickly change the active status on the rule, as seen in figure 5.1. Furthermore, the user can review a rule by pressing the *Overview* button. A small window will appear with an overview of the rule, with all selected options displayed. Options will from now on be a common name for all conditions that can be set for a rule, e.g. product and time. The homepage also includes an *Edit* button for every rule, which allows the user to enter the editing mode where a sidebar is displayed to the right and an option area to change selected options to the left.

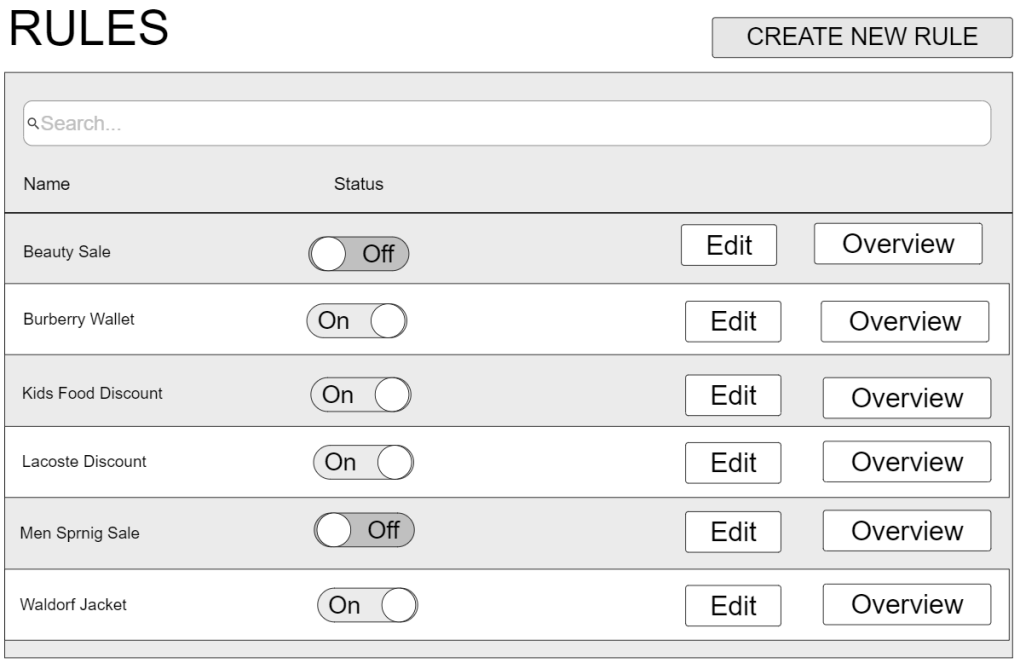

Figure 5.1: The homepage listing all created rules.

Navigation

We have designed two different strategies in order to navigate through the system. The user could either traverse the process step by step by pressing the *Next* button that is placed at the right bottom of the screen. Similarly, the user can step to a previous page by pressing the *Back* bottom in the lower left corner. This strategy is preferable for people in monochronic cultures since it enables the user to make sure every step of the process proceeds as expected. It also keeps a chronological and linear path for cultures with high UA, who prefer a limited amount of choices. The second strategy allows the user to switch between different pages in their own preferred order from the sidebar. Unlike the investigated tools, we decided to not force a predefined order for the subtasks, hence the user is free to chose their own preferred order. We do not want to restrict people from cultures with low UA and their possibility to explore the site and take advantage of their parallel thinking.

Sidebar

The sidebar on our prototype approximately takes up a third of the space and is placed on the right side of the screen. It has an input field for text at the top, where the user can place a title for the newly created rule. Then follows sections to select the product, offer and lastly filter which is a collection of four different kinds of options which the rule can depend upon. As an example can the rule be set to only operate on certain days or specified routes. Arrows with plus sign buttons are placed between the sections in order to create multiple paths. Below the sections is a *Save* button placed in the right corner and a toggle button to change the active status on the rule is placed to its left. All options have a placeholder to declare the option's functionality. It is initially in a faded gray color to indicate that it has not yet been specified. An empty sidebar, which is displayed upon the creation of a new rule, can be seen in figure 5.2. The placeholder is replaced with a short description as soon as a value has been selected by the user. All options also have an icon to graphically illustrate the functionality, which is placed on the left side of the sidebar. The sidebar of a modified rule can be seen in figure 5.3.

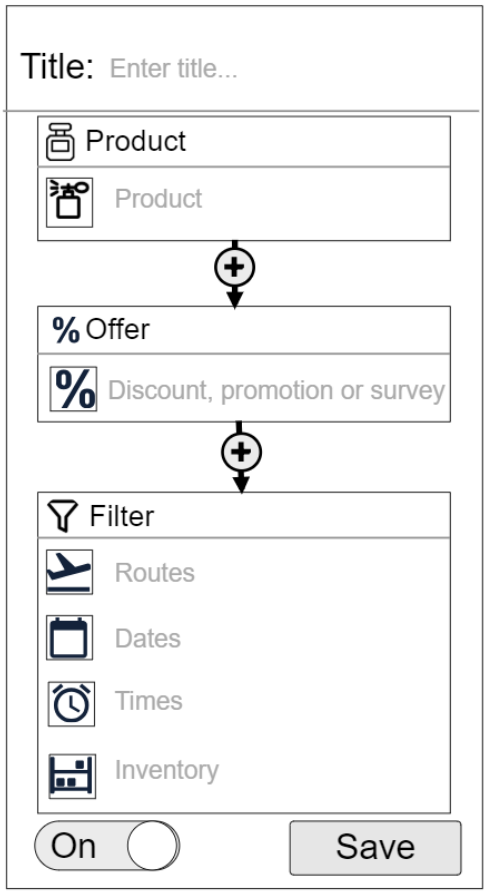

Figure 5.2: Sidebar where no options have been selected.

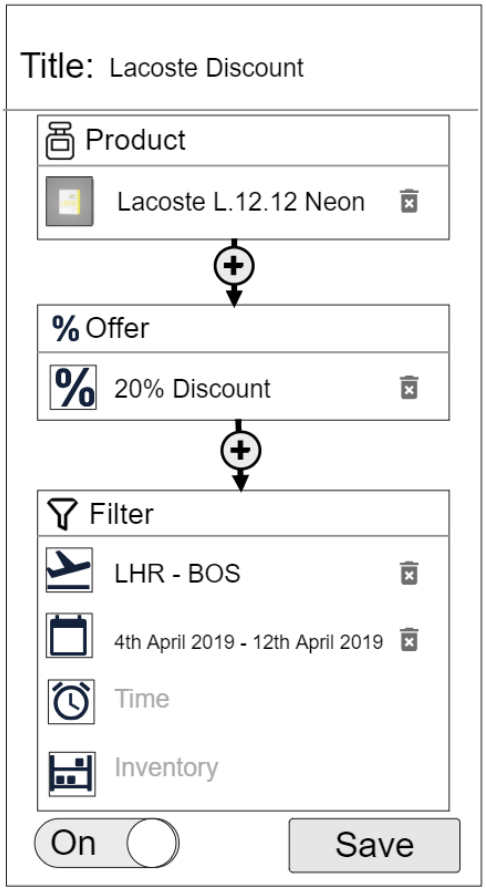

Figure 5.3: Sidebar where the product, offer, route and date have been specified.

Option Menu

The reaming two-thirds of the screen contains the area where different alternatives for each option can be selected. The area switches depending on which option that has been selected. The internal design at Tactel has been used as a specification in order to include some of the needed requirements. Our prototype has frequent use of radio buttons and checkboxes to indicate if single or multiple selections of alternatives are possible. The clarity is important, especially for people with high UA. The prototype aims to keep a simple layout with a limited amount of possible actions.

Product Menu

The view for selecting products contains three different types of choices, which each has a radio button on its left-hand side. The user can either choose a single product, a collection of several products or a whole category of products. If a single product is desired the user can press the small arrow at the search field to see the products in a drop-down list or write initial letters of the desired product to filter the list, as seen in figure 5.4. A selection can either be made by directly pressing the desired product, collection or category, but also by first pressing the radio button. Both ways will give the same result.

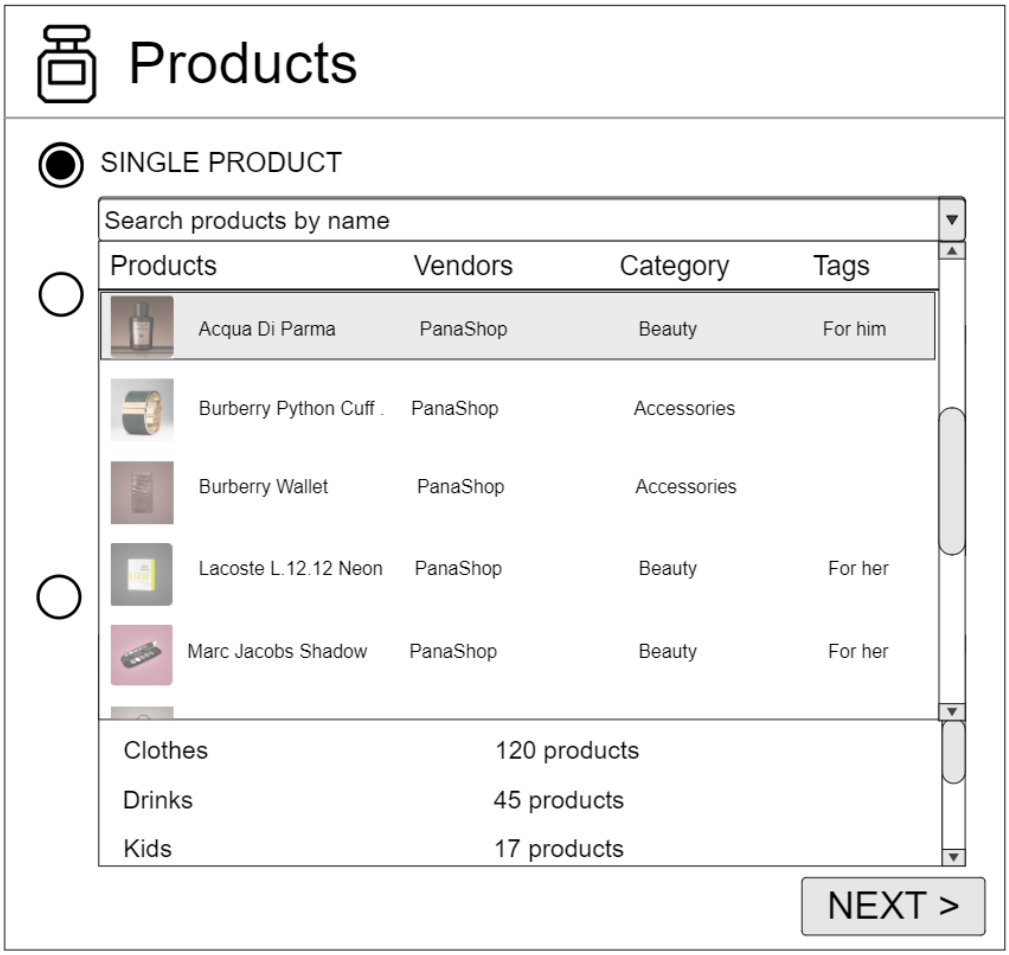

Figure 5.4: Product menu when single product is selected and drop down list is shown.

Offer Menu

Similarly, the offer page has three different types of choices to choose between, either discount, promotion or survey, see figure 5.5. Promotion and survey only consist of text areas to fill in by the user. The discount is selected by either dragging a slider to the desired value or using the up and down buttons, which are placed beside the text field for current value. A third way is to manually type the desired value into the text field. It is a conscious decision to allow multiple actions to give the same result. People from cultures with monochronic time perspective want a time efficient experience. The process will go faster since it is a lower risk of making mistakes if several actions are correct.

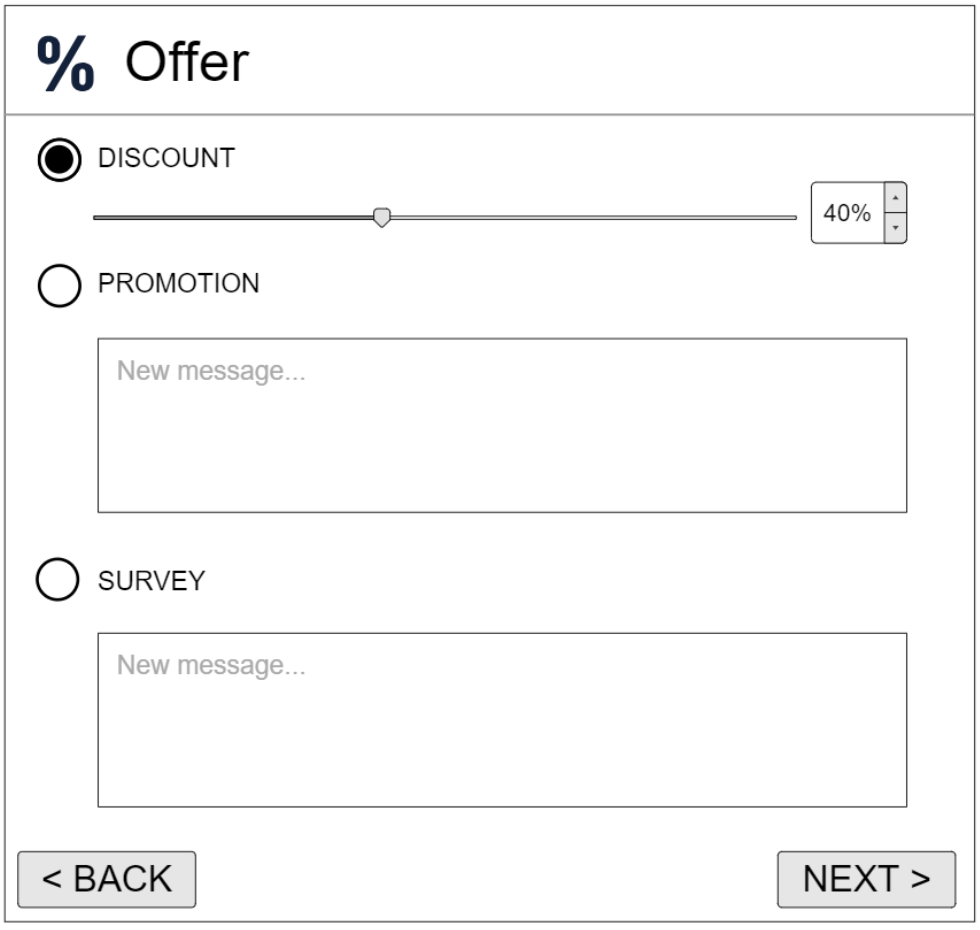

Figure 5.5: The offer menu when a 40% discount has been selected.

Route Menu

In order to select which routes the rule should apply for, the user uses the checkboxes on the left-hand side of each route, see figure 5.6. Multiple routes can be selected and the bolded box in the upper bar will select all routes. If the user would like to filter the list of routes, due to too many results, this can simply be done by writing the locations in the text fields above the list. This will filter the list based on departure and arrival locations. The list can also be sorted by using the arrows beside the *from* and *to* labels in the upper bar. Only one route will be visible in the sidebar, multiple routes will be indicated with a plus sign and the number of not visible routes.

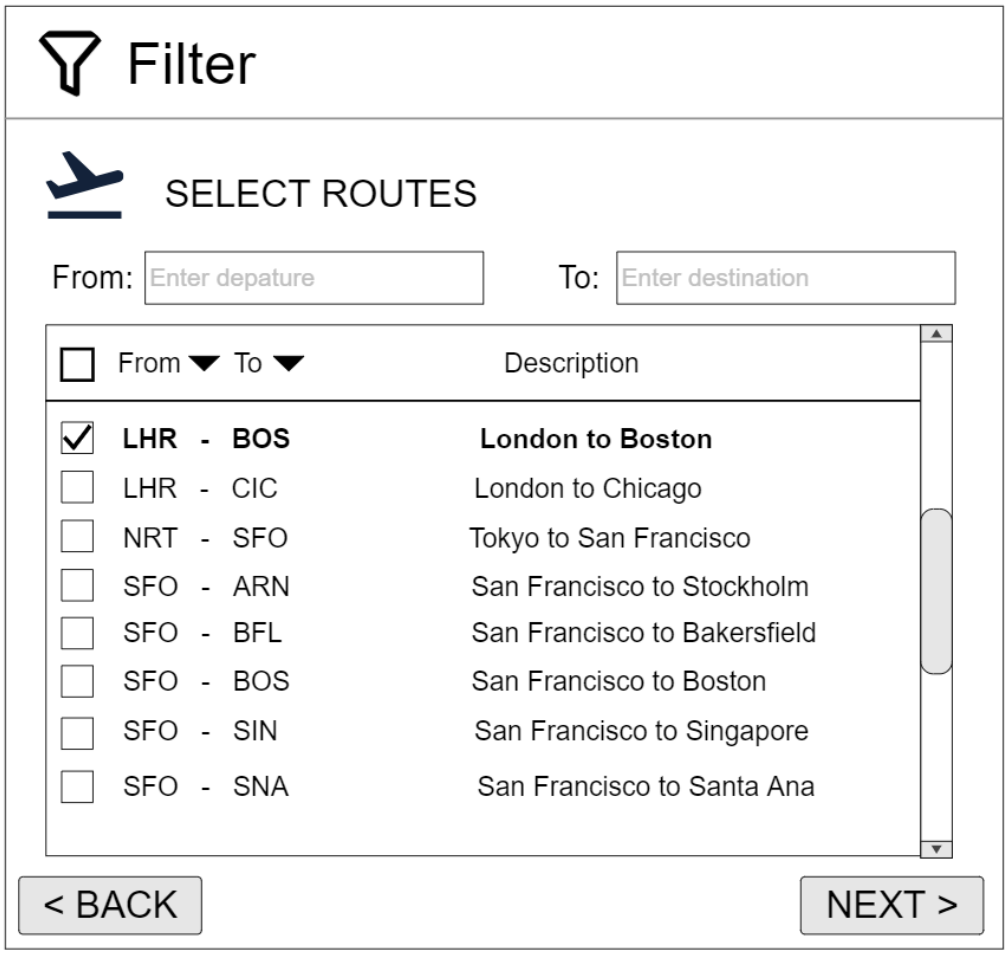

Figure 5.6: The route menu when one route has been selected.

Date Menu

The date page contains a drop-down list of holidays, two radio buttons to toggle between single or multiple days, a calendar, a button below the calendar to add dates and a list on the right-hand side of the calendar to overview the selected dates. All these components can be seen in figure 5.7. When entering the page, the single radio button is pre-checked to indicate that only one day can be selected at the time. Once a date is marked the user has to press the *Add Dates* button below the calendar to confirm the date. The date is then both added to the list in the date menu and to the sidebar. If the user wishes to select an interval of days this can be done by pressing the radio button labeled multiple. This will allow the user to select a start and end date of the desired interval. Once the *Add Dates* button is pressed the interval will be added to the list and visible in the sidebar.

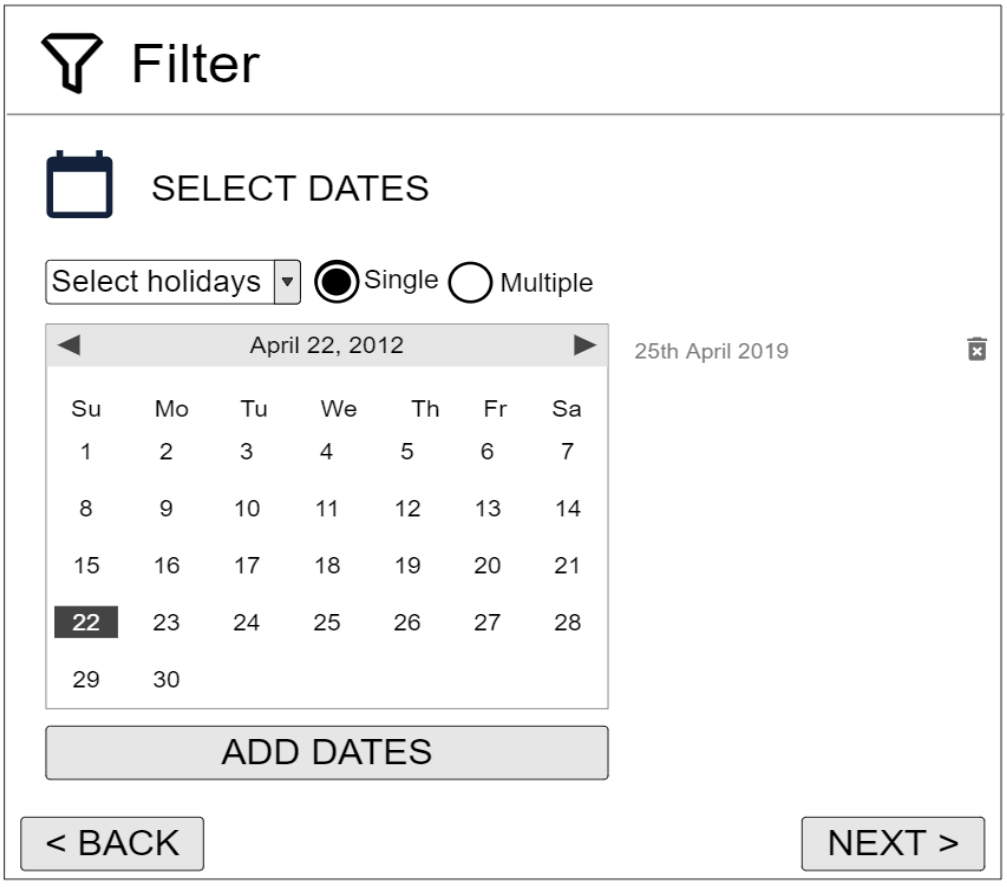

Figure 5.7: The date menu when one date has been selected.

Time Menu

Alternatives to be selected in the time menu are configurations regarding at which time of the route the advertisement will be displayed. Once again is radio buttons used to indicate that only one alternative can be selected at the time. Examples of alternatives are to specify hours from takeoff or hours to destination. If either of these is selected, the user also needs to specify the number of hours by either writing the number of hours in the text field or pressing the up and down arrows until the desired number of hours is reached, see figure 5.8.

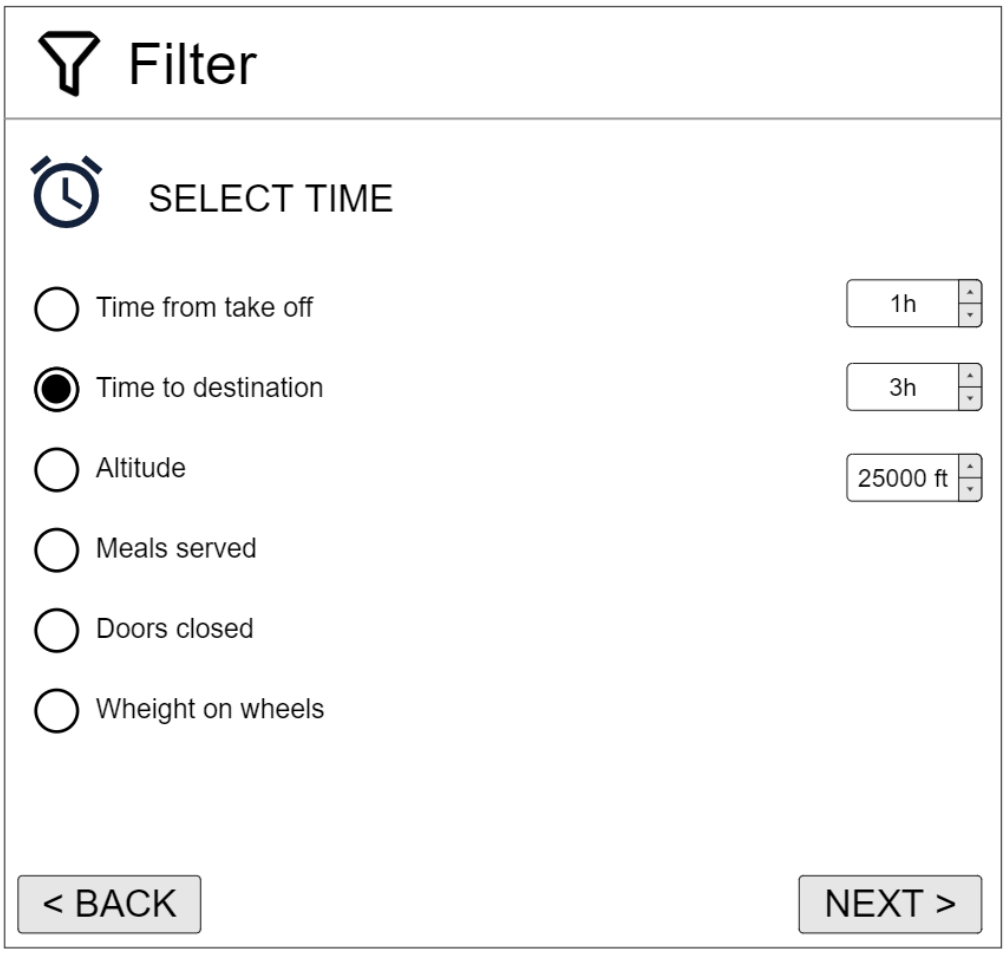

Figure 5.8: The time menu when one alternative has been selected.

Inventory Menu

Inventory criteria can be set if the advertisement only should be visible when there is a certain amount of products in the onboard inventory. The inventory menu consists of two alternatives where the user can decide if the rule should apply when there is more than a certain number of products left or less than a certain number of products left, see figure 5.9.

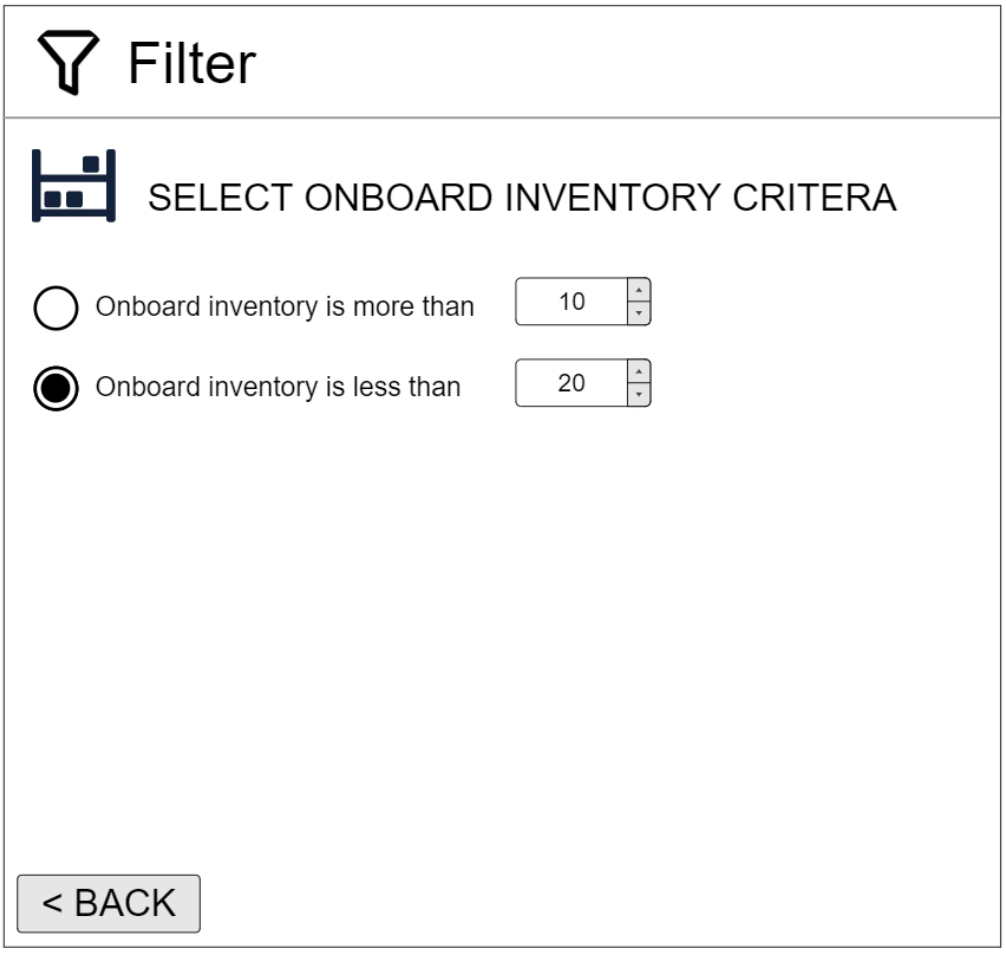

Figure 5.9: The inventory menu when one alternative has been selected.

Parallel Paths

One of the more complex features is to create parallel paths in the rule. This is enabled when pressing the *Plus* button between sections in the sidebar. After pressing the button a pop-up window is displayed that ask the user to define how many parallel paths that are desired. After specifying and confirming a number, the pop-up window disappears and the sidebar will display a line that is divided into several arrows, based on the specified number. Each newly created section will have empty options that can be filled with new criteria and are placed below the arrow. Figure 5.10 and 5.11 illustrates two different ways of dividing a rule into different paths in order to customize its behavior.

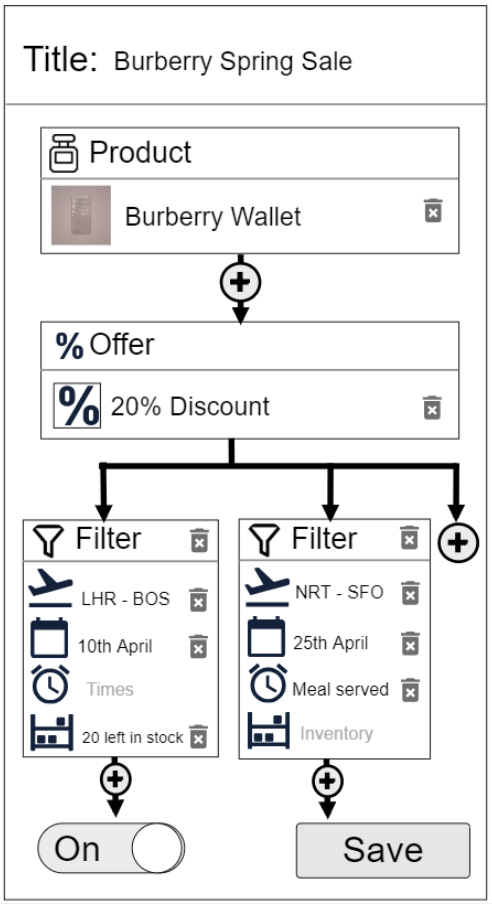

Figure 5.10: Parallel paths for filters.

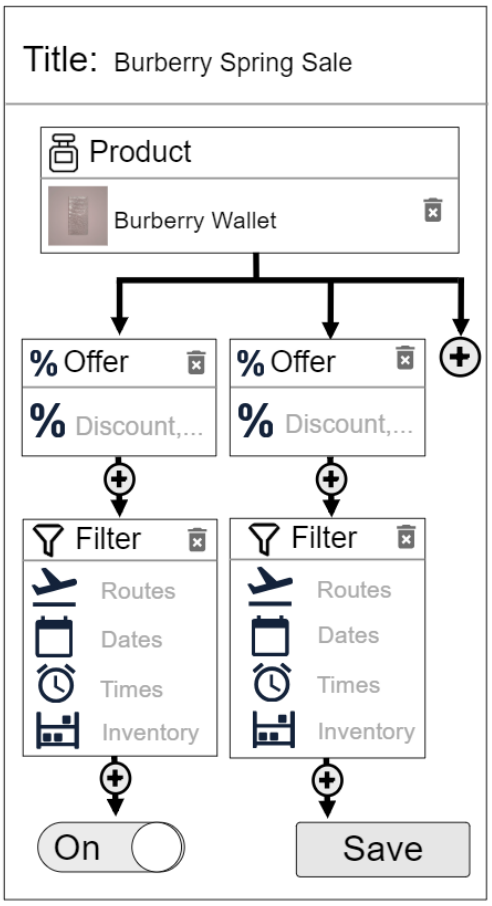

Figure 5.11: Parallel paths for offers.

5.2 Testing

The prototype was tested with nine participants from Sweden, who had different gender, age, and occupational background. Three of them were women and six of them were men, the age range was 23-64 years. During the test, they were asked to think-aloud when they performed the different cases. However, the test participants were not the end users since none of them worked with marketing or anything regarding flights. The test sessions were exploratory and aimed to find the most critical issues. The cases were written to test all the functions, menus and rule structuring.

Case 1A

1. Create a new rule
2. Add the product Lacoste L.12.12 Neon
3. This product should have a 20% discount
4. It should only be valid for routes between London and Boston
5. It should only be valid between the 4th of April and the 12th of April
6. Name the rule to "Lacoste Discount"
7. Make sure that the rule is activated and then save it

Case 1B

1. You no longer want any defined dates for the rule that was just created
2. Remove from the rule, so that it does not apply for any specific dates
3. Save the rule

Case 2A

1. Create a new rule
2. Add all the products from the category beauty
3. All these products should have a 15% discount
4. It should be valid for all routes
5. It should only be valid when there are less than 20 products in the onboard inventory
6. Name the rule to "Beauty Sale"
7. Make sure that the rule is not activated and then save it

Case 2B

1. You realize that you have made a mistake in the rule that you just created regarding the number of products left in the onboard inventory
2. Change the rule so that the number of products left in the inventory is less than 10 instead of 20
3. Save the rule

Case 3

1. Create a new rule
2. Add the product Burberry Wallet
3. This product should have a 20% discount
4. This product should have two different filters with different options
   (a) It should only be valid for routes between San Francisco and Boston on the 13th of April
   (b) It should only be valid for routes between London and Boston, on the 15th of April and only when there is 3 hours left of the flight
5. Name the rule to "Burberry Spring Sale"
6. Make sure that the rule is activated and then save it

5.3 Results from User Testing

There was a lot of positive feedback from the nine persons that tried the prototype. All participants managed to successfully complete case 1 and 2 with no or little help. However, there were features and difficulties in the design that needed to be modified. The most critical problems that needed to be altered are presented in this section.

Create New Rule

Some test participants found the first task, creating a new rule, to be difficult. They where focused on the pre-created rules in the list and did not see the button at the top right corner, see figure 5.1. However, by adding color to the button we think that it will be more distinct and thereby easier to find. A plus sign might also be added to the button to further indicate that something new will be created. The test participants did not have any problems finding the button after the first case.

Trash Can

A few users had problems when they had to remove an option from the rule. They did not see the trash can next to each value in the sidebar, see figure 5.3. This could be because it does not look clickable in the Lo-Fi prototype. The icon will be made more distinct to prevent that it blends in with the text. It is possible to remove dates in the sidebar by pressing the trash can, but the user can remove them from the list in the date menu as well. It should also be possible to remove a date by simply clicking directly on the date in the calendar.

Title

Most of the participants had to search for a while to find where to name the rule, and some of them did not find it without help. They would have preferred to enter a title first, directly after the *Create New Rule* button was pressed. Therefore, we wanted to change the layout for when a new rule has been created. An empty page will be shown to the left, instead of the product menu, with the sidebar to the right. A dialog will then appear in front of the empty page where the user can enter a title. The user can chose to enter it right away or close the window and enter the title later.

Navigation

All of the participants chose to navigate through the sidebar. They clicked on the option they wanted to add or modify instead of using the *Next* button in the lower right corner. This was because they did not know where the *Back* and *Next* buttons would take them. The buttons should be made more informative, so the users know where the buttons would navigate them to. For the product menu the *Next* button would be replaced with *Offer* and for offer it would be replaced with *Routes* and so on.

Offer, Product, Time and Inventory Menus

Minor changes had to be made for the offer, product, time and inventory menus. The current value should be shown clearly when the user use the slider to set a discount. When the drop down list is shown for all the single products it is important that the different alternatives look clickable. For the time menu there was a request to add another alternative that would make it possible to enter the percentage left on a flight instead of specifying the hours. This will be profitable if the rule is valid for multiple routes which have different flight time. The alternatives in the inventory menu also need to be rewritten in order to avoid confusion.

Date Menu

The date menu was another area that many of the test participants found difficult to use. The single and multiple buttons above the calendar were a bit confusing for some,

see figure 5.7, since multiple could mean that they got to chose multiple days and not an interval of days. The *Add Dates* button below the calendar also caused some confusion. No confirmation was needed in the other option menus, if a product or route was select it was automatically presented in the sidebar. However, in the date menu, the user first had to select a date and then press the *Add Dates* button before it would appear in the sidebar as well as in the list beside the calendar. Therefore, most of the test participants did not press the *Add Dates* button since this was an extra step that they did not have to perform before. After they noticed that nothing happened they pressed the button.

Routes Menu

In one of the cases the user had to make sure that the rule applied for all routes. All of the test participants understood the bolded rectangle above the routes which selected all the routes, see figure 5.6. Even though none of them had any problems with the rectangle they all said that they would not mind if there was a text which clarified that it would select all. There was also different interpretations of how the rules should be created to include all routes. Some went directly to routes and marked all of them while other chose to not enter anything since they thought that an empty filter for routes would mean all routes. We changed our opinion regarding selecting all routes after the tests. Our first interpretations was that the user had to mark all flights but after the tests we thought that an empty filter for routes meant all flights. Since the same goes for all of the other options in the filter, if no date is added the rule will be valid all days, if no time is added it will be valid during the entire flight and so on. This could be clarified if the placeholder in the sidebar was changed from Routes, Dates, Times and Inventory to All routes, Every day, All the time and Independent inventory. Hence, if nothing is added it will always be valid.

Parallel Paths

Creating multiple paths was definitely the most complicated thing for the participants. It took a long time to understand the *Plus* button in the sidebar and that it had to be pressed to create parallel paths. Many test users tried searching among the options to see if there was something there, and when there was nothing else to press they found the *Plus* button. Some participants went directly to save the rule and create a new rule for the other path, while other saw the *Plus* button directly and pressed it because there was nothing else to press but they did not know what it meant. We thought that some of the uncertainty could be prevented if the *Plus* button was placed to the right instead, next to the filter as in figure 5.10. It would perhaps make it more clear that a new filter would be added. The pop-up window where the user could select how many paths they wanted should also be removed, instead the *Plus* button would simply create one new filter.

There was also some confusion about the *Plus* button below the filters. Some participants did not understand what they meant but also because there was no *Plus* button

below the first filter in the linear sidebar, see figure 5.2. Therefore a *Plus* button should be added to the linear sidebar as well.

Homepage

All the participants understood the homepage beside from the *Create New Rule* button, which was hard to find. They found the *Edit* button and understood which rule they had created. Some participants wanted to get an overview of the rule they just created when they pressed save. Therefore, an *Overview* button could be placed next to the *Save* button in the edit mode for a rule instead of only having it on the homepage.

We believed a few more changes on the homepage would simplify the search of a specific rule. Instead of just being able to search for a rule name, it should also be possible to search for specific products, locations or dates. All the rules that do not fulfill the searched criteria will then disappear from the list.

6 Second Lo-Fi Prototyping Phase

After evaluating the first prototype and presenting improvements we decided to take a side track and try an entirely different conceptual idea to solve the problem. Two of the issues with the first prototype were the limited overview when there were multiple paths and the strict rule structure. In our second prototype we tried to use the drag and drop technique to investigate how well that approach worked on creating parallel paths.

6.1 Prototype

We felt that there were a lot of good ideas and design decisions in our first Lo-Fi prototype. After changing the prototype based on the feedback we got, we thought that the option menus still could be useful. However, the sidebar caused some limitation since it was designed in a specific order. It was also difficult to understand and illustrate multiple paths with the sidebar. Therefore we wanted to give the users more freedom when they created a rule, which is why we wanted to try the drag and drop technique. Thereby, they would get a clean workspace to create the rule the way they wanted. We placed all the different options, such as discount, routes and date above the empty workspace in a menu bar, see figure 6.1. This, to prevent the cultural preference of either left or right. All of the options were presented with the same icon and corresponding label as in the first prototype. The product is the only option that is already placed at the top of the workspace. The reason for this was that the users could only create a rule with one specific product, category or collection. So this would give them a little navigation of how they should start creating the rule. By pressing the *Select Product* box the product menu from our first prototype would appear in front of the workspace, which is illustrated in figure 6.2. The *Back* and *Next* buttons have been replaced with *Cancel* and *Confirm* buttons. When a user presses *Confirm*, the product menu disappears and the *Select Product* box is replaced with a picture and name of the selected product.

After that, the user can chose any of the options from the option bar. The ideal design was to use arrows as visible ques to facilitate the user's understanding on how two options are related to each other. The arrows would make it clear if an option would be placed as a parallel path to the other options or if it would be placed in the same path. These visible ques were not possibly to illustrate in a Lo-Fi prototype, therefore, we chose to investigate how the participants placed their options during the tests. A rule structure with multiple paths is illustrated in figure 6.3.

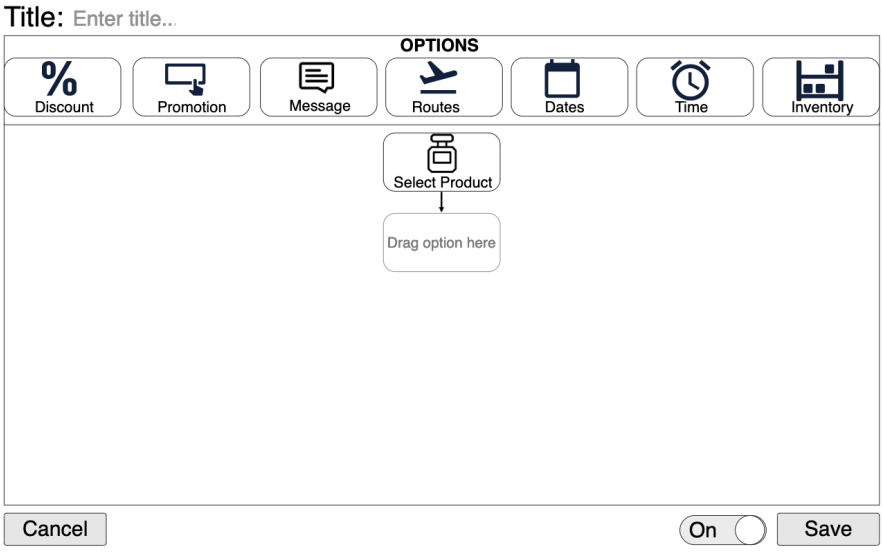

Figure 6.1: User interface when no options have been selected.

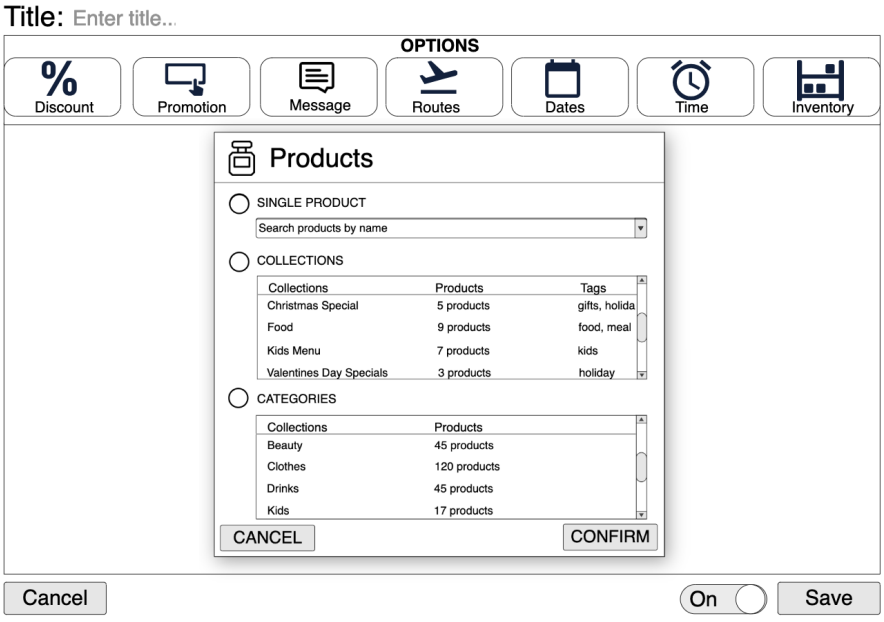

Figure 6.2: User interface when product menu is showing.

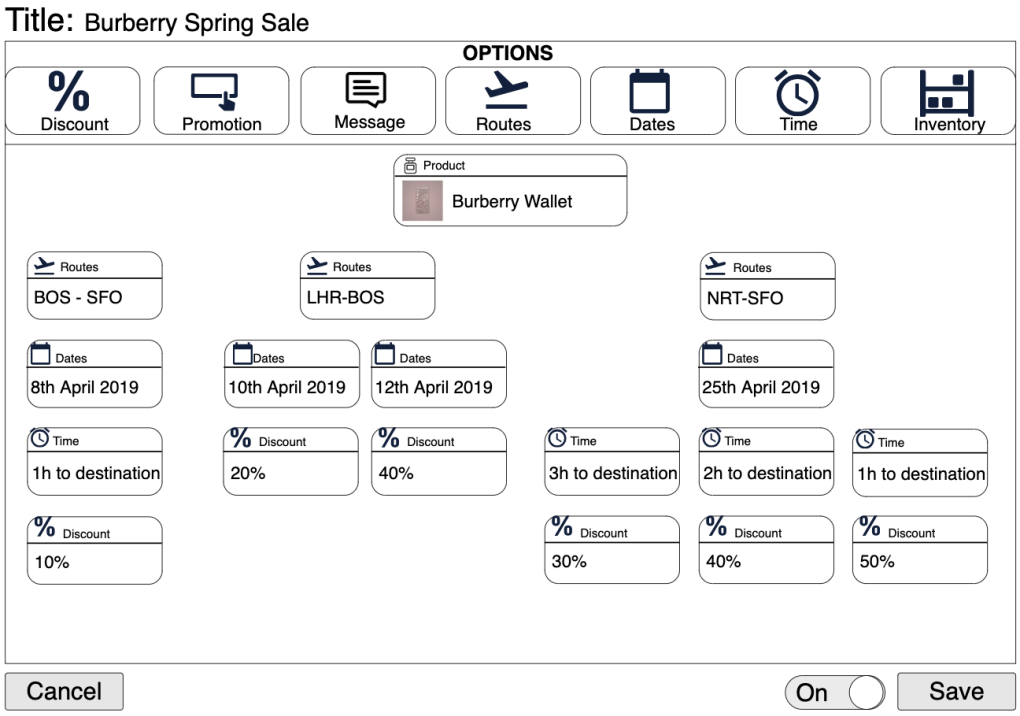

Figure 6.3: User interface when a rule with multiple paths has been created.

We did not design any feature to remove an option from the workspace. However, we decided to ask the participants during the test session of the second Lo-Fi how they would like to remove an option to get a better understanding of how it should be designed. The title is still placed at the top of the workspace and the *Save* button and status icon at the bottom, as in our first Lo-Fi prototype. We also added a *Cancel* button at the bottom left corner.

6.1.1 Improvements

The option menus from the first prototype was reused in the second prototype with a few improvements. A few users thought the slider for selecting discount would be more helpful if it indicated both current value and moved multiple steps at the time. We decided to let the slider move 5% at the time and have a small label displaying the current value just above the dragging element.

Another improvement was made in the inventory menu, where the alternatives were

rewritten to clearer describe the meaning. The simple *more than* was replaced with *Onboard inventory is more than*.

While testing the route menu we were very interested in examine if the users recognized the checkbox for selecting all alternatives or if we had to clarify with a text and button. Since none of the test users had any problem with this task, we decided to keep the design as it was.

The menu that created the most confusion during the testing sessions of the first prototype was the date menu. To prevent the confusion we decided to remove the single and multiple selections that were placed above the calendar. Instead it would work as most calendar does on web sites where you can book flights. The users select a start and end date and the interval will be highlighted in the calendar. If they only want one date they have to double click on that date. As for the *Add Dates* button we decided to remove it, instead the dates will automatically be moved to the date list on the right hand side of the calendar.

6.1.2 Cultural Aspects

The interface has limited amount of visible text, this gives it a clean and easy layout which is important for high UA cultures. There is not a complicated navigation system since the view only switches between the workspace and any of the option menus. This is another aspect that is important for high UA cultures, since it prevents the users from getting lost.

When a user presses the *Confirm* button in any of the menus, the option in the workspace will automatically be updated with the corresponding information. This means that the user quickly will get feedback of their actions and can therefore reach their goals faster, which is important for low LTO cultures. Both the product and route menu provides search bars which is another feature that makes the process faster. When an alternative is selected from these two menus it becomes bold to ease the searching.

The users got a lot of flexibility to drag and place options in their own preferred order, unlike the first prototype where the order was fixed. The order of the options could even differ between two parallel paths in a rule. This facilitates for both low context and high context cultures since the first prefers a strict linear order while the second prefers a non-linear processes.

6.2 Testing

Just like the test sessions on the first prototype was the second prototype tested with an exploratory approach. The scenarios were rewritten to test the rule structuring rather than menu traversing. Therefore were only two test cases created, one where the user had to create a single lined rule and one where they had to create parallel paths.

The testing was made on a total of seven people, who all were from Sweden with different gender, age, and occupation. The age range was 23-65 years and two of the participants were women and five were men. The majority of the participants had a

technical background. They were asked to think-aloud during the whole test in order for us to easier understand their thinking pattern and where they experienced difficulties.

Case 1

1. Create a new rule
2. Add the product Lacoste L.12.12 Neon
3. This product should have a 20% discount
4. It should only be valid for routes between London and Boston
5. It should only be valid on the 12th of April
6. Name the rule to "Lacoste Discount"
7. Make sure that the rule is activated and then save it

Case 2

1. Create a new rule
2. Add the product Burberry Wallet
3. This product should have different discounts based on different options
   (a) Between London and Boston, it should have a 20% discount on the 10th of April and 40% discount on the 12th of April.
   (b) Between Tokyo and San Fransisco, it should only be valid on the 25th of April and when it is three hours left of the route. The discount should then be 50%.
4. Name the rule to "Burberry Spring Sale"
5. Make sure that the rule is activated and then save it

6.3 Results from User Testing

Just like the testing on the first Lo-Fi prototype we receive a lot of constructive feedback from the test users. Observing their interactions with the prototype also gave us valuable information that was used to introduce prospective improvements. This section lists the most critical issues that were discovered during the test sessions.

Drag and Drop Technique

There were quite few hints in our Lo-Fi prototype which indicate that drag and drop should be used to handle the creating process of a rule. The only visible sign was the text *Drag option here*, written in the empty box below the box for product selection. This is something that could be clarified in a Hi-Fi prototype so users easier understand how to interact with the interface.

Structuring Behavior

The test users had a few different approaches to structure the rule in the second case where multiple paths should be created. Some of them were correct, but not necessarily the most effective way since it included duplicated values. Duplicated values could be avoided by structuring the options in hierarchic order. The Lo-Fi did not include any clues on how to place the options, which could be improved in a Hi-Fi prototype.

Rule Overview

In the testing process of the first prototype, we got a lot of positive feedback about the sidebar since it gave a clear overview of the process and which options that had been selected. This was something that was missing in the second prototype and the users experienced that they were unable to get an overview of the rule while editing an option, since the option menu covered the center of the screen.

Another thing we would like to have in the interface is a written description of the entire rule. This would give an overview of the rule that is not graphical rather textual, since it was something that several test users expressed they desired.

Layout

Something that confused some users was that the product option was already placed in the workspace, while the rest of the options were placed in the upper menu bar. It seemed illogical to them that the interaction behaviour differed, so it did not act as an assistance in the beginning as we had thought. Another confusion that was perceived during the test sessions was whether there was a relationship between the route option in the upper menu bar and the product option, since they were placed right below each other. We thought the reason for this was lack of colors and borders and could be improved in the Hi-Fi prototype along with the style implementation.

Error Handling

Due to the simplicity of the Lo-Fi prototype were no error messages displayed upon mistakes. Our vision was to detect errors in the rule and write an error message that clarified what kind of error that has been made. We would also like to visualize the affected area in the rule so the user becomes aware of where changes need to be made.

A simple mistake could be that a certain path is missing a product or an offer and hence does not serve a purpose.

7 First Hi-Fi Prototyping Phase

We started to create our Hi-Fi prototype based on our designs from the first and second Lo-Fi prototypes as well as the feedback from the test sessions. We decided to implement a web application instead of using a prototype tool but it differs from a real product since it does not have any backend development. Hence would no rules actually be preserved and stored upon save or reloading of the page. We used Vue.js [36], which is a framework based on JavaScript, along with HTML and CSS to create our web application. All the code was written in Visual Studio Code [37] and we used git to be able to implement simultaneously. A package called Element UI [38] was used to simplify some parts of the design implementation such as radio buttons, checkboxes and tables. This also created a nice layout on the web site since they all got the same appearance. Most of our initial ideas and design decision from the Lo-Fi prototypes were reused during the creation of the Hi-Fi. However, further improvements and alteration were implemented in the Hi-Fi prototyping phase.

7.1 Prototype

The Hi-Fi prototype, just like the second Lo-Fi, used drag and drop to create rules. All the different options, such as date, route and discount, were placed in a horizontal menu at the top of the page. The product was also placed in this menu in comparison to our Lo-Fi where it was placed directly in the workspace. The new design implied all options to be managed the same way, dragged from the upper menu bar to a desired spot in the rule hierarchy. The design aimed to be more clean and uniform, which is a good criterion for people from cultures with high UA. It also brought more flexibility to the rule and allowed the user to build even more advanced rule structures with multiple products.

An option can be dragged down to the visible gray box in the workspace which is used to guide the user initially, see figure 7.1. The corresponding option menu will be shown by clicking on the option when it is placed in the workspace. More space and different backgrounds where added to the top menu and the workspace in comparison to the Lo-Fi prototype. These improvements were implemented to make it clear that they were two different components in the user interface.

Multiple options can be placed in the same gray box to create a single lined rule, which is illustrated in figure 7.2. However, if the user wants to create different paths for the rule they have to place the option below the origin box. We decided to only implement two different paths for each box, which means that each parent box can only have two children. This demarcation was made due to time limitations but also because creating multiple paths can become very complex. An example of a rule with multiple paths can be seen in figure 7.3.

The title input, save and cancel buttons as well as the toggle to activate or inactivate a rule is placed in the same position as in the Lo-Fi prototype. Each option menu is also similar to the ones in the Lo-Fi prototype, but modified based on the received feedback.

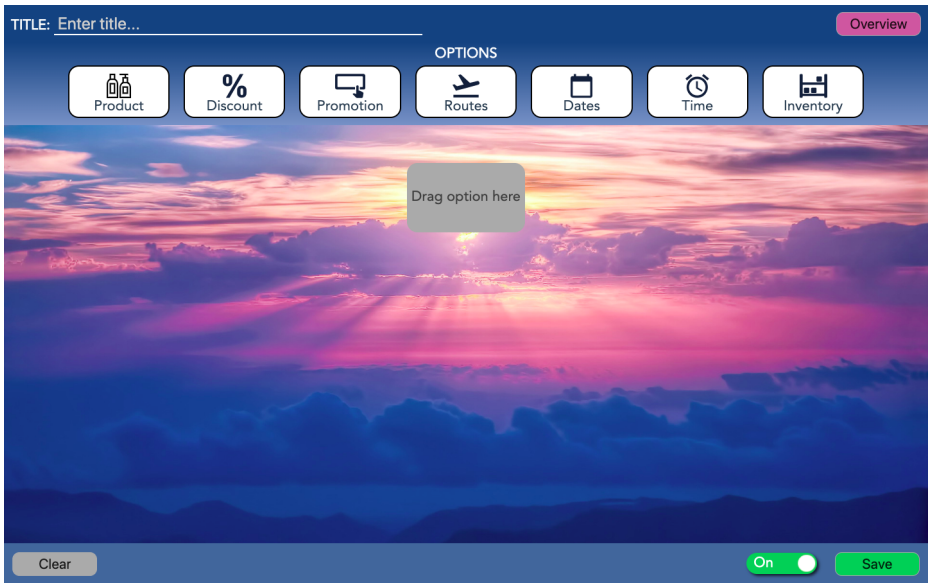

Figure 7.1: User interface when no options have been selected.

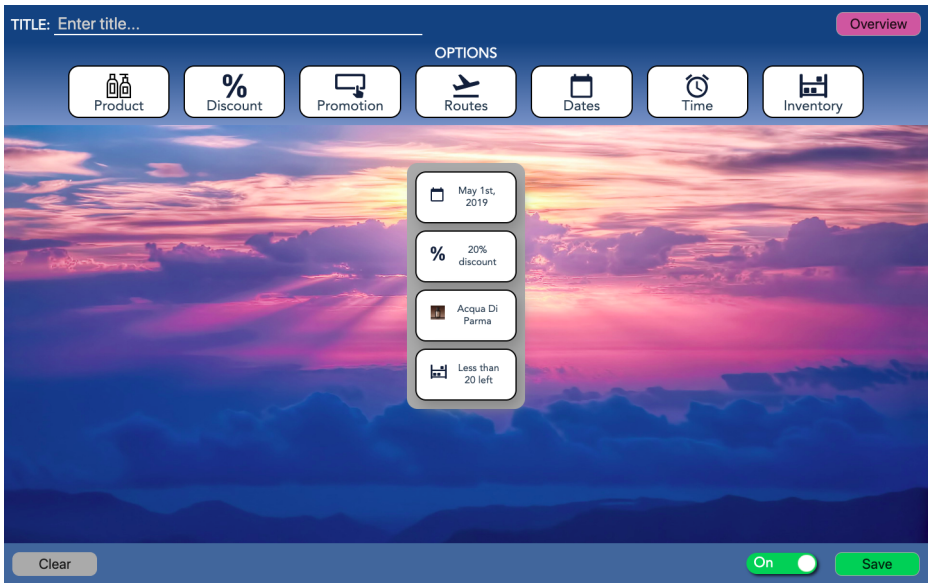

Figure 7.2: User interface when a single lined rule has been created.

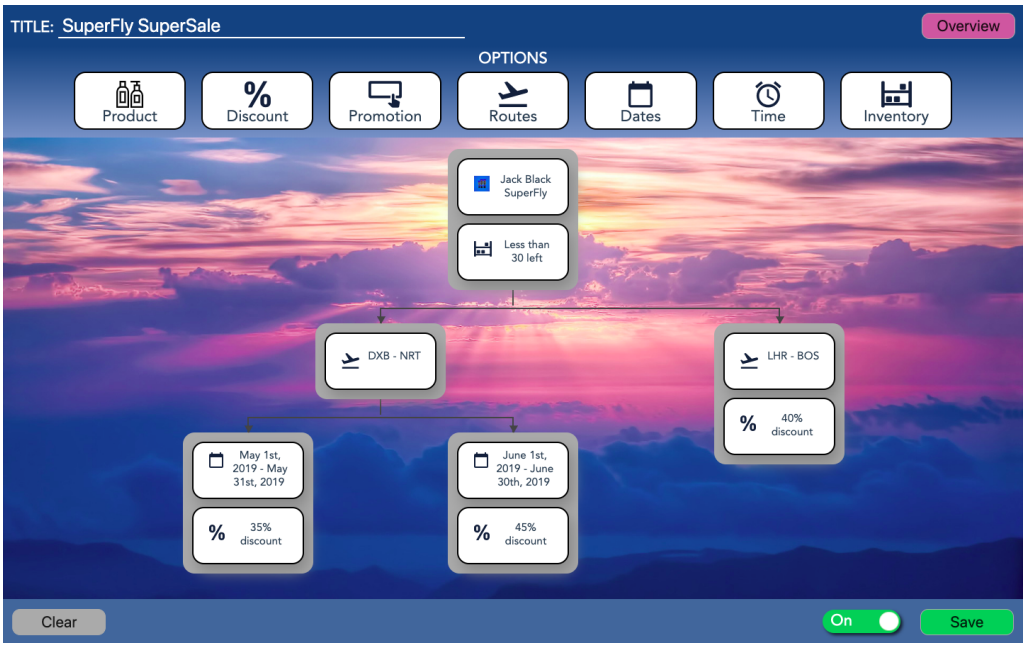

Figure 7.3: User interface when a rule with multiple paths has been created.

7.1.1 Improvements

Our second Lo-Fi prototype did not contain any functionality for removing options from the rule, since we wanted the test users to express how they wanted this function to be preformed. The selected method was based on how users remove chats from a commonly used chat application. When dragging an option, a trash can will appear at the centered bottom of the site, where options can be placed in order to be removed, see figure 7.4. Once an option is placed right in front of the trash can it will appear with a red background in order to clarify that it will be removed upon drop.

An appreciated feature from our first Lo-Fi prototype, which was missing in our second Lo-Fi prototype, was a rule summary. Hence, we decided to combine our two Lo-Fi prototypes and reuse the summary from our first prototype and place it on the right hand side of every option menu. The summary includes all options from the workspace hierarchy that is valid in the current open option menu. An option is valid if it is placed within the same gray box or placed above and vertically connected. An example of a sidebar based on the example in figure 7.3 is illustrated with a discount menu in figure 7.5. It shows under which criteria the 35% discount is valid.

Figure 7.4: Trash can and faded boxes are visible when option is dragged.

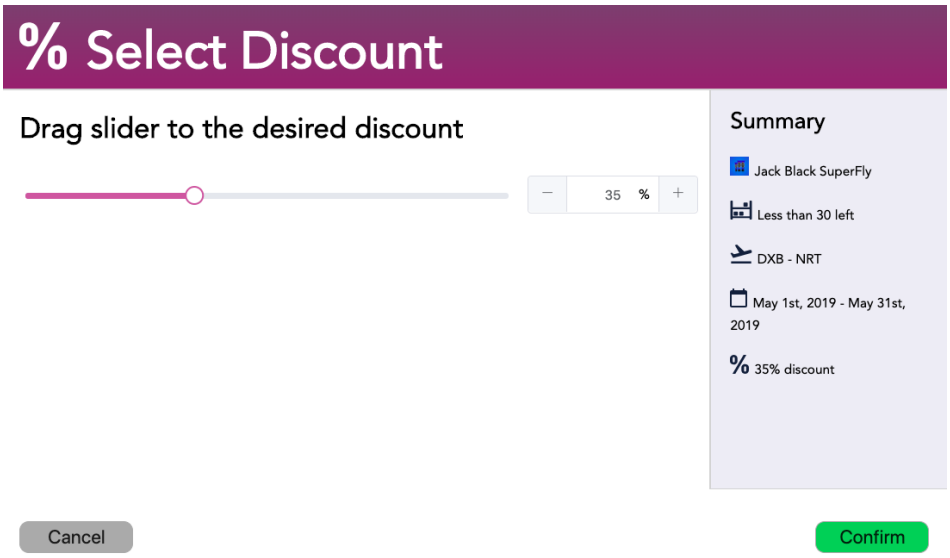

Figure 7.5: Discount menu and sidebar with rule summary.

Besides the sidebar in the option menus, we implemented an overview feature. The purpose was to include a written summary of all the rule requirements as a complement to the workspace's graphical approach. By pressing the overview button at the upper right corner, a window will appear with the rule information. Figure 7.6 illustrates the overview created for test case 3 written in section 7.2.

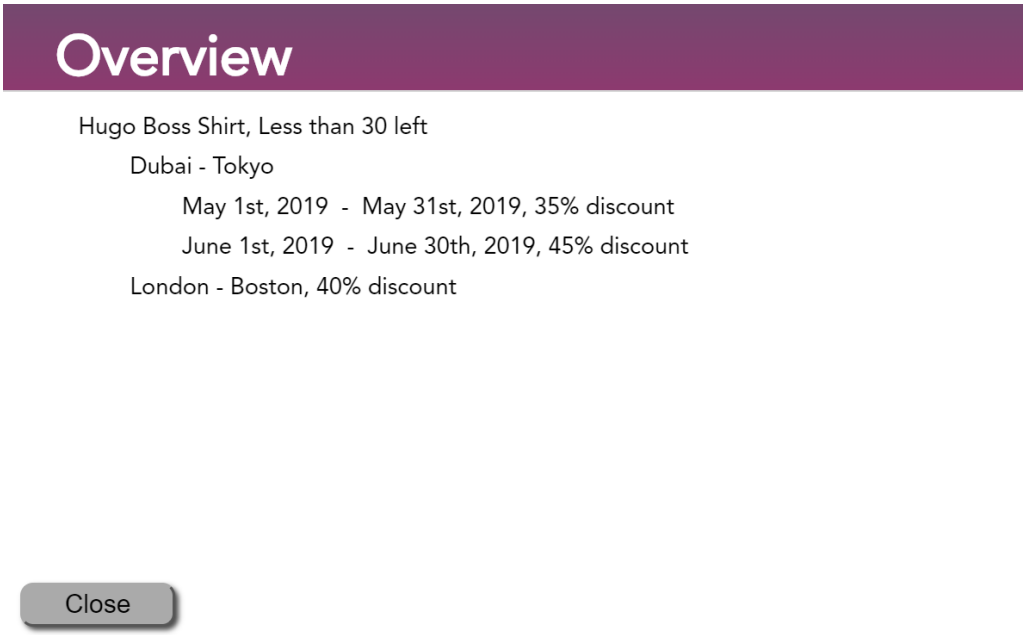

Figure 7.6: Overview created for test case 3

During the test sessions of our second Lo-Fi prototype were the participants able to place the options anywhere at the screen, without any restrictions. This implicated both freedom and uncertainty. Since many users were unsure of how the options related to each other, the Hi-Fi prototype was improved with gray boxes. These boxes enclosed all options that were placed at the same level in the workspace hierarchy. The order within a gray box did not matter, since they were all valid simultaneously. Once an option was placed in the gray box, the box would expand to fit the new option. The purpose was to easily identify which options that belonged together.

Arrows were added to the prototype in order to easily identify the relations between different options and to get a better understanding of the rule hierarchy. The arrows displayed the relation between a gray parent box and its two child boxes.

Gray faded boxes would appear while dragging an option from the menu bar or from

another gray box, this is illustrated in figure 7.4. These faded boxes were meant to help the users understand that options not only could be placed as a single lined rule, but also as a parallel path by placing them in a gray faded child box.

7.1.2 Colors and Fonts

All buttons mainly had two different colors, either green or gray. The green buttons had a positive effect such as saving or confirming an action, while the gray buttons would cancel or clear. Special features had a purple color such as the overview button in the upper right corner.

It was important that text in the user interface was readable, hence had a clear contrast to its background. This was something we had in mind while selecting colors to text and other elements in our prototype.

7.1.3 Limitations

A limitation we agreed upon was to only focus on the rule building part and thereby not include the homepage from the Lo-Fi prototype where all created rules were listed. This simplified the development, since we did not need any functionality for searching and filtering among saved rules.

We also decided to exclude the error handling, due to the too complex rule structure that could be built. Our vision was to both show the path where an error occurred and what kind of error it was. Since we did not have any backend would the development of this feature be too complicated to develop and we decided to aim for a good rule building environment instead.

Since rules would not be saved and listed upon pressing the *Save* button, we also decided to remove the *Close* button since there was no homepage to return to. The button was replaced with a *Clear* button, which would empty all rule options and allow the user to start over.

7.2 Testing

Eight people with different age, gender and occupation tried our Hi-Fi prototype. Three of them were women and five were men. The age range was 23-35 years and the majority had a technical background. The tests were exploratory and made in Sweden to get a comprehension if there were any major difficulties in the prototype which had to be altered before proceeding with the tests in Japan, the Middle East and the United States. We decided to make the cases less strict and gave the users all information to create a rule in one paragraph. This, to analyze how the users structured a rule and if they found all necessary features.

One feature that was implemented in the middle of the testing sessions was a label with the word *or*. This was placed under the horizontal line between two child boxes in order to clarify that an option could be placed in either of the two child boxes. It should

not be placed in both of them, instead it should be placed in the parent box to avoid duplicated values. Four of the users tried the prototype without the word *or* between the two child boxes and four of them tried it when the word was visible.

Neither of the test users had tried our Lo-Fi prototype previously, so they were all new to the system. Each of the test users got a short scenario text before they started the test cases. The scenario text would help them understand what the test was about since they were all new to the system as well as the content of our thesis. Again, the users were asked to think-aloud when they preformed the test cases.

Scenario

You are working in an office for an airline company and you want to add advertising onboard the airplanes. The advertisement will be shown on the displays that are positioned on every seat on the plane (the in-flight entertainment systems). You will create the rules that decides when different advertisement should be showing on the screen. These rules will be predefined by you and then shown on the airplane.

Your job is to create some of these rules that will be used on the planes. Examples of how a rule can be built to create more dynamic advertising are:

- A product will have a 20% discount between London and Amsterdam when there is only 2 hours left of the flight.
- On Valentine's Day there will be a 10% discount on chocolate and a 5% discount on flowers for all trips to Paris.

You are sitting at your desk and have pressed the "create new rule" button to start building a new rule. The instructions to create the rule will be shown when you press next and you will complete three different test cases.

Case 1A

Build a rule that fulfills the following instruction: On the first of May there will be a 20% discount for the product "Acqua Di Parma" when there is less than 20 items left onboard. The rule should be activated and named "Acqua Di Sale".

Case 1B

You received new information from your boss that the rule you just created should no longer be valid on the first of May, instead the date should be from the 5th of June to the 7th of June.

Case 1C

Save the rule you just created.

Case 2A

Build a new rule that fulfills the following instruction: On routes from San Francisco to Amsterdam as well as Tokyo to Abu Dhabi all beauty products will have a 33% discount when there is 3 hours left to the destination.

Case 2B

You received new information from your boss that the rule should valid without any time limitation. Please adjust the rule so the option with 3 hours left to destination no longer applies.

Case 2C

The newly created rule should be named "Big Beauty discount". Make sure the rule is inactivated, since you are not sure during which dates this discount should apply. Then save the rule to finish the task.

Case 3A

Build a new rule that fulfills the following instruction: The airline wants to put a sale on Jack Black SuperFly. However, it should only be valid when there is less than 30 items left onboard.

Case 3B

The product should have different discounts based on certain routes. So it should have a 30% discount between Dubai and Tokyo and a 40% between London and Boston.

Case 3C

After a few days the airline reaches out to you that they would like to add some changes to the advertisement between Dubai and Tokyo. It should furthermore have a 35% discount all days in May and 45% discount in June.

Case 3D

Name the new rule to "SuperFly SuperSale". Make sure the rule is activated and save the rule to complete the task.

7.3 Results from User Testing

Once again we got valuable feedback from the users during the tests. Most of the option menus got positive feedback and were intuitive to use and understand. The major problematic was creating the rule in the workspace, i.e. how to drag them and where to place them. Some of the formulations in the test cases were also rewritten in order to avoid misunderstandings and test the interface instead of the user's problem solving ability.

Option Menus

In the time menu did the alternative "time to destination" create some confusion among the test users. A few users found it unclear that the alternative was equivalent to the number of hours that was left to the flight's destination. In the date menu did one user experience that the dates, which were listed on the right hand side were very tightly positioned. This made initial changes in the list harder to discover.

We also got feedback for the displaying values for routes. When a user had selected a route the three-letter code for the corresponding airport was shown in the workspace. However, it was sometimes unclear which city the three-letter code represented. Another thing that was a bit complicated was the name of the products. One of them was named "Jack Black SuperFly" which caused some confusion, whether it was a product or if we meant something else.

Promotion was the menu options that created the biggest confusion among the test users, even tough we did not even include the option in any of our test cases. Many users thought that the whole rule was a promotion, since the rule somehow promoted a product, and thereby had to include the promotion option.

Trash Can and Activation Toggle

Most of the test users had problem finding the trash can since it only became visible when an option was dragged. Instead, they clicked on the option that they wanted to remove and examined in that option menu if they found any remove button. They also tried to unselect the alternative by clicking the selected radio button. After neither of that worked they tried to drag the option back to the horizontal menu at the top, which then made them notice the trash can that appeared.

Another thing that some of the users found difficult was to inactivate a rule. They tried to find the action in the different option menus, specially in the date menu since the dates determined when a rule should be valid. Some of the users found the toggle, but did not really know what it meant, but switched it off anyway.

Drag and Drop

Overall the users found the drag and drop approach very handy and easy to use when it came to building conditional rules. Some users did not immediately drag the option,

rather clicked on the option in the menu bar. They quickly realized that nothing happened and then noticed the text *Drag option here* which made them drag the options instead. The uncertainty about the interaction behavior was exclusively in the beginning of the test session. One user thought the drag and drop approach would have benefit more if the test cases were performed on a touch screen instead of a computer screen with a mouse or touch pad. The drag and drop technique might feel more natural when using fingers. One user expressed that the creativity was increased along with the curiosity to explore different opportunities with drag and drop. The *or* label was used in half of the tests to clarify how to place the options correctly, but the test user claimed that it caused more confusion than assistance.

8 Second Hi-Fi Prototyping Phase

The Hi-Fi prototype was further improved based on the feedback we got from the first Hi-Fi prototyping phase. The basic structure of the prototype was very similar to the previous prototype, but small changes were made to facilitate for the users. The improved Hi-Fi prototype was then tested on users from Europe, Japan, the Middle East and the United States.

8.1 Prototype

All of the feedback mentioned in the result section from the previous phase was improved in the Hi-Fi. The displayed value for the route options was changed so that the cities were displayed in the option instead of the three-letter airport code, which can be seen in figure 8.3. This change was made since some of the test users found it hard to remember which three-letter code that represented which city. The space was also adjusted in the list of selected dates to prevent that they were placed too tight. One alternative in the time menu was changed to *Time left to destination* to prevent confusion. The products were also exchanged to products that people where more familiar with such as Toblerone chocolate and Ben & Jerry's. We removed the promotion option completely from the top menu bar since it created unnecessary confusion and was never used in any if our test cases.

Figure 8.1 shows that the trash can is visible all the time to make it easier for the users to find it. It was placed in the left corner just above the *Clear* button since they both have similar actions. The clarification text next to the toggle button in the lower right corner is also illustrated in figure 8.1. The text *Active status* would hopefully make it easier for the users to understand how to change the status of a rule.

To reduce the recurrent moment of confusion regarding placement of new options, we added plus signs at the bottom of every gray box that contained one or multiple options. The purpose of the plus icon was to indicate that new options could be placed in the same box as already specified options. The same plus icon was also placed in the faded boxes below the gray boxes, to indicate that new options could be placed in a child box as well. By using the same icon in both cases we hoped to clarify where a dragged option could be placed.

How to begin building a rule was another obstacle that most of the users found troublesome. The text *Drag option here*, which was placed in the gray box on the workspace, was not enough guidance that the drag and drop technique should be used. Therefore, the mouse cursor got different layout depending on where it was hovered in order to encourage right interaction behaviour. This can be seen in figure 8.2 where the cursor is changed to the icon that is association with drag and drop. While in figure 8.3 the cursor is a hand which often is associated to a clickable item. The border around the box was also changed to purple with a slight shadow to make it look even more clickable.

Figure 8.1: Hi-Fi prototype with static trash can in the lower left corner and active status label in the footer next to the toggle button for rule activation.

Figure 8.2: Draggable options have move cursor.

Figure 8.3: Clickable options have pointer cursor and colored border and shadow.

8.2 Testing

The testing in this phase was achieved online using the service trymyUI. By using this service we got access to a recording of the participant's screen as well as sound. Twelve different users tried the prototype where three were from Europe, three from Japan, three from the Middle East and three from the United States. They all had different occupation, age and gender and they were asked to read and think-aloud at the beginning of the test. Table 8.1 gives an overview of the participants' country, gender, age and education. Each participant is mapped to a number between one and twelve. After they finished all the tasks they answered four questions about the prototype as well as a SUS questionnaire.

Table 8.1: Overview of the twelve participants' gender, age, education and country.

Participant ID	**Country**	**Gender**	**Age**	**Education**
#1	Europe	Male	54	High school / Secondary school
#2	Europe	Male	29	College / University
#3	Europe	Male	25	College / University
#4	Japan	Female	37	Graduate school
#5	Japan	Male	21	College / University
#6	Japan	Male	19	High school / Secondary school
#7	Middle East	Female	30	College / University
#8	Middle East	Male	34	College / University
#9	Middle East	Female	31	College / University
#10	United States	Male	50	High school / Secondary school
#11	United States	Male	37	College / University
#12	United States	Male	30	College / University

The test cases were the same as the once mentioned in the previous phase with small corrections on some of the formulations in order to prevent confusion. The products in case 1 and 2 were changed to *Ben & Jerry's* and *Hugo Boss shirt*, and the corresponding title names were changed to something that matched the product. In the previous test session, some of the participants got confused in case 3A where it stood *the airline wants to put a sale on the product*. They got confused what sale meant and how much discount that implied, so we changed it to *The airline wants to advertise the product*. Another problem occurred in case 3C where the user was asked to change the discount for a route based on different dates. In the sentence *It should furthermore have a 35% discount*, did the word *furthermore* confuse the users. They thought that they should add the new discount to the old one instead of replacing it. Therefore, we changed the word *furthermore* to *instead* to make it clearer that the discount should be replaced.

8.3 Results from User Testing

The result from the global testing was stored and saved as videos to our account on trymyUI's website along with general information about the test user's background. We watched all the recordings and wrote down relevant information about their performance behaviour. The test results were evaluated based on both qualitative and quantitative data as well as the user's preferences and performance. This, in order to get a wide picture of the user experience of our prototype.

8.3.1 Performance

For each of the test users, we measured their quantitative performance by examining how many errors they did during the different cases as well as the task success. The errors that occurred could be of different severity, some led to an incomplete rule structure while others were minor mistakes. The error rate and task success for each test user is presented in table 8.2 and 8.3. The error rate is illustrated with two numbers, or a zero, for each test case. The first number is minor mistakes and the second number is fatal errors, in the table it is written as *minor/fatal*. An example of when many minor errors occurred were in task 2B, where the user was asked to remove an option. Many of the participants tried different approaches to remove it, but in the end they all managed to complete the task. Therefore, none of them are measured as fatal errors. A fatal error is instead if a test user structured the rule incorrectly, failed to fill in a value for an option correctly or just dragged the options into the workspace without entering any values afterwards. This would lead to a user failing that task.

There are three different degrees of the task success. It will be green if a rule is correctly created, red if they failed to enter a value or if they structured the rule incorrectly and yellow if a rule is correctly created but not optimized. Case 2 is an example of when most participants passed the case with a remark, hence got a yellow marking in table 8.3. They created two different route options instead of entering both of the routes in the same option. The rule was still correctly made and would work, however, it was not optimized and the user had preformed unnecessary steps.

We also gathered data from the user's qualitative performance by watching the videos of when they preformed the different tasks. The general thoughts expressed during the test session was positive regarding the interface. The users experienced the interface as easy to interact with and appreciated the ability to complete a task in multiple ways. As an example was the user able to select a desired discount by either dragging the slider, pressing plus and minus buttons or manually typing the value into a text field. Besides this, most of the spontaneous comments regarded their uncertainty whether they were doing the task right or wrong.

An improvement from previous iteration was to add a plus icon at both faded and gray boxes. However, the impact of this addition is difficult to measure, but among all test users did only one person misunderstood its meaning and tried to click on the icon. The test user quickly understood that nothing was happening and figured out how to

Table 8.2: Error rate. The amount of errors are written on the format X/Y, where X corresponds to minor mistakes and Y to fatal errors that caused the user to fail the task. The error rate is measured for each participant and for each subtask of a case. The total amount of errors for a subtask is written in the right column. Each participant ID is mapped to a person from table 8.1.

Participant ID / **Task**		Europe			Japan			Middle East			United States			**Total**
		#1	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**	**Errors**
Case 1	Error rate 1A	2/1	1/0	0	1/0	3/2	1/0	0/2	0	0/1	0	0	0	7/6
	Error rate 1B	0/1	0	0	0	0	0	0	0	0	0	0	0	0/1
	Error rate 1C	0	0	0	0	0	0	0	0	0	0	0	0	0
Case 2	Error rate 2A	1/0	0	0	0	0	0	0/1	0	0	0	0	1/0	2/1
	Error rate 2B	4/0	1/0	0	1/0	3/0	1/0	3/0	4/0	0	1/0	0	1/0	19/0
	Error rate 2C	0	0	0	0	0	0	0	0	0	0	0	0	0
Case 3	Error rate 3A	0	0	0	0	1/0	0	0	0	1/0	0	0	1/0	3/0
	Error rate 3B	0/1	0	0	0	0	0	0	0/1	0	0	0/1	0/1	0/4
	Error rate 3C	1/2	0	0	0	0	0	0	1/0	0	0	0/1	0/1	2/4
	Error rate 3D	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 8.3: Task success. The table visualizes whether a case has been successfully completed by a participant. A case can be completed successfully with minor mistakes. A successfully built rule, which is not optimized counts as a pass. Each participant ID is mapped to a person from table 8.1.

	Europe			Japan			Middle East			United States		
Participant ID	**#1**	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**	**#11**	**#12**
Case 1												
Case 2												
Case 3												

success pass fail

continue with the task correctly.

The menu for selecting products had two large tables for selecting categories and collections and a smaller search field for selecting a single product. Two users selected a collection named "FF Ice Cream Giveaway" instead of "Ben & Jerry's" as told in the case description. One test user detected the mistake and corrected it, while the other continued the task with wrong product selection.

Two of the test users did not understand that the options were clickable from the start. Hence, these users were unable to specify any options rather dragging them into the workspace area. One of them also struggled with a too zoomed screen which implied that major functionality as confirming an option choice was not visible and could not be completed. This test user deviate from the majority due to the technical issues and had big problems to complete the first few task. The user adjusted the screen size during the second case, which ease the understanding of the interface and the user managed to

complete the final case with multiple paths without any problems.

The second case contained a task where the users were suppose to remove one of the options from the rule. Only three of the test users dragged the option to the trash can placed in the lower left corner as their first immediate action. Five users clicked on the option, but quickly realized that there was no way to remove the option from this view, closed the option menu and dragged it to the trash can. The last four users struggled a little bit more before they found the correct way to remove the option. Some of these users tried to unclick the radio button, change selected alternative's value to zero or negative and drag the option back to the top menu. Eventually did all users succeed to find the trash can and remove the option.

Two of the users experienced some confusion regarding the selection of routes. The route menu contained a table listing all routes and two fields where the user could enter departure and destination in order to filter the list. These input fields can be seen in figure 8.4. The two users completed the task successfully, but thought it was unclear whether the fields for the route's departure and destination had to be filled in.

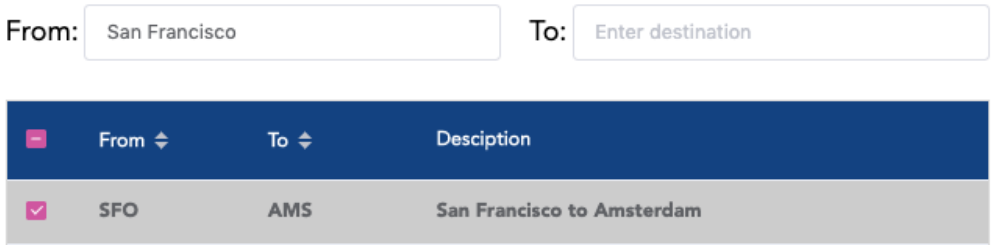

Figure 8.4: Input fields to enter departure and destination.

The most serious errors were when users built the rule with the wrong structure, that is misplacing the options in the rule hierarchy. This error can be divided into three different categories: misunderstanding of multiple paths, misunderstanding of arrows and lack of optimization. The first error occurred to one test user from Europe and two test users from the United States. They simply failed the third case with multiple paths by putting all options in the same gray box, thinking the order mattered. The second error was made by one test user from Japan and one test user from the Middle East. They misunderstood the faded boxes below the gray origin box and built simple rules by placing options in different paths. An interesting fact is that they both managed to solve the last case with multiple paths, meaning they probably understood the concept eventually. The last error regarding lack of optimization was made by one user from Europe, one user from Japan and two users from the Middle East. These mistakes did not result in any logical errors in the rule. However, it could have been optimized by placing the options differently to avoid duplicated values and using fewer options.

A few test users forgot to add some options to their cases, which meant that the

advertisement was missing a date or a product. Our conclusion was that it was mainly due to long test cases with a lot of information and lack of accuracy from the test users. Another mistake was that two test users mistook the product name to be the rule title. The reason for this was the case formulation and did not require any changes in the user interface.

8.3.2 Preference

We used SUS in order to measure the test user's quantitative preferences on our prototype. The questionnaire is built upon ten questions where the user is asked to rate their answers on a range between *Strongly Agree* and *Strongly disagree*. The result can be seen in table 8.5. The United States gave our prototype a top score closely followed by Japan. The region that gave us the lowest score was the Middle East, however, the average SUS score became 87.9. A SUS score below 60 percent is considered to be a relatively poor result while a score over 80 percent is considered to be pretty good [39]. This means that we got a relatively good score on our prototype. Another measurement that evaluates the prototype is the average task completion, which measures the user's ability to successfully complete a given task. Our prototype got a score of 80%, based on the data from table 8.3 which also is rated as a good value [39].

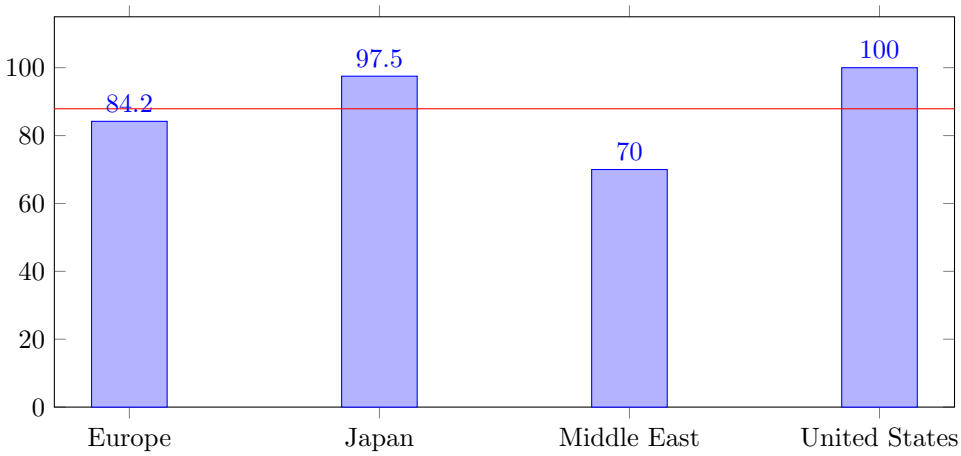

Figure 8.5: SUS score grouped by region. The red line corresponds to total average SUS score based on all twelve participants, which is 87.9

Beside from SUS, the participants also answered four questions after the test cases. These questions gave us data about the test user's qualitative preferences. A summary of the test user's answers were created for all four questions and full answers can be found in appendix B.

1. How did you feel about the drag and drop approach?
The answers were very unanimous for all of the regions. They thought that the drag and drop technique was easy, simple and intuitive to use. They also mentioned that it was convenient, interactive and that it made the process feel a lot more customized. They thought that drag and drop was very straight forward and user friendly at the same time. One user specifically expressed that drag and drop made the process feel a lot more understandable.

2. How did you feel about creating different paths (I.e. when different dates had different discounts)? Was it easy or complicated and how did you figure out how to do?

Europe: Two of the participants from Europe manged to create multiple paths. They saw that they could group multiple conditions together and one of them thought it was super easy and very intuitive. The last participants did not manage to create multiple paths and thought it was difficult since the faded boxes were difficult to notice.

Japan: Everyone in Japan manged to create multiple paths correctly. They did, on the other hand, have some problems creating a single lined rule. One user thought that creating different paths was very simple and that minimal training would be required. Another one thought that it was easy because when an option was being dragged there were two visible gray areas that showed where you could put a path. The third one thought that it was complicated in the beginning but after exploring it for a couple of minutes the user understood how to use the website. The user also thought that the overview button was really helpful when changing the path.

Middle East: Everyone in the Middle East also manged to create multiple paths correctly. Two of them thought that it was very easy because whenever an option was dragged the scheme would appear and the option could easily be dragged and dropped. The third one thought that it was quite complicated in the beginning but later figured out a way to do it correctly.

United States: One person managed to complete all three tasks without any problems. So this user thought that it was intuitively easy to create multiple paths since it was just to drag an item below another item to create a new branch. However, the other two did not manage to create multiple paths correctly so they thought that this was difficult. They were unsure if they were doing it correctly since the prototype did not give them any feedback.

3. What did you think the arrows meant and did you think the order inside a gray box mattered?

Europe: The two users who managed to create multiple paths did not think the order inside a gray box mattered. One stated that it was just all the things related to one advertisement, so it did not matter in which order the options were placed. They thought that the arrows represented the next step and different conditions on the advertisement. The last participant thought that the order inside a gray box mattered. The user did not see the faded boxes below and therefore placed all options in the same gray box. The user had no comment on the arrows since they were never visible to the person.

Japan: They thought that the arrows were a great way to show a category or subcategory. Neither one of them thought that the order inside a gray box mattered.

Middle East: One said that the arrows showed the next following information that reflected the previous information. Another one stated that the arrows meant different routes, that is, the different paths the rule could take. The third one did not know what the arrows meant and none of the users mentioned anything about the order inside the gray box.

United States: The user who managed to complete all the tasks guessed that the order inside a gray box did not matter and the arrows linked those gray boxes together. The other two, on the other hand, thought that the order inside a gray box mattered and that the rule read the conditions from top to bottom. Therefore they placed each discount below the corresponding route. They did not understand what the arrows meant since they never saw them.

4. Do you have any other comments?
The general comments where overall positive. They liked the prototype and the fact that it used drag and drop. Three of the participants said that they thought that anyone could learn how to use the system and create complex rules after a short tutorial. One participant missed filling in the title on the first task because the user wanted a "Name Box" to appear when the *Save* button was pressed. So the user wanted to make that somehow catch your attention more.

The major difficulties and confusions were to structure the rule correctly and the order inside a gray box. Some of them wanted the prototype to give distinctive information if the order inside a gray box mattered since it was confusing to organize them. Another one wanted to have a button that checked if the rules they just created made any sense. One also suggested a zoom in and out function if the rule became too complex or a chatbot which could help in case of an emergency.

9 Final Hi-Fi Prototyping Phase

Once again the Hi-Fi prototype was improved based on the feedback from the previous phase. However, this final prototype was not tested since we felt that we gathered enough information to draw a conclusion regarding our three main questions. The feedback we received was valuable and useful, however, nothing major had to be changed in the implementation and some of the wanted improvements required a backend to work correctly. Therefore, we concluded that another testing round would not result in much new feedback.

Option Menus

Some of the test users had problems understanding the input fields in the route menu. They thought that the route had to be written in both fields as well as selected in the table. To clarify that the input fields were search engines, the placeholders were rephrased to *Search departure* and *Search destination*, which can be seen in figure 9.1.

There was also some confusion in the date menu. Some of the participants failed to select a single date since it had to be double clicked. They also tried to select an interval twice since the highlighting disappeared from the calendar and the selected dates were instead presented in the list next to the calendar. From the beginning of the Hi-Fi development we wanted the selected dates to stay highlighted in the calendar, since it would make it more distinct that they been chosen. However, we never got that to work technically.

There was also some struggles in the product menu when the participants had to find a single product. Instead of choosing a single product they selected a collection that resembled the wanted product. This misunderstanding could be because the collection and category tables were bigger which made it easier to miss the input field for single products. This issue could be solved by giving single products its own table with an associated search feature. Another alternative could be to create one big table divided in single products, collections and categories. Which would make it possible to search for all three of the alternatives. However, we did not know which of the three alternatives, single products, collections and categories, that would be used the most by the airlines. Therefore, we decided to keep the design as it was. Although if it turns out that an airline never advertise a single product, only collections of products, then that alternative could easily be removed.

The case where most test users struggled were when they were asked to remove a specified option from the rule. The vast majority of the users clicked on the option, in hope of finding a remove button. Even though all of them eventually found the trash can and dragged the option there, we could ease the process by redundant functionality, just like we have done with multiple other features. Hence, an option could be removed both by the drag and drop alternative implemented in the prototype and by pressing a remove button in the option menu. Figure 9.1 illustrate how a remove button could be

placed in an option menu. The color red would be chosen since it is most associated with a dangerous action, such as removing an option. It might also be necessary to implement an alert that asks the user to confirm the action. This, to prevent the user from accidentally removing an option instead of closing the menu.

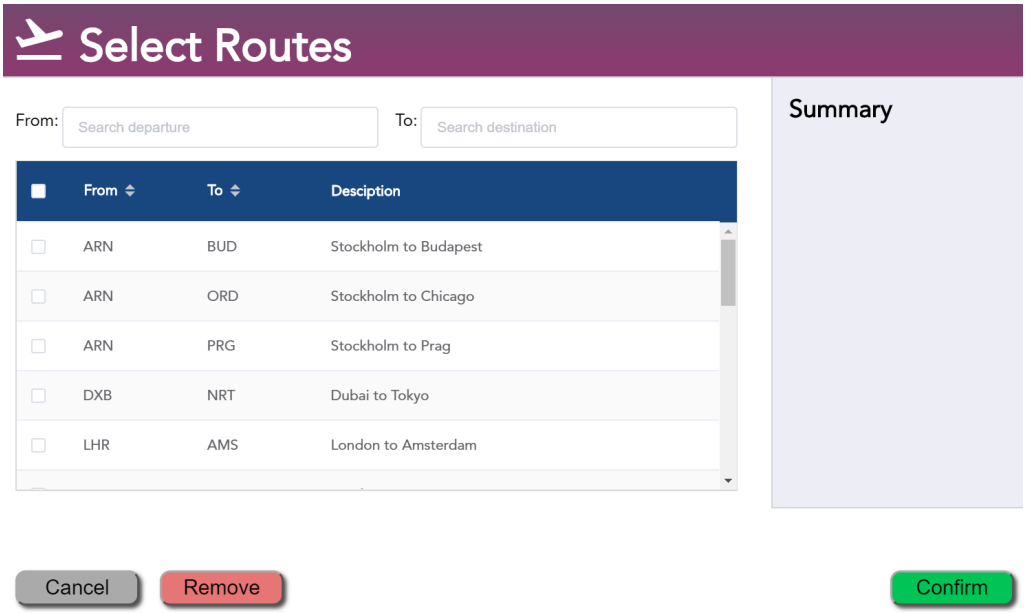

Figure 9.1: Remove button in the lower left corner inside an option menu and new placeholders for the search fields.

Faded Boxes

Most of the fatal errors had to do with incorrect structure of the rule. The rule often got wrongly created when the user had to add multiple paths. In some of the cases they entered all the options in the same gray box. The reason for this could be that the faded boxes beneath the gray box was too transparent and difficult to notice. The faded boxes only became visible once a user started to drag an option. The user might notice them if they were less transparent and thereby placing an option in them. Another thing that might facilitate for the user would be if the arrows also became visible when an option was dragged. This could make it more distinct how the rule could be structured, but also draw more attention to the faded boxes.

Error Handling

The feedback we received expressed the uncertainty the users felt when organizing and placing the options in the workspace. It was a conscious decision to exclude the error handling, due to the scope of our project, but would definitely be something that could improve the user experience. By placing an error message in the center of the footer, the user would be notified that the rule contained logical errors. This could then be clarified by giving the gray boxes, that contained an error, a red border and a tooltip which explained the issue. An example of an error would be if a gray box contained two discount options. Hence the gray box would get a red border and a tooltip which typed *Box should not contain duplicate discounts*, which is illustrated in figure 9.2. Another error could be that a path missed a mandatory option, such as a product. Hence, all gray boxes in that path would be displayed with a red border and the tooltip should type *Path is missing a product option.*

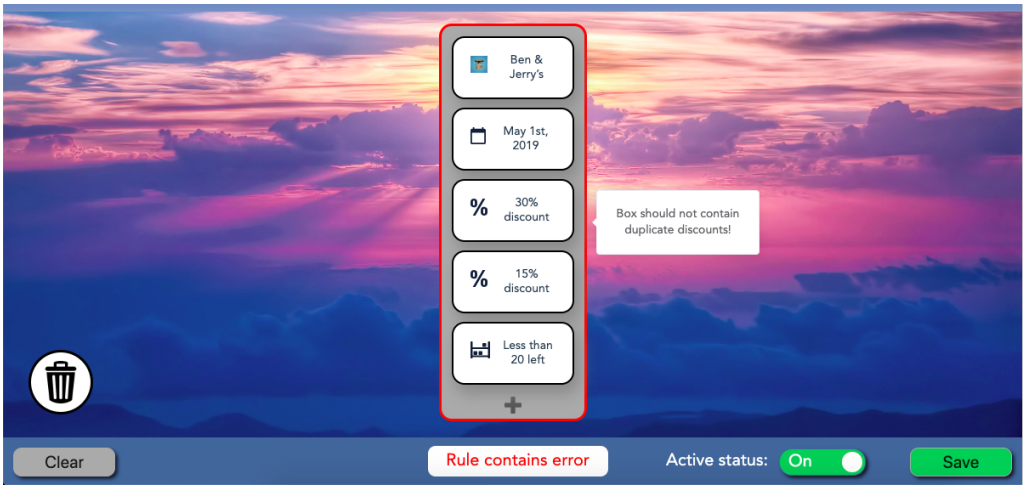

Figure 9.2: Error handling with red border, general and specific error message.

Overview

A final adjustment was to improve the overview to ease the users' understanding of the rule hierarchy. This was done by exchanging the previous overview format, which used indents for new paths, with a description which clearer described the options relationship between each other. Hence same option could be mentioned several times, if it exists in multiple paths. Different fillers, such as *will have* and *for routes between*, were written

in the overview to facilitate for the user, but also to make it more legible and coherent. Figure 9.3 illustrate the overview for test case 3 with fillers and repetitions, in comparison to figure 7.6.

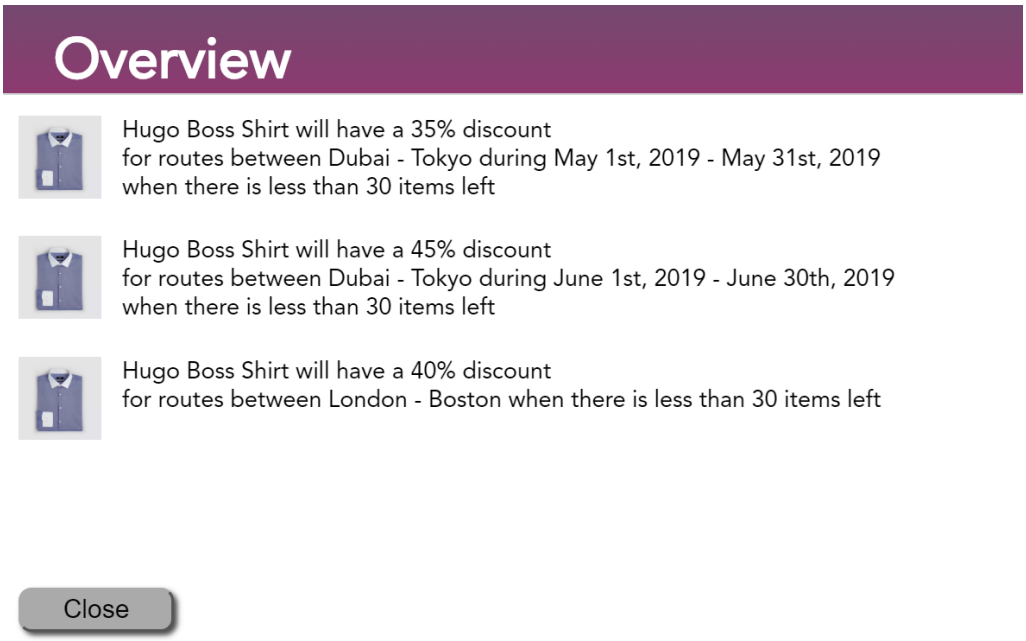

Figure 9.3: Improved overview with fillers and repetition.

10 Discussion

The opinions from the test users, for all of the phases, were overall positive. They liked the concept of drag and drop to create different rules, which was introduced in the second Lo-Fi prototype. There were no clear indication that the rule building tool was more difficult for a specific region. Some of the test users did not manage to structure a rule correctly, however, these users were from different regions. Also, the comments we received were generally the same for all of the regions. Therefore our conclusion is that it is possible to create a cross-cultural rule building tool.

Design Process

We felt that we had a good design process during the project, the literal study gave us good knowledge of different cultures. By continue and investigating different rule building tools, we received a better understanding of the tool's purpose and inspiration to our future design. The combination of the literature study and investigation of rule building tools were very valuable when starting to create our cross-cultural prototypes. The best part about our Lo-Fi phase was that we got encouraged to create two prototypes with different approaches. Instead of just improving our first Lo-Fi prototype, we manged to combine them both into one Hi-Fi prototype which we considered had the best prerequisites to work globally.

The people who we tried our prototypes on were not the end users since none of them worked with marketing. However, we do not think this affects the result negatively since most of the participants managed to create and structure the rules correctly. This hopefully means that the end user not will have any problems with the tool since they have more knowledge about marketing and will use the tool on a daily bases. One aspect that might affect the result was that most of the participants that we tried on in Sweden had a technical background, which might not be the case for people who work within marketing.

In most of the test sessions we tried our prototype on people in Sweden which we knew. This might have given incorrect results since the target users origin from different regions around the world. Due to the simplicity of a paper prototype we could not manage to test it globally, even if the results would have been valuable for our development. We wanted to use the service *trymyUI* more in our Hi-Fi phases to get more participants form each of the region. Due to economical aspects, as well as time limitation, we chose to only use the service on 12 people and only one iteration.

General Design Decisions

Our design differs quite a bit compared to the rule building tool we investigated in the beginning of the thesis. We did not have the standard setup with *Triggers* and

Actions, which was frequently used in the investigated tools. Our prototype used the word *Options* instead, to represent different conditions of a rule. This word was chosen since we thought our target users easier could understand and associate to the word *options*. We have avoided programming terms that might confuse users and have chosen a clear design with minimal information presented in the workspace. We created a distinct border between the workspace, top menu bar and footer to facilitate the user's understanding of the layout and functionalities. We have also chosen to use bold text in tables where a lot of selectable alternatives were shown. When an alternative was chosen, it became bold to create a clear distinguish from the other alternatives. The bold text also made it easier for the user to scan the tables.

Besides from these design decisions we also had to take into account the cultural aspects when we created our rule building tool. Some design decisions would facilitate for everyone while others were mainly focused on some of Hofstede's or Hall's classifications. We created a vertical flow in our rule building tool. This, because we felt that more users could associate to a top to bottom system rather than left to right, since not every culture reads from left to right. Another implementation we thought facilitated for many users was the possibility to choose an alternative in more than one way. For example could the alternatives with checkboxes or radio buttons be selected in multiple ways. The user could either press the checkbox/radio button, the text itself or even the row itself where it is blank.

We also tried to have logical buttons such as save and cancel with corresponding color, which often is associated to that action. For example green for save and gray for cancel. The color for the *Overview* button on the other hand was purple to match the color scheme in the prototype since no color is associated to that action.

Three of Hofstede's dimensions were not as applicable to our prototype as the other two, these three where *Power Distance*, *Collectivism vs. Individualism* and *Femininity vs. Masculinity*. We do not conceal information based on individual's PD, neither do we have any religious symbols. Therefore, we have not consider PD when we design our prototypes. However, our prototypes are more applicable to people from low PD cultures since they do not use religious symbols or concealed information. Our prototype does not handle personal data, therefore, is IC not applicable since individualism is mostly about the importance of protecting personal information. IC is also about the way success is visualized through images, which is not relevant for a rule building tool. For MAS we have tried to not create any distinctions on age and gender since our target users vary in both. We have tried to use both blue and purple colors to prevent a too masculine or feminine impression, which would be considered to be a low MAS approach.

Uncertainty Avoidance and Long Term Orientation

Uncertainty Avoidance was however very relevant to our prototype. High UA cultures want to have a simple system with limited amount of choices and clear metaphors. They do not want any hidden content, instead they want to be able to see every action that is

possible to preform in the system. One difficulty we noticed during the first Hi-Fi testing was that the participants had trouble finding the trash can. Therefore we decided to make it visible all the time, which also facilitate for user with high uncertainty avoidance. The faded boxes also became visible when a user dragged an option, to emphasize where the option can be placed. It is challenging to create a prototype that shows all possible actions and still is simple and clean. Therefore, we chose to only make the faded boxes visible on drag instead of all the time, to keep the workspace clean from unnecessary empty boxes. We also tried to clearly mark which type of interactions that were possible in the prototype by changing the mouse cursor. High UA cultures are often afraid of getting lost and want to know if what they are doing is correct. We noticed that many of the test users felt frustrated with the fact that they did not know if the rule they created was correctly structured, since the system did not give them any feedback. Therefore would error messages be essential to facilitate for the users. It might also increase the user's satisfaction since the frustration hopefully would be decreased.

One of our major strategies to favor people from countries with low LTO was to implement redundant features. Hence, our interface had multiple actions that resulted in the same outcome. As an example could a desired discount be made by dragging a slider, pressing plus and minus buttons and manually typing the value into a text field. By using redundant features, the users reached their goal faster since they avoided making mistakes. Another feature we used, that favors low LTO countries, was the search function, which allowed the user to faster find an item that he or she was looking for. Something that could have been made more efficient was to have the option menus appear directly upon drop, since this would reduce the number of clicks. Throughout the test sessions we observed that many users preferred to build the rule structure first and specify the correct criteria afterwards, which would not work out smoothly if the menus appeared directly. Hence, this is something that could be investigated further hereafter. The user interface was overall organized in a flat hierarchy, which means that many possible actions were visible in the first view or only a few clicks away. This does not favor low LTO cultures in general, but was possible due to the few existing options in our prototype. If the site would expand with more possible options, it would have been more beneficial if they somehow were organized. As an example, if the site contained hundreds of options, the options could be grouped into categories and only visible upon clicking the right category.

Time Perception and Context

When it came to time perspective, we tried to ease the working process for people from monochronic cultures. They find it harder to adopt to the parallel thinking, which is practised in polychronic cultures than the reverse. Hence, all actions were made in the same window and no links guided the user to a page outside of the existing window. When an option menus appeared, they were displayed in front of the workspace area in order for the user to easier understand the interface's navigation. Our goal was to

increase the users' understanding of their location and that they would be located back to the workspace once the option menu was closed. This was done by having the workspace visible in the background of an open option menu.

As mentioned in Marcus Liljenberg's thesis in section 1.3, Eastern websites have higher information density than Western websites. Furthermore, Eastern people easier adapt to Western interfaces and designs than the reverse, which can be due to the Western's monochronic cultures. Therefore, we chose to have low information density to facilitate for both cultures. It have been a consciously decision throughout the whole design process to adjust the design in order to make it profitable for the vast majority. Cultures have different ability to adapt depending on different design aspects.

We tried to facilitate for people from both high-context and low-context cultures in our prototype. We sorted all routes, single products, collections and categories in alphabetical order to aid people from low-context cultures. However, the options in the top menu bar were not sorted in alphabetical order, instead we chose to place them in a logical order of how we thought people would like to create a rule. The test users did not have any problems finding the option they were searching for during the tests. Although, this might be because they only had six options to choose from in our prototype. It might become problematic if more options were added in the menu bar. Then it would be easier to scan the menu if the options were sorted in alphabetical order.

The process of creating a rule might also vary between HC and LC, since the first uses non-linear discovery processes while the later mainly focus on rationality and logic. To ease for both of the cultures we decided to not have a fixed position for each option within a gray box. The user could thereby chose their preference for how they wanted to arrange the option. People from LC culture could choose to always place them in the same order while people from HC culture might place them randomly.

Theory vs. Reality

We received a lot of positive feedback regarding our interface design. The vast majority found it easy to use after a simple instruction or after they have been trying it out for a little while. An aspect of high importance was that the users learned how to use the system quite rapidly. The system would be used on an everyday basis since the end users of this product were employees within the airfare marketing, and not costumers. Therefore, it was not essential that they understand the system immediately, rather found it efficient and easy to use regularly after a short introduction period.

The different cultures' behaviour could be explained by a pattern that was discovered during the test sessions. The monochronic cultures had a hard time creating parallel paths, while the polychronic cultures struggled with the single-lined rules. The most common mistake made by participants from Europe and the United States was that all options ended up in the same gray box. They did not take advantage of the faded boxes below, which would create parallel paths. We thought the reason for this devolved upon their monochronic time perspective and difficulty to have a parallel thinking mind.

Simultaneously, the most common mistake for Japan and the Middle East was to use the faded boxes for parallel paths even for creating simple single lined rules. Hence, they used their parallel thinking in a stage were it was not necessary and a more simple strategy would have been successful. These behaviours proved the theory about how different cultures act differently and we thought improved error handling and messages would have helped their understating and reduced the number of mistakes made due to cultural differences.

However, all the result we got from the global testing did not completely match our theory. According to Hofstede's measurements does Japan have high UA and the United States low. However, from our tests it seemed like the United States had high UA since they did not really dare to create multiple paths in the third test case, instead they placed all options in the same gray box as they did in the first two test cases. They were more insecure of themselves and if their performance was right or wrong, while test users from Japan tried many different things and were not afraid of exploring the prototype. We also noticed that almost all of the participants used the search engine, even high LTO cultures. This might mean that the categorization made in the theory is not completely applicable to real life. More than just the cultural aspect could affect a person's behaviour. However, we only had three participants from each region, this was undoubtedly too few to draw a statically correct conclusion. If more people from each region had tried our prototype we might have seen a clearer and more convincing pattern between the different regions.

Another aspect that was very likely to effect the test result was the modern time's globalization. The way we communicate and spread information today differs a lot compared to the way we communicated thirty years ago. The use of common applications for both social media and online purchasing allow us to easier get in touch with different cultures. This have made us become more acclimatized to different cultures and their designs, but also develop global standardizations, which everyone understands. As an example are mobile phones used worldwide and their frequent use of drag and drop is thereby well known. Other global components are radio buttons, checkboxes and toggle buttons, which are used for both configuration and daily use on mobile phones. Hence might Hofstede's theory be a little bit outdated, since it is based on assumptions made over thirty years ago.

Future Work

Our main focus have been on user center design and cultural aspects. We have designed, created and tested a frontend prototype, however, there are still improvements that could be made. The entire backend was missing in the system, which meant that none of the created rules were saved when the *Save* button was pressed. It would be possible to edit a saved rule and store items, such as routes and products, if a backend was implemented with a database.

It would also be possible to create the homepage we designed in our Lo-Fi prototype,

where all the saved rules would be presented. Different features could be implemented in the homepage. The search engine could for example be more complex than we intended in our Lo-Fi by making it possible to search for a specific product, route or date instead of just the rule name. The list of rules could also be automatically updated. For example, a rule should be inactivated if the date has expired.

Solutions for rule conflicts could also be implemented in the system. For example if no date option was added, will it then be valid for all dates? The same goes for products and routes. Another thing that could be decided is prioritization. For example, a product and a 20% discount is placed in the origin box and in one of the child boxes there is a 25% discount with the date 25th of April while in the other child box there is a 30% discount with the date 7th of June. This rule could mean that the product should have a 20% discount all the time expect for the 25th of April and the 7th of June where it will have 25% respectively 30%. That would mean that the child nodes have higher priority because they have a date specified. Or this kind of structure would simply be an invalid rule since the discounts contradict each other, which means that the 20% discount would need a date that specifies when it should be valid.

11 Conclusion

We have created a prototype for a marketing tool, which was intended to increase the flexibility for advertisements onboard airplanes. We chose to create a rule based marketing tool, where advertisements are constructed as rules with different criteria. The criteria could be routes, dates, time or inventory, these decided when a certain product should be advertised. This was a successful approach, based on the testing since the users managed to create rules that advertised different products.

The marketing tool would be used by airlines around the world, therefore it was also important to consider the cultural aspects when designing our tool. A test session was made with twelve participants from the four different regions Europe, Japan, the Middle East and the United States. The feedback from these test users were positive and they responded that they would like to use the system frequently. Hence, we state that it is possible to create a cross-cultural marketing tool.

One of our design decisions was to use the drag and drop technique. This approach differed a lot from other rule building tools that were tried out during the investigation phase. The test users found it very easy and intuitive to interact with the prototype. They liked the freedom that the drag and drop technique brought, as well as the easiness to create complicated rules.

Some design decisions, that were important in order to satisfy people from different regions, were clean layout, limited choices and clear metaphors. This specially favors people from high UA cultures such as Japan and the Middle East. We also chose to place the option menus in front of the workspace to make it clear that the user easily could navigate back to the workspace. Two design decisions that were made to benefit low LTO were to implement search engines and redundant features to speed up the process. However, these functionalities were surprisingly used by test participants from all of the four regions.

It was hard to discover any direct connections to the theory from the observations of the global test sessions. Sometimes the observations even contradicted the theory. As an example did the cultures with high UA not act upon our expectations, since they were not afraid of exploring the tool and try out its functionalities. Meanwhile, the low UA cultures had a more reserving approach toward the tool. An example of when the theory was consistent with the test sessions was how monochronic and polychronic cultures structured their rules. The polychronic cultures, which use parallel thinking, had no problems creating parallel paths. On the other hand, monochronic cultures had some difficulties with parallel paths, but created single-lined rules perfectly.

No certain inferences could be made from the observations. This, due to too few test users from each region and incoherent observation results. The globalization was another interesting aspect to consider when analyzing the results. The cultural aspects that Hofstede and Hall investigated are very different compared to the cultural aspects in technology today. Information and communication are spread around the world with a rapider speed in today's society, which makes it easier to adapt to new cultures.

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Appendix A

Hofstede's Table

A.1 Europe

Table A.1 illustrates Hofstede's index for ten different countries that represent the combined index for Europe. An average based on the indexes have been calculated for each of Hofstede's five dimensions.

Table A.1: Hofstede's full table for Europe. Where PD = Power Distance, IC = Individualism vs. Collectivism, MAS = Femininity vs. Masculinity, UA = Uncertainty Avoidance and LTO = Long- vs. Short-term Orientation. The written number is the index based on Hofstede's study.

Dimension / Country	PD	IC	MAS	UA	LTO
Denmark	18	74	16	23	35
France	68	71	43	86	63
Germany	35	67	66	65	83
Greece	60	35	57	100	45
Italy	50	76	70	75	61
Lithuania	42	60	19	65	82
Portugal	63	27	31	99	28
Sweden	31	71	5	29	53
Ukraine	92	25	27	95	55
United Kingdom	35	89	66	35	51
Avrage	**49**	**60**	**40**	**67**	**56**

A.2 Middle East

Table A.2 illustrates Hofstede's index for ten different countries that represent the combined index for the Middle East. An average based on the indexes have been calculated for each of Hofstede's five dimensions. Some of the countries are missing an index value for LTO, since the study regarding the fifth and last dimension was made in a later stage.

Table A.2: Hofstede's full table for Middle East. Where PD = Power Distance, IC = Individualism vs. Collectivism, MAS = Femininity vs. Masculinity, UA = Uncertainty Avoidance and LTO = Long- vs. Short-term Orientation. The written number is the index based on Hofstede's study.

Dimension / Country	PD	IC	MAS	UA	LTO
Egypt	70	25	45	80	7
Iran	58	41	43	59	14
Iraq	95	30	70	85	25
Israel	13	54	47	81	38
Jordan	70	30	45	65	16
Kuwait	90	25	40	80	
Qatar	93	25	55	80	
Saudi Arabia	95	25	60	80	36
Syria	80	35	52	60	30
United Arab Emirates	90	25	50	80	
Avrage	**75**	**32**	**51**	**75**	**24**

Appendix B

Test Answers from trymyUI

Full answers made by the participants in table 8.1 on the second Hi-Fi prototype.

How did you feel about the drag and drop approach?

#1 It feel good. Pretty easy to figure out.

#2 It was very easy to use, and quite intuitive.

#3 It was very intuitive and easy to use! At first I was confused about how the arrows worked, but it then became very clear when I reached the last questions!

#4 It was very easy to use and clear. The icons made it quick to identify the correct category. The background was well contrasted, meaning the interface was very user friendly.

#5 It made the process feel a lot more. customizable, and easier to understand and use. It also made the process a lot more interactive so when doing processes like what was in the test, it made it less tedious.

#6 It's very convenient and interactive. I feel that most of the user will feel really appreciate this kind of creativity, I, second myself. Its's also easy to use when I get the hang of it.

#7 Very straight forward and easy to use.

#8 It makes things a lot more easier to do advertisement without any hassle in fact i enjoyed doing it as it is very much comfortable and not complicated at all.

#9 It was easy and very userfriendly but i was confuised if i am placing them in right position.

#10 It was intuitive. No instructions where given on how to use it and I figured it out immediately with no issues.

#11 I really love it. This makes creating rules look really easy to do. Reading the Frame of Mind, I thought this was gonna be hard but seeing and understanding that the Drag and Drop was really easy made me enjoy doing it.

#12 It was intuitive. No instructions where given on how to use it and I figured it out immediately with no issues.

How did you feel about creating different paths? Was it easy or complicated and how did you figure out how to do?

#1 Hard to figure out, since the faded boxes are vague.

#2 I saw that you could group multiple conditions together, so I grouped the first route and discount on the left, and the second route and discount on the right. Unfortunately I wasn't really certain if this was correct or not.

#3 It was super easy to use! I immediately understood that was the way to use the arrows, it was very intuitive!

#4 It was very simple, minimal training would be required. It is far simpler than using a spreadsheet formula, for example. I figured it out intuitively, I think someone with even a basic grasp of the different factors at play should be able to create rules with multiple variations based on date, inventory or route.

#5 It was a really easy thing to do and i think this is because when you drag an option over, if you hover over a spot a grey area appears showing you two options to split where you want to put a path.

#6 First of all there are no easy tasks when you doing things for the first time. At first I thought it was complicated then after explore it for a couple minute I immediately understand how to use the website. The overview button is really helpful in changing the path.

#7 It was very easy because whenever you were trying to drag an option, the scheme would appear and you could easily drag and drop it.

#8 It is quite complicated in the beginning but i have figure out a way to do it correctly so that is not confusing and the information can be conveyed correctly to the customer through the advertisement.

#9 Yes it was very easy ....as soon i saw it i understood how to select dates and discounts it was very easy navigation.

#10 Also intuitively easy to figure out without any instructions given. I could see I was able to create different paths by dragging an item below another item to create a new branch. It was obvious to me (when asked to do this task) that this is what this was for.

#11 I felt unsure when it came to that because there was no way to tell if I was doing it correctly. I was just thinking that the logic was that the rule read the conditions from top to bottom.

#12 Also intuitively easy to figure out without any instructions given. I could see I was able to create different paths by dragging an item below another item to create a new branch. It was obvious to me (when asked to do this task) that this is what this was for.

What did you think the arrows meant and did you think the order inside a gray box mattered?

#1 I thought it mattered, since I did not see the new boxes.

#2 I thought the arrows were meant to represent the next step. I don't think the order of the conditions in the gray box mattered.

#3 No I thought that the order in the grey boxes did not matter! It was just all the things related to one advertisement, so it does not matter in which order I put it. The arrows represented different conditions on the advertisement. For example, depending on the route or date, different discounts apply.

#4 The arrows or order could matter in some cases and not in others. When splitting the paths the location after which the path is split becomes far more important. When creating a simple rule (40% discount on all beauty products, in June, on all routes, for example) then the order seems to make no difference.

#5 I dont think that the order inside a grey box mattered, and the arrow was just for the selection going down the list.

#6 The arrows is a great way to show a category or sub-category and it help me a lot to create a partition. The order is doesn't matter at all because when I click the "overview" button I immediately can see the rules that I created. To sum it all up, the arrows is a great indicator for me to see which category I was on and the order inside a gray box is not matter at all.

#7 Arrows meant different routes, for example in the case A, we needed to do this, in the case B, we needed to do something else.

#8 The arrow actually shows the next following information that actually reflects the previous information for example different flights has different discount so the arrows helps to direct the correct information based on specific flights. The information in the gray box really matters as it contains the information that is needed to be delivered to the customer.

#9 No idea what the arrpows maybe it was to connect the different rules in different siutuations. i dont know what order u r asking about.

#10 I think the arrows linked grey boxes with sets of tasks in them conditionally depending on what was defined in the grey box the arrow was coming from. I don't *think* the order inside a gray box mattered. I assumed that all items within a single grey box would go into effect regardless of order, and if all those conditions were meant it would then go to the next set of grey boxes in a branch.

#11 I knew that the cross arrow icon means you can drag the item I hovered it over because I have used some softwares before that enabled drag and drop and they also used the same cross arrow icon. Yes, I did thought the order inside the gray box mattered because it would dictate how the rule should run.

#12 Yes I assumed the order of the gray box had to matter since you did have to follow specific rules to certain flights that had to be taken into consideration since there were more than one route and different discount rules and I do not recall any specific arrows.

Do you have any other comments?

#1 It is probably easy to use after a short introduction.

#2 I did not name the first rule, since I was expecting the "Name Box" to be appearing when I clicked Save. Only on the second task did I notice that I was on the top left hand corner. So making that somehow catch your attention more, might be good. Additionally, I wasn't really sure if what I did was correct or not, maybe some sort of feedback would be good, that might help me improve in the subsequent attempts.

#3 Super user-friendly! Really loved the arrow functionality.

#4 I liked the visual layout, I think that when creating complex paths across many different routes a zoom in and out option, to allow the user to toggle between an overview and detailed view may be helpful. Overall it was fast, clear and very well designed.

#5 It was an easy and interactive system to use.

#6 I quite enjoy using the website because it's fun and creative, I feel like I'm doing some activities that my teacher at kindergarten used to teach me. Overall it's a great and simple design website.. Wish the creator of the website will always be blessed. I thank you.

#7 No, every task was very easy to perform and the website worked perfectly.

#8 As a whole drag and drop is a terrific idea as ease the job of creating an advertisement but i feel they should have an option for design and interface of an advertisement so we could select that too in order to make it more impressive. Besides , they could also have a chatbot which could help in case of an emergency to ask any doubts or questions.

#9 Overalll dragging and making selection was easy but confused on how to organize them.

#10 I think anyone could learn to use this system and create complex rules with about a 5 minute tutorial (and I was able to create rules with no instructions or tutorial...this is a good system. Thanks for the opportunity. I hope the feedback I gave is useful.

#11 I just wished that there was a button to somehow check if the rule you made makes sense. Without seeing any confirmation or error message, I think that what I made was correct since I was able to save the rule. A navigational tour or a help section for complicated rules might be needed if a check logic or check rule button can't be applied.

#12 The site was easy to use the rules were easy to follow just that the order inside the gray box should be specified just to keep it even simpler and easier and follow the simple instructions to perfection.