

# THE ROLE OF HEURISTICS IN ONLINE REVIEW ENABLED DECISION-MAKING PROCESSES

*Research paper*

## **Abstract**

*Online reviews play an important role in shaping an individual's intentions — be it for selecting the next product to buy, the next movie to see or the next hotel to visit. The literature has acknowledged that online reviews have an impact on an individual's decision, but to date it has failed to map their exact influence on the various stages of the decision-making process. More importantly, the socio-technical design artefacts that are an inherent component of online review Web sites have not been studied for their influence on decision-making.*

*Using a mix of controlled observations in combination with scenario simulation and in-depth interviews, we show that individuals utilize design elements of the online review system at various times and to varying degrees. We also uncover six heuristics triggered by the contents of the review and by the design elements of the Web site itself. Individuals apply these heuristics in an effort to improve the efficiency and quality of their decision-making. Our findings provide an in depth view of how the decision-making process is influenced by the presence of artificially created system elements.*

*Keywords: Heuristic, Online Reviews, Decision-making.*

## **1 Introduction**

In recent years, online reviews have become an integral part of decision-making processes. They play an important role in shaping the behavioural intentions of online shoppers (Amazon, Yelp), movie-goers (RottenTomatoes, IMDB), travellers (TripAdvisor, Booking.com) and individuals in a variety of situations. As more and more people utilize online opinions to make their decisions, scholars have paid close attention to drivers and motivators of their use. They found that individuals rely on online reviews to obtain purchase related information, to feel part of a community, or to learn how to use a product (Hennig-Thurau, Walsh and Walsh, 2003; Burton and Khammash, 2010). They pay attention to the quantity of reviews provided (Park and Lee, 2008), their valence (Flanagin and Metzger, 2013), the quality of their content (Chin-Lung, Sheng-Hsien and Leeder-Juinn, 2011), their affective content (Xia and Bechwati, 2008), and the context in which they were written (Sparks, Perkins and Buckley, 2013). Individuals are also more persuaded by negative reviews than positive ones (Cheung and Lee, 2008).

Previous work, however, fails to examine the impact the design of an online review system has and its specific influence on individuals' behaviour (Bartosiak, 2016). Furthermore, scholars have called for research that advances our understanding of the mechanisms and heuristics of online reviews usage and decision-making process (Zhang, Pan, Smith and Li, 2009; Zhang, Zhao, Cheung and Lee, 2014). We respond to this call. We do not focus on why online reviews are useful, the subject of much previous work, but we explain the logic and mechanisms behind the decision-making process of individuals who rely on online reviews. We conceptualize online review systems as a sociotechnical (ST) artefact and we focus on understanding "the full complement of consequences" of its use (Silver and Markus, 2013, p. 84). Specifically, we answer the following research questions through a mix of observations and in-depth interviews:

RQ1. What is the decision-making process of individuals using an online review platform?

RQ2. What design elements of the ST artefact influence the decision-making process?

RQ3. How do these design elements of the ST artefact influence the decision-making online?

The paper is organized as follows. First, we present supporting literature background on motivations to use online reviews and their role in user decision-making. Second, we present the methodology and procedures used in the study. Finally, we present and interpret the results – the collection of insights, followed by the directions for the future in this stream of research.

## **2 Literature background**

### **2.1 Influence of online reviews on individuals' behaviour**

Online reviews are peer-generated evaluations posted on a company or third party website (Mudambi and Schuff, 2010). The reasons why individuals read online reviews vary from obtaining information and learning about new products, to determining their social position and building relations in an online community (Hennig-Thurau et al., 2003; Burton and Khammash, 2010). Yet, the focus of scholarly research has been on the change of buying behaviours (Hennig-Thurau et al., 2003). Individuals read online reviews to reduce search time and to obtain buying related information; based on this activity they make decisions and change their behaviours (Kumar and Benbasat, 2006; Cheung, Lee and Rabjohn, 2008; Duan, Gu and Whinston, 2008; Litvin, Goldsmith and Pan, 2008; Hong and Park, 2012).

While the role of reviews on the decision-making process seems well understood, the influence of the review system is not. The variety of elements that go into the design of online review platforms may also affect how individuals perceive the object of a review. For example, the existence of positive ratings and multiple reviews for a product modifies an individual's attitudes about a product (Hong and Park, 2012, p. 906) and influences her buying decisions (Goldenberg, Libai and Muller, 2001).

Previous research focuses mainly on presenting the persuasive elements, but not on how the process of persuasion occurs. Many scholars focus on influencing factors such as argument quality of reviews (Chin-Lung et al., 2011; Schlosser, 2011), valence (Jeong and Koo, 2015), and other text characteristics (Cheung et al., 2008; Yin, Bond and Zhang, 2014). The persuasion literature highlights the importance of message content, in which argument quality is theorized as a central driver of influence (Petty and Cacioppo, 1986; Toulmin, 2003; Bhattacharjee and Sanford, 2006). When the content of an online review is of high quality and it lacks non-verbal cues, people build trust beliefs on the basis of the review text (Racherla, Mandviwalla and Connolly, 2012).

However, according to the Elaboration Likelihood Model (ELM), argument quality is only one of possible ways to persuade an individual (Petty and Cacioppo, 1986; Petty and Wegener, 1999). The other is based on other elements of the message and its context (e.g., images, ranking, authors information), like the design elements of the IS artefact. This is particularly germane to online reviews that are multimedia and often include contextual information. Thus, readers' persuasion will follow two possible routes, depending on the individual's ability to elaborate information. The central route is based on the textual content of the message and is generally preferred by individuals who have the cognitive ability and knowledge to process it. The peripheral route is a 'shortcut' that is based on non-textual elements of the message, like the author, the images available, and the like. In the context of online reviews, the peripheral route is implemented through the design elements of the online review system. Based on the dual nature of the persuasion process, recent literature claims that individuals build their judgments of online reviews not only on reasoning and analysis of all the available arguments but also that they employ heuristics to make decisions (Zhang et al., 2014). It follows that analysing the effect of design elements of online reviews is a central research question in this area.

## **2.2 The role of heuristics**

Heuristics are simplified models of reality that reduce the complex tasks of decision-making to simpler mental activities, usually based on previous experiences in similar situations (Tversky and Kahneman, 1975). They help humans overcome their limited information-processing abilities. Heuristics allow individuals to adapt to the complex environment by reducing the cognitive load spent on searching for a solution and sacrificing the optimal solution for a satisfactory one (Simon, 1957).

The Heuristics-Systematic Model (HSM) is another dual process persuasion model, which explains the role of heuristics in the process of persuasion (Chaiken, 1987). It posits that there are two ways in which individuals make decisions under the influence of persuasive communication. The first approach – systematic – is based on an analytical judgment of a message. Systematic decision-making requires cognitive ability and capacity. However, according to (Chaiken, 1987), many individuals are remiss in investing cognitive efforts to validate the persuasive message. They instead use heuristics in the persuasive process. These individuals may base their judgment on a superficial assessment of "other-than-arguments" cues. Unlike ELM, HSM posits that both approaches may be employed at the same time.

To date, the limited work on heuristics applied in the context of online reviews has identified three types of simplified models (Zhang et al., 2009):

- Single-criterion-stopping rule: individuals search for particular information using one criterion and stop when they feel that they have found enough information that satisfies the criterion
- Credibility heuristics: individuals judge the credibility of information based on the credibility of its author
- Consensus heuristics: individuals evaluate the coherence of positive information found on different websites as a positive indication to retain a recommended product selection

The literature on online reviews' persuasiveness identifies also other elements, which might be used in heuristic models. For example, the type of author (Dou, Walden, Lee and Lee, 2012), the number of the reviews (Flanagin and Metzger, 2013), and the presentation format (Xu, Chen and Santhanam, 2015).

### **3 Methodology**

Given our focus on the interaction between individuals and the online review system, we adopted a variety of research techniques. We use scenario simulations, along with controlled observations and in-depth interviews, to map an individual's decision-making process. We pay particular attention to the manner in which the design elements of the review systems contribute to the decision process and outcome. The context of our work is the search for a hotel in one of the dominant online review systems in the industry – TripAdvisor.

#### **3.1 Participants**

We used convenience sampling to recruit 22 participants - 10 females and 12 males. All of them were students of an international master's program in a large public European university. All participants reported that they liked traveling and use online reviews when planning a trip with TripAdvisor as their main source. This was important as they were familiar with the website's layout and learning bias was not an issue. Before starting the task, each participant signed an informed consent form and was briefly introduced to the study. We indicated that the study pertained to the hotel industry, but did not reveal the research questions to not bias their behaviour. Every participant was free to stop the study and withdraw at any point in time.

#### **3.2 Procedure**

First, in order to discover the mechanisms of online reviews usage, we conducted a real scenario simulation, along with observations (Pan and Fesenmaier, 2006; Zhang et al., 2009). Participants were asked to imagine that they were going for a short stay to a touristic destination in Switzerland to simulate a natural hotel search process. Subjects were informed that one of the participants, randomly chosen, would win a trip to the hotel they chose. Because the study was focused on the design elements of the online reviews system, we wanted to avoid biases caused by income inequality. Therefore, we asked participants not to pay attention to the price. Since the winning participant would not have to pay for the hotel, this was a realistic scenario.

Subjects were limited to exclusively use TripAdvisor. No time constraints were given. We asked the subjects to narrate their actions and their thought process as they were carrying out the task. We recorded all their words and actions with screen-recording software and an audio recorder. During this phase, the interaction between researcher and subjects was limited to observation only and reminders about narrating their actions.

In the second phase, just after the participants had chosen a hotel, we conducted interviews to surface motivations for their action and to explore causality. We used semi-structured interviews and a laddering technique to find subconscious motives, rather than what subjects thought the motives were. We used an interview protocol, but adjusted questions to each subject and each situation. After the interview, each participant was debriefed about the real objective of the study.

#### **3.3 Data analysis**

We analysed, transcribed, cleaned and coded all the records (Miles and Huberman, 1994). We gathered a total of 83 pages of transcribed documents and 17 hours and 32 minutes of video.

First, we read each transcript, tagging all relevant information. We did not focus on the opinion about the content of the reviews. Our objective was to identify design elements of the online review system that participants used as part of the decision-making process. These elements were used to tag the

transcripts. In this phase we adopted a method of stacking of comparable cases (Miles and Huberman, 1994).

Second, we wrote up each case using the same set of variables, coding the information in the form of a partially ordered meta-matrix. When the full list of tags was identified, we iterated the process to find further information that could be coded under the tags but was missed in the first round of coding. We analysed the matrix to understand how the subjects used online reviews platforms elements to make decisions.

Based on the actions of the participants and the elements of the online reviews platform they paid attention to, we identified different approaches to the decision-making process. We analysed the transcripts and the matrix further for repeating patterns and for quotes evidencing our findings. We also looked for alternative explanations to the findings in the transcripts and the literature. After we made sure that no alternative explanations existed, we conducted a composite sequence analysis (Miles and Huberman, 1994) to discover the phases of the search process and to identify actions belonging to each phase.

As a last step, we collated our findings with the existing literature on psychology and influence of online reviews to find explanations for observed behaviours. When we decided that a heuristic explained faithfully the observed behaviour, we matched it with the tags and adopted it as a higher order theme.

## 4 Findings

### 4.1 The decision-making process and the role of online reviews

We identified three phases of the process of online reviews usage in the context of hotel search. All three are in line with the traditional phases of the customer decision-making process – information search, evaluation of alternatives and product choice (Solomon, Bamossy, Askegaard and Hogg, 2013). Figure 1 illustrates the full process of online reviews based decision making.

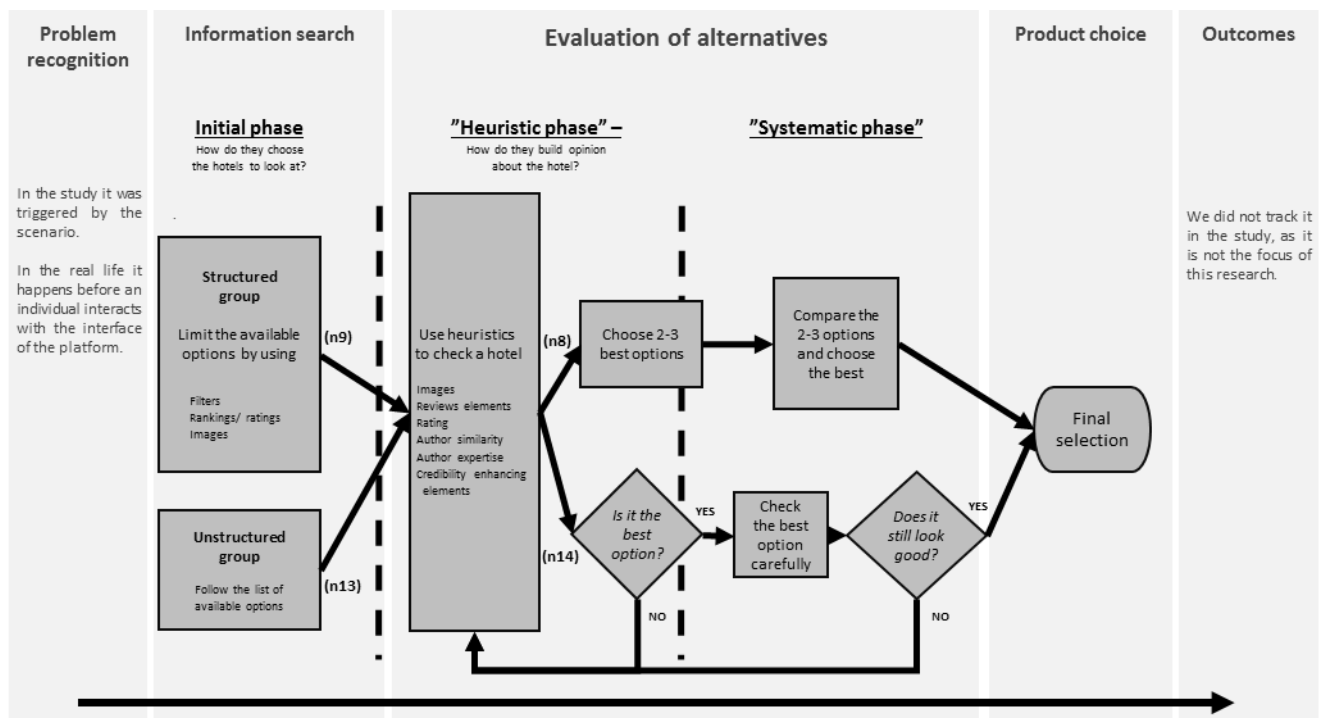


Figure 1. Online reviews search process.

#### 4.1.1 Phase 1: Initial search phase

In the initial phase, participants made a preliminary decision about the approach towards the search. Two approaches surfaced during the initial search about the offer: structured and unstructured. Nine subjects, adopting the structured approach, had an idea of the type of the hotel they would like to stay at. These participants knew what characteristics to look for, and they focused on finding them. Those subjects used filters, rankings, ratings, or images to segregate the hotels in the initial phase and to look for an option matching their ideal scenario. Their approach is represented by the following quote:

*"Basically, I know what I like and I know what I don't like, so I don't need a lot of time and overthinking."*

Thirteen subjects, adopting the unstructured approach, had no preliminary idea or an 'optimal' scenario for their trip. Their initial choice was directly guided by the online review system. While following the scenario given by the researcher, they often claimed that they did not "have an ideal hotel they would like to stay in." As a result, they followed the cues provided by the displayed list of offers, hotel ratings, and images:

*"I have the impression that TripAdvisor leads me [...]. I have to, in some way, follow the path that they give me."*

These participants employed a more heuristics-based approach and did not look for an a priori "ideal" stay, as one of them expressed:

*"I don't care so much [about the facilities]. I just want to have a shower. I don't care if there is any pool or anything in particular."*

Despite this difference, we made an interesting observation in both groups – all participants, no matter the initial strategy, skipped the sponsored offers displayed on the top of the page and moved immediately to the organic list of hotels. They trusted them more than paid offers:

*"The advertisements are not a good thing. I always skip them."*

#### 4.1.2 Phase 2: Heuristic phase

The second phase began when the subjects started formulating opinions about the hotels displayed on their screen. Participants checked the hotels' characteristics, not paying much attention to the details and not focusing on a deep analysis of each offer, as shown in the following quote:

*"I don't read all the reviews. I only take a look, trying to get some important information."*

On average, they paid more attention to diverse elements of the design of the online reviews' provider's website. We called this phase a 'heuristics phase,' because participants generated a diverse set of heuristics to simplify their decisions (as discussed later).

There were two different outcomes of the second phase that did not depend on the approach employed in the initial search phase. One group of participants (eight subjects; three from the structured and five from the unstructured group) limited their final choice to a shortlist of two to three hotels. The reason to do so was to reduce the time of the search and to simplify the decision, as described by (Simon, 1957). One of the participants in this subgroup summarized this approach as follows:

*"I usually don't have time to check all the existing hotels. I prefer to limit my search to two or three hotels that match with my expectations instead of looking for the perfect hotel for ages."*

The other group (14 subjects; six from the structured group, eight from the unstructured group) followed the list displayed on the screen. Using the same elements, they chose the best possible option. If another hotel better matched their expectations, it took the position of their top choice and the previous top hotel was discarded. The difference between the two groups was their approach to the final choice in the next phase.

### 4.1.3 Phase 3: Systematic phase

In the third and final phase, the systematic phase, individuals from both the structured and unstructured groups applied a more detailed analysis. They all methodically evaluated the hotels they were interested in by carefully analysing the reviews and summaries of the ratings. However, they fell into two further categories – regardless of their initial search approach. In the first, the “comparative” group, participants carefully evaluated the hotels in the choice set relative to one another and proceeded to select one. The following quote is representative of their process:

*“So, I will start analyzing the three chosen ones. So, we have two similar hotels, talking about the price. This one is better. The quality is surely better. Rooms are big, nice. It's near the lake. This one – the rooms are minimalistic, but I like them. There are a lot of pictures, but I like it. [...] think I would choose the cheaper one. Not only by the price, but also, I liked it more. The photos. The reviews - everybody said it's excellent. So, I think that's the best option I've found.”*

In the “sequential” group, participants analysed their chosen hotel more systematically. If the current option did not meet their expectations, they iterated the heuristic phase and looked at other hotels. The quotes below are representative of their approach:

*“Actually, I really like the hotel [name]. Let's check travelers' photos... They are not so convincing. [Opens a new hotel] Ok. I am looking again at the travelers' photos. And reviews. "A little bit of paradise". Wow. Hmm. Maybe I will change my idea. The photos are very suggestive. Ok... This is good.”*

If the offer was still appealing, they proceeded further:

*“This hotel has 4,5 stars and the price is fine. I will open it to look for the reviews. I am looking at the reviews. They are very good. All of them are around 4 and 5 points. I will keep in mind this hotel. It has 73 excellent reviews and 0 poor. So, it is very good. I will see the pictures to have an idea of how is the hotel. It looks very modern. The location is good as well. The rooms are very nice. Also, the bedroom. Ok. I like it.”*

The majority in the “sequential” group (nine participants) did not change their decision.

## 4.2 Elements of online reviews and heuristic models

During the heuristics phase of the decision-making process, participants focused on several elements of the online reviews platform to generate their respective heuristic models. Building on the notion of information design, we classified these elements and identified eight elements that appeared in the decision-making processes of more than one participant (Table 1).

### 4.2.1 The Influence of Images

Most subjects (17) relied on images when making a decision, and nine stated that the images were very important, if not the most important, elements of the online reviews provider's website. For these participants, the pictures played a role in two phases of the decision-making process. First, during the initial information search phase they relied on the pictures when making an initial choice, comparing this to the “first impression” in human communication:

*“For me, the initial picture is a big, big thing. [...] it gives me a certain feeling. What environment I will be in.”*

Second, six participants used pictures as the main source of information. Three out of the six looked solely at the pictures in the heuristic phase of the decision-making process. These participants relied only on the images of the hotel, skipping the text reviews or numeric ratings. Pictures showed them the place more directly than the text. Interestingly, only in three cases the participants changed the

initial picture-based opinion during the systematic phase of the decision-making process – a testament to the power of “first impressions.”

Design element	Number of participants mentioning it	Description
Images	17	Images of the hotel, both on the list of the hotels and on the hotel's specific page.
Hotel description	-	Details about the hotel and its amenities.
Online reviews [notable elements below]	15	Peer generated opinions posted on a third-party website.
➔ <i>Coherent reviews</i>	13	Online reviews, which present the same or a similar opinion.
➔ <i>Number of reviews</i>	9	Number of online reviews about the same hotel.
➔ <i>Negative reviews</i>	9	Online reviews, which express negative valence and emotions about a hotel.
Price	11	The information about the hotel price on the website.
Rating	12	Numerical rating – average of all grades given by the individuals (represented as stars, bubbles).
Ranking	-	The position of the hotel in a ranking, in comparison to other hotels.
Managerial response	-	A section of hotel staff's answers to the reviews.
Quality badges (e.g. “Travelers' choice”)		A ‘badge’ or a ‘certificate’ issued by the platform to recognize the quality of the hotel.
Usefulness rate	3	An indicator if a review was considered useful by other users.
Authors identifying elements	-	All the elements revealing the identity of an author of a review (e.g. pictures, age, nickname, traveller type, etc.).
Author's contribution information	8	All the information indicating how many reviews were written, or objects were visited by an author (e.g. number of reviews, ‘rank’ etc.).
Order of reviews	2	The order in which the reviews appear on a website (by date, by evaluation).
Presentation format	-	The technology used to present the reviews (text, images, video, speech).

Table 1. Classification of online reviews platform design.

#### 4.2.2 Influence of the Textual Content and Coherence of Reviews

Fifteen subjects used the text of reviews as an element to generate their heuristic model. Further, all nine subjects from the structured group relied on elements of the review text. Noteworthy is, however, that a third of the subjects did not read the textual content of the reviews during the heuristic phase. Participants who used this design element claimed that they only glanced at the reviews initially, and only later focused on the actual content during the systematic phase of the decision-making process:

*“I don't read all the reviews. I only take a look, trying to get some important information”*

Moreover, subjects who paid attention to the textual content of individual reviews during the heuristics phase agreed that those reviews affected their choices by enhancing the effect of other elements of the website:



*"The pictures looked nice, but without the reviews... I don't think I would click it. These couple of sentences drew me and that's the reason I clicked it"*

*"They are kind of final push. I like these hotels equally based on the pictures. And then I go down to the reviews and this is the convincing push'n'pull"*

From all the characteristics of online reviews, the coherence of a set of reviews was the most widely used in during the heuristic phase of the process. Our subjects expressed bigger trust towards the reviews and created a more convincing image of a hotel in their minds when all the reviews were in consensus about the quality of the facilities:

*"I think the first reason why I trust them [online reviews] is that they all say the same things. They all agreed."*

#### **4.2.3 The Influence of the Number of Reviews and Number of Negative Reviews**

The number of reviews also enhanced their persuasive effect on readers. As mentioned by one of the participants:

*"The more reviews you read, the more it reinforces the feeling."*

Nine subjects stated that the number of reviews gave them a feeling of trust. The more reviews they perceived, the greater their confidence in the content. However, the perception of what a large number constitutes varied significantly, from 74 to over a thousand. Not surprisingly, no one read all the reviews, but the aggregate number seemed enough to strengthen trust. Confirming the existing literature, subjects stated that a few good reviews were simply not enough to ensure that the hotel is a good one. A higher number of reviews built trust by showing that many other peers visited the same hotel.

On the other hand, a single negative review seemed to have a strong effect. While research has shown that negative reviews have a stronger impact on perceptions about a review's helpfulness than positive ones, we found that nine subjects started the heuristic phase of their search by reading the negative reviews first. They mentioned that they placed more trust into negative reviews because they showed what could go wrong and thus helped avoiding such risks. Moreover, for three subjects the encounter of one negative review addressing an initially identified selection criterion was enough to discard the hotel outright:

*"Even if I read only one bad review that matches with all my 'must-haves' I will skip the hotel immediately. I don't care about the other good reviews anymore."*

In case the negative review did not address a criterion that was important to them, subjects continued to look at the hotel—even if more negative reviews existed:

*"I try to understand if the characteristics of the hotel that for someone are bad are also important for me."*

Subjects only changed their behaviour if too many negative reviews iterated the same drawbacks, as shown in the following:

*"[If] five bad reviews say [the same thing] then it is a red flag for me. But if its five different bad reviews [...], then I sort of think that these are just outliers."*

#### **4.2.4 The Influence of Ratings and Quality Badges**

Over half the subjects used the numerical (star) rating during the heuristics phase of their search process. Subjects considered the rating system as a "good, generalizable system" that helped comparing different options easily, as indicated in the following quote:

*"[...] it's a pretty generalizable system. I mean, you know that five out of five is really good and one is pretty terrible. [Star ranking] is something that anyone can relate to."*

However, neither of them made their choice based solely on the rating system. All of them turned to the content of reviews or pictures and treated the ratings as a useful aid—not as a “decisive factor.” Further, three of the participants used quality certificates, or badges, issued by the online reviews provider as a cue, because they increased their trust in the provider, as stated below:

*“I looked at the award they have posted there [Travelers’ Choice]. [...] if you have two hotels that are similar and the reviews say the same, then maybe I will go to look for other factors”*

Interestingly, subjects did not know the details about the type of certificate or the procedures of awarding them to hotels. Yet the mere presence seemed to signal to some subjects to unquestionably accept these design elements as meaningful. When asked why they trusted them, subjects labelled badges as a sign of quality and evidence that other peers have chosen the same hotel.

#### **4.2.5 The Influence of Author**

Eight participants paid attention to the similarity of the author when compared with themselves:

*“[I choose reviews] based on fitting to my lifestyle. If somebody is reviewing [from a family’s point of view] this is not something so relevant to a single guy. [...] Because they aren’t looking for the same things I would look for.”*

These subjects used elements like pictures, age, lifestyle or nationality of the author to see if they were similar to their own; they also used those elements to judge if a review was credible and the hotel suited them.

Additionally, for two of the participants the expertise of an author was an important element of the decision-making process. They judged the author’s expertise by checking how many reviews she had written and by judging the quality of a review, as the following quote indicates:

*“[T]his [author wrote] 70 reviews and the other one 23 reviews. So, these people might be rather experienced travelers. And they may know what the quality of a hotel might be. So, maybe I can trust them.”*

#### **4.2.6 The Influence of Price information**

While we explicitly did not focus on price, participants reiterated the importance of price in the decision-making process. Participants knew that they should avoid paying attention to the price. After all, the scenario was created in a way that made it clear not to worry about it. Yet, half of the participants based their decision heavily on the price perceptions or used it as one of the initial selection factors, as shown in the following quote:

*“I excluded the hotels with too high price. I only considered the hotels with the right price for me. “*

When asked why price was so important, they were unable to provide an answer; some stated that this was what they always did and felt secure about the price level. Even if they could have chosen a more luxurious hotel, they decided to keep the price level they were used to and continued looking at other factors through the lens of price.

## **5 Discussion**

We confirmed that individuals conduct both a systematic analysis of the arguments and the creation of heuristic models to simplify their decision-making process when using online reviews. More specifically, we identified six heuristics employed by the subjects during the heuristic phase of the decision-making process. Figure 2 presents the mapping of design elements to these heuristics pointing to the unique nature of the decision-making process enabled by the online review system.

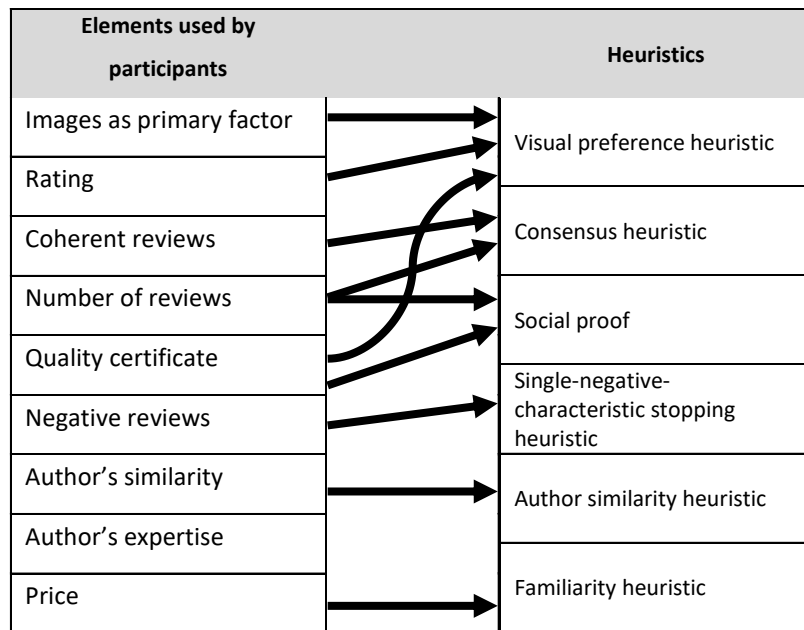


Figure 2. Mapping of design elements to heuristics

### 5.1 Single-negative-characteristic stopping heuristic

The very fact that subjects discarded a hotel after reading only one negative review leads us to propose a *single-negative-criterion-stopping heuristic* – individuals stop considering the product or service when they find enough negative information on a criterion that they deem important. Core to this heuristic is the match between the negative review content and a key decision criterion. We are not aware of anyone uncovering this heuristic in the context of online reviews. However, it is a specific case of the single-criterion-stopping rule (Zhang et al., 2009).

Prospect theory provides an explanation, since individuals seem to avoid risks stronger than they seek gains (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). The literature on online reviews suggests that individuals find negative reviews more useful than the positive ones (Sen and Lerman, 2007). To strengthen the persuasive potential of online reviews, online reviews providers should consider learning about users' preferences, gathering data not only from the offered filters but also from other sources, like social media or search engines.

### 5.2 Consensus and social proof heuristics

Most of the subjects paid attention to the coherence and the amount of reviews. Our study confirms the existence of the *consensus heuristic* (Zhang et al. (2009). Looking at the same element – number of reviews, the subjects employed also the *social proof heuristic* – they assumed that a big number of similar actions of other people reflect a correct type of behaviour and followed their example (Sherif, 1935). This is consistent with previous literature, demonstrating that social proof built on online reviews has a strong effect on electronic commerce sales (Amblee and Bui, 2011).

### 5.3 Visual preference heuristic

The images accompanying the reviews appeared to be an important element of the search process for most participants. Their role was more important than we initially hypothesized, in part due to the limited research examining design elements of online review systems beyond quantitative evaluations and text. The subjects found pictures important because there was less space for personal interpretation, unlike the textual portion of reviews; they often started their initial search phase by looking at the

photographs. Accordingly, we label this heuristic as *visual preference heuristic* (Townsend and Kahn, 2014).

Individuals prefer visuals, more than any other forms of a message presentation (Holbrook and Moore, 1981), when formulating their first opinion about an object. We are not aware of any literature that discusses the effect of product images on the persuasiveness of online reviews. We note, however, that the role of images may also vary with the type of product or service. Our context is hotels, a multi-faceted service where the physical space is an important element of the experience. This is very different than utilitarian search products (e.g., a digital camera). The lack of research on visual cues in online reviews is particularly troubling, given the centrality of the sociotechnical artefact's design in information systems research (Silver and Markus, 2013). The psychology literature lends some support in that visual materials are more persuasive than texts in many contexts (Joffe, 2008). In the context of online review platforms, many design elements can act as visuals, such as stars, or the graphical representation of quality badges and certificates. Furthermore, the presence of visual design elements is a key differentiation of review systems as compared to traditional word of mouth. Thus, more empirical research is needed to measure their effect as an instrument of persuasion, providing fertile ground for cutting edge research that is uniquely positioned as information systems theory.

#### **5.4 Author similarity heuristic**

The perceived similarity of the source appeared to be more important than other source characteristics. Drawing on the psychology literature (Read and Grushka-Cockayne, 2011), we propose an *author similarity heuristic* in the context of online reviews. It captures the fact that an individual's perceived similarity of a review source increases its perceived credibility and usefulness.

While the effect of author characteristics on the outcome of a decision in the context of online reviews is well known (Flanagin and Metzger, 2013; Plotkina and Munzel, 2016), this heuristic is surprising because the literature has yet to empirically confirm the effect of author's similarity on the perception of online reviews (Lis, 2013; Zhang, 2015). The fact that some subjects paid so much attention to the authors' similarity might be evidence of the fact that individuals try unconsciously to replicate physical processes in the online environment. Absent physical cues (McKenna and Bargh, 2000) they turn to other available information. Far from being conclusive, our findings point to the need for more research in this area.

#### **5.5 Familiarity heuristic**

Subjects relied heavily on price information, irrespective of the fact that they were explicitly asked not to do so. One possible explanation for this phenomenon might be found in the *familiarity heuristic* (Metcalf, Schwartz and Joaquim, 1993; Komiak and Benbasat, 2006). Individuals tend to trust more and prefer scenarios, which are similar to what they know from past experiences. Choosing a price level could be an example of such a scenario. It is also in agreement with previous research that has looked closer at the issue of price familiarity (Mazar, Koszegi and Ariely, 2010). However, this heuristic has not been previously studied in the context of online reviews. Since we do not want to challenge the foundation of rational choice theory, as recently done in behavioural economics (Ariely, 2009), we highlight this issue and point it out as an interesting question for future research in the area of microeconomics and behavioural economics.

Online review systems remain a widely popular class of sociotechnical artefacts that individuals all over the world use frequently to make important decisions. Yet, information systems scholars have accumulated a surprisingly little amount of knowledge about the impact of their design on persuasion and decision-making. In this study, we contribute to this line of research and call attention to the need for further research in the area.

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