# Putting the ‘AR’ in Marketing

Utilizing Augmented Reality to Influence Product Evaluations and Purchase Intentions in the Online Shopping Context

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Abstract

***Introduction:*** As online shopping possibilities are constantly evolving, companies have to keep up with the pace of development. Augmented Reality offers limitless possibilities for marketeers to implement into their marketing strategies by providing product simulations via smartphone cameras.

***Objective:*** This study aims at exploring the way Augmented Reality influences a potential customer's product evaluations and purchase intentions in comparison to a mobile product website.

***Methods:*** For the purpose of this study, experimental research including a questionnaire was conducted with 60 students who were exposed to either a product website or the same website with the addition of an Augmented Reality feature. After a sufficient exploration of these tools, the participants' product and brand evaluations were measured using a questionnaire that asked about their sentiments towards their experience and the product itself.

***Results:*** The insights gathered from the survey suggest that Augmented Reality does significantly increase a potential customer's brand attitude, enjoyment, perceived usefulness, consumer informedness, product evaluation and purchase intention towards the product. Especially enjoyment and purchase intention were greatly increased, proving how AR can turn online shopping into an enjoyable experience that results in a purchase.

***Conclusion:*** This allows to draw the conclusion that adding Augmented Reality to the product marketing experience can positively influence a potential customer's product evaluations and purchase intentions. This study and its findings prove AR's potential in marketing and emphasize the necessity of its implementation.

*Keywords: Augmented Reality, Marketing, Online Shopping, Purchase Intention*

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**Enclosures**

## 1. Introduction

The progressive nature of the technology industry results in a multitude of emerging technologies and tools of which many can be utilized for the reinforcement and improvement of product marketing. The ever-growing field of innovation continuously develops and constitutes technologically advanced products and services, with one of them being "Augmented Reality". This approach is defined through its mixed-reality environment, in which reality and simulation co-exist simultaneously. Even though Augmented Reality is often named next to or confused with the related concept of Virtual Reality, it is not quite the same. However, the concepts are comparable as Virtual Reality immerses its user into a completely simulated world in which the environment does not necessarily depict any cues of reality. Within these Virtual Reality environments, the laws of physics such as gravity or time do not necessarily apply and there is no connection between reality and simulation. Contrary to Virtual Reality, the Augmented Reality environment is clearly restricted by the laws of physics. Whereas a user of Virtual Reality can immerse himself into a spaceship and float through galaxies, Augmented Reality can simulate a model of that spaceship onto one's desk. While Virtual Reality users are solely exposed to the screen, Augmented Reality users look at the screen as addition to their real environment.

In the Reality-Virtuality Continuum established by Milgram, Takemura, Utsumi and Kishino (1995) in which reality and simulation are juxtaposed at two opposing ends of a continuum, Augmented Reality (further referred to as 'AR') finds itself located between the real-world environment and the completely simulated environment of Virtual Reality. In Augmented Reality, the real world and the simulated elements are hybridized and complement each other in order to fit the intended purpose of application. The cues that are computer-generated *augment* the real environment and obtain the ability to enhance it by adding additional information to the real environment. The digital layer is put over the layer of reality which the users can then observe through the lens of a screen. Augmented reality was first mentioned and developed by Ivan Sutherland in 1968, who created a head-mounted AR-display. This display could create an illusion on the user's vision who would experience an additional dimension to a two-dimensional object (Sutherland, 1968).

Since then, AR has come a long way. Throughout the past fifty years of existence, AR has evolved immensely and experienced vast improvements. These especially took place throughout the current millennium, which provided developments such as the Google Glasses or AR-apps for mobile phones (Arth et al., 2015). In fact, the establishment of the smartphone into daily life helped to simplify the implementation of AR into the world of marketing, as

smartphones have proved themselves to be the most propitious and practicable device for AR usage (Arth & Schmalstieg, 2011). In recent years, Augmented Reality has been applied by a long list of enterprises in hope for it to boost product sales, communicate innovation and create customer interaction.

Within these enterprises, Augmented Reality provides a platform for marketeers, programmers and communication professionals to express their creativity through the means of an innovative tools and strategies. Due to its simulated elements, AR enjoys creative freedom and can therefore be utilized in a variety of fields. However, it remains unclear why only limited research has been conducted into its effectiveness as a marketing tool. Especially long-term effects have not yet been explored to a broad extent due to the novelty of the innovation. This formed the purpose of this study, as it is of specific interest to research how and to what extent the utilization of Augmented Reality can improve the marketing experience regarding a product compared to conventional methods. Therefore, this paper aims to draw a comparison between a user's experience with the web-based approach of a traditional website selling a product compared to the rather novel approach of including human-computer interaction via the means of mobile Augmented Reality.

If methods using Augmented Reality prove themselves as beneficial for marketeers by creating a better picture about the product and brand or even triggering behavioral intentions regarding a purchase, the fields of applications will almost be limitless. These areas range from retail, where users could use an AR-app in store environments, to repair and maintenance support tutorials which users could use via AR. Scholz and Smith (2016) examined recent examples of Augmented Reality in marketing by renowned brands such as IKEA, Pepsi, Volkswagen or McDonald's and summarized that AR obtains potential abilities for groundbreaking additions to marketing programs. This technology sparked interest for a wide field of economic factors, yet it is important to research exactly how AR in marketing influences a potential customer and can target profit maximization. Therefore, this paper's research question reads as follows:

*RQ: In comparison to a website, how does Augmented Reality affect the user's product evaluations and purchase intention?*

In order to find answers to this question, *purchase intention* and a number of its essential antecedents – being *enjoyment, perceived usefulness, brand attitude, consumer informedness, product memory and product evaluation* – are examined within the context of Augmented Reality to find out if AR consequentially helps to sell a specific product. These constructs will

be further explained and measured via the means of experimental research, before being analyzed and interpreted throughout the following paragraphs.

## 2. Theoretical Framework

There are numerous concepts and theories that improve, influence and explain the product evaluations and purchase intention of potential customers. Within these frameworks, the different constructs *enjoyment*, *consumer informedness*, *brand attitude*, *usefulness*, *product memory*, *product evaluation*, and their influence on *purchase intention* will be defined and described in order to create a research model. The model will be used to illustrate Augmented Reality's potential to positively affect customer's purchase intentions and various product evaluation measurements. As Augmented Reality influences the variables that in turn influence purchase intention, all variables besides Augmented Reality itself are considered as dependent.

### *2.1 The Involvement of Augmented Reality*

Augmented Reality has been implemented by many companies as part of their marketing strategy, yet the influence of AR on purchase intention has only been researched to a limited extent. Nevertheless, this framework approaches an illustration of literature regarding AR's influence on the distinct dependent variables which in turn are connected to purchasing behavior. It can therefore be assumed for AR to be influencing the relationship of the different variables with the consumer's purchase intention. As for the level of consumer informedness, AR can potentially provide the consumer with a more detailed and realistic idea of the product, as well as the design and functions. A website with its pictures on the other hand does not get as close to "reality" and therefore leaves a consumer with a knowledge gap between expectations and reality.

Furthermore, a simulation can show the product in its usage environment, such as furniture simulated into the room where it will later be used in. It was found that a richer media environment such as a virtual setting significantly increases the user's enjoyment and capacity to evaluate and remember the information about the displayed product (Li & Meshkova, 2013). A virtual environment generates a sense of presence which in turn leads to an enhanced ability to both learn and feel knowledgeable about a product (Li, Daugherty & Biocca, 2002). Moreover, interactivity within an augmented environment directly increases the perceived level of enjoyment of the user, which in turn directly influences the attitude towards the usage of AR within a marketing context and thereby the decision to purchase (Pantano, Rese & Baier, 2017). Furthermore, Augmented Reality has proven itself to be beneficial towards not only enjoyment, but also the perceived usefulness in comparison to web-based product marketing, resulting in a higher likelihood of purchasing (Yim, Chu & Sauer, 2017). In addition, the immersive nature of the partly simulated environment that is AR leads to an improved brand attitude which

directly influences the purchase intention of the consumer (Jovarnik, 2016).

Considering the existing researches regarding the utilization of Augmented Reality in a marketing context, it can be assumed that AR is a significant influencer for the relationships between the variable of *purchase intention* and the remaining variables *enjoyment, usefulness, brand attitude* and *consumer informedness* and can reinforce the impact that the various variables have on the decision of purchasing. The immersion and innovativeness that AR entails opens up possibilities for marketeers in any field, which the conventional web-based approach is often not able to deliver. For this study, it is of importance to explore if these findings translate to the specific online shopping context. Conclusively, the expected influential power of AR translates to the later visualized research model which illustrates the influence of AR on the antecedents of purchase intention as well as purchase intention itself.

### *2.2 Purchase Intention*

One of every marketeer's ultimate goal is to maximize profits. In order to generate profit maximization, means of sales increasing have to be implemented successfully. Generally speaking, companies are in need of innovations in order to survive (Altshuler & Behn, 1997). By making use of innovative technologies, salespeople can surpass the expectations that customers have (Jones, Roberts & Chonko, 2000). Additionally, the potential customers often feel a surprising "wow"-effect following a company's use of recent innovative technologies (Campbell, 1998). Consequentially, it can be assumed that the right utilization of innovative technologies can be beneficial for a company as innovativeness has proven itself to have a positive influence on the user's purchase intention (San Martin & Herrero, 2012). Purchase intention itself refers to the "subjective judgment by the consumers that is reflected after the general evaluation to buy a products or services" (Yurezka, Hudrasyah, 2016, p.2). It is the potential customer's willingness to buy and thereby spend money in exchange for a specific good or service.

This decision-making process leading to a potential purchase completes the customer's journey from product- and brand awareness up until the actual financial exchange. The process obtains the ability to maintain the customer for a long term and turn him into a loyal regular of the brand. There is a variety of components that can influence a customer's conscious plan to purchase a particular good or service. Those factors can derive from human nature as well as surrounding the nature of the product or service itself. Many aspects that influence purchase intention derive from the interaction process of the user and the product or service. In the case of this study, the human-computer interaction includes the user both using and experiencing the

Augmented Reality marketing tool. Compared to the website, Augmented Reality simulates the product into the environment and allows the user to engage with it interactively, whereas the website is limited in the possibilities of informing about and promoting the product. As these numerous factors are believed to be improved by Augmented Reality as opposed to the conventional method of a product website, the research hypotheses read as follows:

*H1: In comparison to a website, Augmented Reality has a higher positive influence on a customer's purchase intention.*

*2.3 Enjoyment*

Purchasing behavior does not generate itself but rather consists of an interplay of various variables and antecedents, of which some can be of emotional nature. It seems rational to assume that positive emotions also translate into positive action. Enjoyment itself has been defined as an "affective state of positive feelings, such as pleasure, liking, and fun" (Hagberg, Lindahl, Nyberg & Hellenius, 2009, p.745). If a person is getting excited and feeling happiness towards a product, this will reappear in his willingness to purchase the product. This claim is being scientifically backed up, as enjoyment has been proven to be "one of the key emotional values and prime researched objects for experiences" by Bulearca and Tamarjan (2010, p.242). Especially in the context of online shopping, enjoyment seems to play a fundamental role regarding potential behavioral decisions. In fact, research assigns a highly important position upon enjoyment regarding its influence on purchase intention (Lee, Khong, Wong, 2014). If implemented properly, a user's enjoyment can directly lead to a higher purchase probability in the context of online shopping, as human emotion plays an essential role when it comes to decision-making (Lu & Su, 2009).

These research insights are promising and thereby increase the relevance for further research into the question if this phenomenon translates to the context of Augmented Reality as well. As stated by Avery, Piekarski, Warren, and Thomas (2006), the use of AR in the context of video games significantly increases the user's enjoyment. One implication would be that the use of such innovative technology can be enjoyable within the context of marketing as well. As noted by Sherry, Lucas, Greenberg and Lachlan in 2006, remarks about enjoyment in the context of technology frequently derive from the uses & gratifications theory. This positivistic communication theory assumes that a specific medium would be utilized more frequently if using it would result in a higher degree of satisfaction (Katz, Blumler, & Gurevitch, 1973). Moreover, it was found that enjoyment is a gratification that derives from the usage of Augmented Reality which positively influences the user's attitude towards it (Rauschnabel,

Rossman, tom Dieck, 2017). Considering these research outcomes, the state of enjoyment is a promising antecedent for the purchase intention in the context of Augmented Reality. This translates to the hypothesis of:

*H2: In comparison to a website, Augmented Reality has a higher positive influence on a customer's level of enjoyment.*

### *2.4 Perceived Usefulness*

The satisfaction of a customer's needs and wishes can be achieved through various ways and channels. Aiming towards a user's emotions is an efficient and effective approach, yet not the only one that makes sense. An alternative method is aiming for the customer's rationale as opposed to the emotional aspects. To be specific, it is valuable to maximize the usefulness of a certain product in order for it to successfully perform the tasks it should perform and thereby satisfy a customer. Apart from its satisfactory purpose, usefulness influences how a technology will be accepted by the user. As part of the Technology Acceptance Model (TAM) by Davis, Bagozzi and Warshaw (1989) which explains the acceptance process of a new technology, usefulness has been shown to be a direct influencer of the behavioral intention to use a certain technology. Acknowledging the power of usefulness entails a meaningful lesson for marketeers, as improving the usefulness positively affects the likeability of technology acceptance and alters the behavioral intention of the user. Furthermore, usefulness allows for a technological success as it has been shown to increase a user's belief of a technology to improve one's performance on a task (Davis, Bagozzi & Warshaw, 1989).

The notion of usefulness in current times does not only apply to a product itself since companies benefit from providing useful tools within their e-commerce repertoire. Especially when these are not physically available for the customers to see and touch, but only appear on screen via static images of it. If the e-commerce tool (such as the website of the product or the Augmented Reality manipulation) appears useful to the user, it has a significant positive influence on his or her intention to buy the product (Lim, Osman, Salahuddin, Romle & Abdullah, 2016). This is especially worthwhile in the context of online shopping, as it is limited to pictures/simulations of the product and cannot present a real version like the actual store can. Therefore, online-selling companies need to compensate that limitation via a sufficient product description and by providing high-quality information about it that are valuable for the customer and his decision-making process (Gillenson & Sherrell, 2002).

Providing a useful tool for shopping online differentiates one company from another, which is essential in today's world with a massive number of online offers for one certain

product. If the tool is not useful itself, the customer has enough other options to choose from and quickly shifts to a competitor with a more useful online store (Kim & Song, 2010). If the perceived usefulness is provided and of high quality, it significantly affects one's purchase intention on the internet (Xie et al., 2011). However, it is important to differentiate between the notions of usefulness and ease of use as these are two distinct constructs. Though these concepts are often confused with one another, ease of use rather refers to the complexity and difficulty of the actual use of the product or tool. This distinction is critical as usefulness was proven to determine the intention towards usage and purchase whereas ease of use does not show a significant effect (Gong, Stump & Maddox, 2013). As usefulness shows a direct influence on the purchase intention in the online context, it is a valuable concept for marketeers to consider (Lu & Su, 2009). Taking the beneficial impact of perceived usefulness into account, the following hypotheses derive:

*H3: In comparison to a website, Augmented Reality is perceived as the more useful tool for product marketing.*

### *2.5 Brand Attitude*

It is important to note that not only the product itself is important when it comes to one's behavioral decisions and product attitudes. One's perception of a brand is highly influential as well when it comes to this brand's product as the product and the brand are closely related. A customer that has a negative opinion towards Apple will not go out of his or her way to purchase the newest iPhone. Instead, the choice would fall on one of the competing brands. To avoid this behavior, companies try to deliver satisfactory products and other means of affecting the brand attitude towards the company. Whereas Mitchell and Olsen (1981, p. 318) define brand attitude as an "individual's internal evaluation of the brand", Keller later adds the notion that it is rather challenging to define the broad construct of brand attitude, as attitudes consist of an interconnected web of advantages and sentiments towards a specific object, in this case the brand (1993). However, Keller additionally states that a customer's attitude composes the foundation for his or her behavior and ultimately the purchase decision.

This statement gets reinforced by Ajzen's 'Theory of Planned Behavior', in which the reasoning behind behavior is explained (1991). Ajzen's model claims that the intention that influences behavior is produced through attitudes, subjective norms and perceived behavioral control. As one of the three pillars behind behavioral intention, brand attitude is a powerful tool for any marketeer. On the contrary, a lack of focus on brand attitude has proven itself to be harmful for a company, as a reduced brand attitude ultimately results in an equally reduced

intention to purchase a product (Bulearca & Tamarjan, 2010). This clarifies how influential the attitude towards a brand can be for every existing as well as upcoming products that a company might release.

As brand attitude has proven to be influenced by object-centered engagement as well as a brand experience provided to the customer, it opens up a world of marketing strategies. In the context of Augmented Reality, this means that the highly engaging object-centered feature of AR on the website obtains the power to affect one's brand attitude. As AR often remains an untapped approach in product marketing, this "brand experience" will remain in the memory of the ones using it, potentially resulting in an improved brand attitude with long-term benefits for the company. In fact, marketing in three dimensions evidently results in a superior brand attitude as compared to the two-dimensional alternatives that marketing offers (Salehzadeh & Pool, 2017). These factors translate to the following research hypotheses:

*H4: In comparison to a website, Augmented Reality has a higher positive influence on a customer's brand attitude.*

### *2.6 Consumer Informedness*

When a brand launches and markets a product, it is of great importance to inform the consumer about the product details, such as its functionalities, the design or the price. To start a purchasing process, the consumer must know about the specifications of the good or device at hand. Consumers obtain certain needs and wishes that can potentially be fulfilled by the acquisition and possession of the product. Research proved that a higher level of information about a product's specifications enables the buyer to determine a more precise estimation of the product's value and its ability to suit the needs and wishes (Akerlof, 1970). The earlier named degree of information and knowledge regarding a specific product is summarized under the term of "consumer informedness" in various researches. Clemons (2008) defines consumer informedness as a "cognitive measure that can be explained as the understanding consumers gain about a product's quality and physical characteristics, the product's fit with consumer requirements, and the later benefits or problems a consumer may experience" (p. 15). This cognitive process is able to persuade and can thereby convince the consumer and turn him or her from a potential customer to an actual buyer.

Conclusively, it is meaningful to consider the power of informedness when it comes to purchase intention, as it has a multitude of beneficial effects on the consumer. Firstly, being cognizant about a certain product leaves the user or consumer with a positive feeling about it (Li et al., 2014). Secondly, as consumers are going through the journey from getting to know a

product all the way to the actual purchase, being knowledgeable about the product is considered a success within the process of evaluation (Smith, Johnston & Howard, 2011). These beneficial phenomena result in the consumer informedness factually reinforcing the purchase intention (Li & Meshkova, 2013). Taking this link into account would make marketeers having to constantly think of innovative and interesting ways to provide the consumers with information about the product in order for them to generate a demand to purchase it.

Informing about the product's objective and detailed characteristics is especially crucial for the online environment as this form of shopping cannot provide a physical product experience, whereas actual stores can. The lack of this experience therefore has to be compensated in order for the customer to still be able to create a sufficient image of the product while only seeing it through a screen. In order to examine the effect of consumer informedness on the purchase intention that he/she has, the following research hypothesis is formulated:

*H5: In comparison to a website, Augmented Reality will leave a consumer more informed about the product.*

### *2.7 Product Memory*

In order to reiterate a purchase decision, a customer must remember the product that he or she might buy. However, there is no formula that can simply demonstrate the degree of memory that a potential customer has to reach in order for it to lead to a purchase. Considering this research, it is assumed that AR generates a higher engagement with the product in comparison to a website and thereby triggers the attention and cognitive effort that one puts into the product. Conclusively, this could result in an improved recall and recognition of the product and its details. And this is a factor that should not be taken out of the picture – previous research expressed the importance of three-dimensional product experiences for consumer learning. As Lau and Lee (2016) stated, these experiences help to create a sharpened product memory. This construct of product memory was given an exceptional relevance in literature revolving around technological revolutions (Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). Due to its explorative nature, Augmented Reality is expected to create an impactful tool for product memory. This translates to the following research hypothesis:

*H6: In comparison to a website, Augmented Reality has a higher positive influence on a customer's product memory.*

### *2.8 Product Evaluation*

Consciously or not, if exposed to a product, one will almost automatically evaluate it. And this judgmental process can happen on various levels that differ in their degree of superficiality. For example, one might evaluate a product based on its looks and design, but also on the extent to which it would influence one's "social status" or approval by peers. Being able to evaluate a product's influence, usefulness or overall objective characteristics is of immense importance considering its influence on future behavioral intentions of the potential customer. If a product affects peer approval or social status, it surrounds subjective norms, which is part of the Theory of Planned Behavior (Ajzen, 1991). This means it is proven to be of direct influence of intention which in turn results in behavior.

In relevant literature, product evaluation is often linked to an individual's attitude towards a product which has proven to be of close connection to one's purchase intention (Bagozzi, 1982). Especially in today's world of online shopping, online stores are limited in their ways of presenting a product for potential customers to evaluate. In order to compensate for this lack of physical product experience prior to a purchasing process, stores must find alternative ways to provide methods and tools for product evaluation. This is where AR comes into the play, as it can increase the extent to which a potential buyer is able to see the product in its details or even its natural environment of use. Furniture can be simulated in its intended room or sunglasses can be projected on one's face. Therefore, AR is expected to increase the indicated level of experienced product evaluation in comparison to a website, that can simply offer pictures and descriptive words. This translates to the research hypothesis of:

*H7: In comparison to website users, consumers using Augmented Reality have an improved feeling of being able to evaluate the product characteristics.*

*2.9 Research Model and Hypotheses*

Figure 1 depicts the research model that resulted from reviewing the relevant literature. Within, it is visualized how Augmented Reality influences the antecedents of purchase intention which ultimately influence purchase intention itself. Additionally, the different hypotheses are depicted to illustrate the connection between the hypotheses and their visualization within the model.

Figure 1

*Research Model*

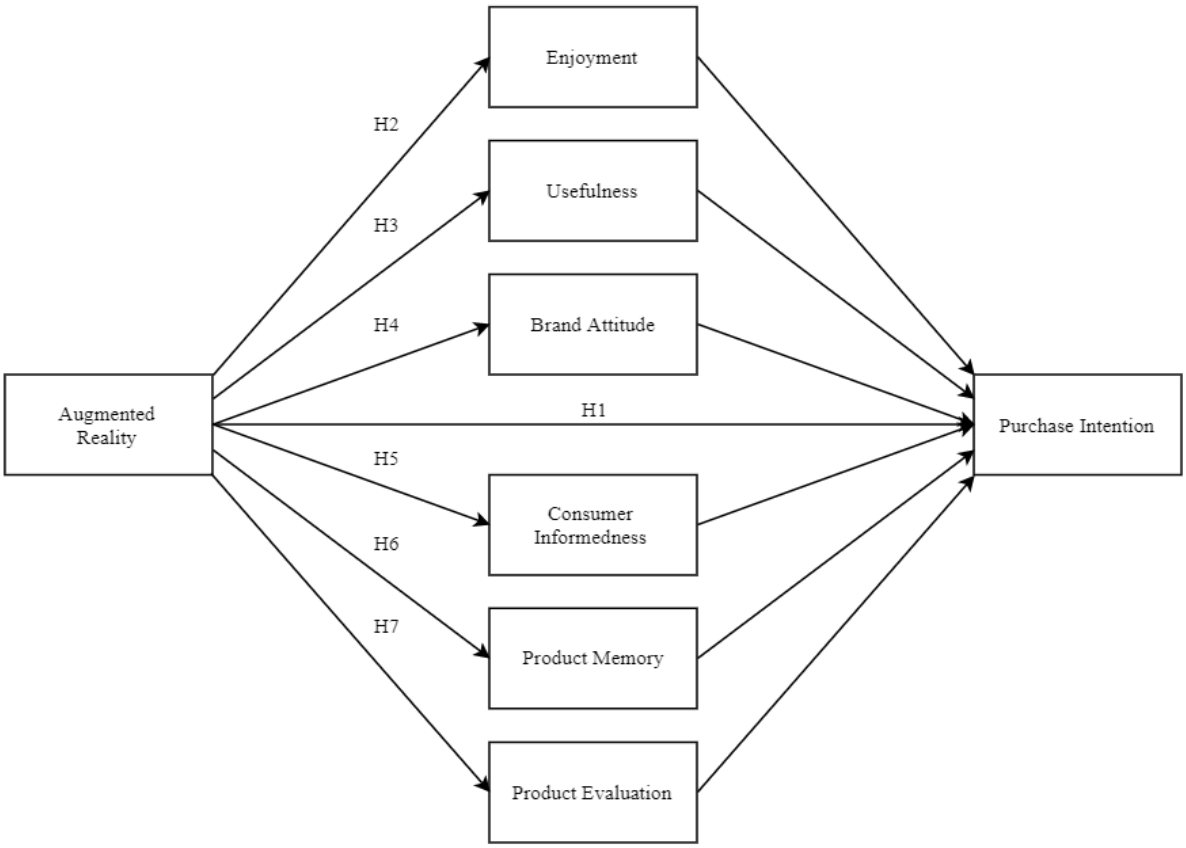


Table 1 summarizes the hypotheses that derived from the theoretical framework and were then formed into the research model. These clarify the expectations of existing connections between Augmented Reality and the dependent variables.

Table 1

*Hypotheses*

| Hypotheses |
| --- |
| H1: In comparison to a website, Augmented Reality has a higher positive influence on a customer's purchase intention. |
| H2: In comparison to a website, Augmented Reality has a higher positive influence on a customer's level of enjoyment. |
| H3: In comparison to a website, Augmented Reality is perceived as the more useful tool for product marketing. |
| H4: In comparison to a website, Augmented Reality has a higher positive influence on a customer's brand attitude. |
| H5: In comparison to a website, Augmented Reality will leave a consumer more informed about the product. |
| H6: In comparison to a website, Augmented Reality has a higher positive influence on a customer's product memory. |
| H7: In comparison to website users, consumers using Augmented Reality have an improved feeling of being able to evaluate the product characteristics. |

## 3. Methods

### *3.1 Procedure*

In order to answer the research question of this study, an experimental research with Augmented Reality and a product website was conducted. This specific research was built in a manner that allows for a comparison between two distinct groups: 1) A manipulation group that tested a mobile product website in addition to the embedded Augmented Reality feature and 2) the control group, which was solely exposed to the mobile product webpage. Participants were randomly assigned to one of the two groups. The conducted research consists of two parts with the main part being an experimental study and subsequently a questionnaire to measure sentiments resulting from the experiment. The ethics committee of the University of Twente granted the permission to conduct the research in this specific manner. Firstly, participants were briefed regarding the origin and procedure of the study, as well as any existing privacy implications and associated risks.

Secondly, after being presented with a consent form and signing it to allow participation, the individuals were given time to explore a mobile product website that presents and promotes a backpack. Here, they find various pictures of the backpack in an opened and close state as well as detailed descriptions about its functions and characteristics, such as size and weight. The participants were then given the instruction to act in an organic manner as if they were to shop for a backpack online. After notifying a confident level of knowledge about the product, the manipulation group was given the embedded Augmented Reality feature of the website as a stimulus material, which simulates a three-dimensional version of the backpack into the real environment of the user. This feature estimates the size of the room and adjusts the calculated size of the simulation accordingly. Following, the participants of the manipulation group were given time to explore the simulated backpack and evaluate the product through this different perspective. This meant walking around the room and spectate the backpack through the phone display from a very close and detailed distance as well as farther away. The difference between the product website and the AR-simulation are visualized through two screenshots below the procedures.

After the certain participant notified that the simulation was discovered sufficiently, they were given a questionnaire and asked to indicate their sentiment regarding the brand, the product and their personal opinion of it. The control group on the other hand was asked to complete the survey immediately after reading through the product website. After completing the questionnaire, participants were debriefed regarding further information as well as the

intention of the study. On average, the complete research procedure took approximately 15 minutes per participant. This experiment was conducted with a one on one interaction between researcher and respondent in order to ensure sufficient understanding of the procedure. Additionally, this procedure ensured an absence of bias regarding the answers of the survey as participants were not able to express opinions to one another during their experiment.

Figure 2

*Mobile Product Website*

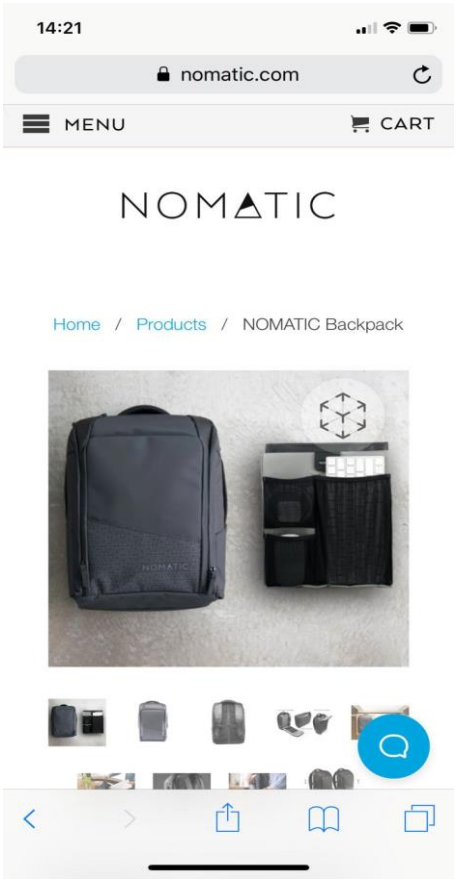



Figure 3

*AR Simulation*

*3.2 Sample*

The final sample consisted of 60 students that were equally distributed into the two experimental groups (N=30). Students were specifically targeted due to them being in a close age bracket as well as being used to using technology more regularly compared to older demographics. Additionally, this age group is a fundamental target group for the online shopping sector and therefore represents a fruitful group of potential target customers. This tech-savvy demographic experiences less difficulties when adopting novel technologies and can quickly adapt to innovations that the market offers. In total, the age ranged from 19 to 27 and reported a mean of 21,5 years. The final sample consisted of 41,7% male participants (N=25)

and 58,3% female participants (N=35). The figure with the gender distribution can be found within Appendix A. Additionally, participants were asked about pre-existing experience with Augmented Reality which turned out to be equally distributed with 30 participants having prior experience and 30 participants without any experience with Augmented Reality prior to the research. These were distributed almost entirely equally across groups, as 14 participants of the manipulation group and 16 participants of the control group had prior experience using Augmented Reality.

Further, it is of interest to note that a total of 71,7% of the participants (N=43) are currently enrolled in Communication Science, followed by 18,3% psychology students (N=11) and 10% students from the course of International Business Administration (N=6). This means that all 60 participants follow a course within the faculty of BMS (Behavioral, Management and Social Sciences) and therefore have a similar educational background. It is of equal importance to mention that 34 participants originally come from Germany, followed by 19 participants from the Netherlands, who together account for an accumulated percentage of 88,4% of the sample. Inhabitants of these two neighboring countries are exposed to similar marketing strategies as well as a comparable level of innovative technologies and therefore do not differ greatly in these fields. Furthermore, the sample consisted of two participants from Bulgaria as well as one participant each from the countries of Brazil, Romania, St. Maarten, Switzerland and the United States of America. The participants were personally approached on the campus of the University of Twente as well as via the scientific research platform SONA in which eligible students can sign up for participation.

### *3.3 Design, Instruments and Measurements*

This research was conducted using a mixed methods approach as it includes both an experimental study as well as a questionnaire. Additionally, the research was approached in a 2x1 design as the sole independent variable of the condition (AR and website) was exposed to one setting each. As pretest, the survey was primarily conducted with ten participants from the intended target group in which they were asked to freely express existing ambiguities and concerns regarding the experiment and the questionnaire. In this pretest, participants were exposed to the same product website and AR feature. However, the participants reported confusion about American measurements (such as ‘lbs’ and ‘oz’), which were then clarified for participants in the main study. Equal adjustments were executed for the term of “lifting handles”, which seemed unclear for participants during the pretest. Questions were also tried to be reformulated as self-explanatory as possible to avoid any further confusion.

Moreover, it was found that the AR feature needs sufficient lighting in a room and works better in rooms that have indications for size measurements, such as tables, chairs, etc. To ensure smooth procedures during the main study, the experiments were conducted in appropriate rooms. After taking the feedback into account and adjusting the questionnaire accordingly, the variables were measured. These are targeting both the product and the brand 'Nomatic' that was used as a case example due to the company using AR within their product marketing processes.

Firstly, the survey asks for demographic variables, being age, gender, experience with AR, country of origin and the current study that the participant is following. Secondly, brand attitude was measured using the items 'Buying Nomatic is a good choice', 'Nomatic is a satisfactory brand', 'Nomatic has a lot of beneficial characteristics' and 'I have a favorable opinion of Nomatic'. These items were received from the advertising study by Putrevu and Lord (1994) and measured on a 7-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree'. This scale was found to be reliable with a Cronbach's alpha of .84. The table for this as well as for the following reliability analyses can be found in Appendix B.

The items for the control group solely measured and included the wording "website", whereas the manipulation group found the wording "website + AR" in their questionnaire. Following, the same Likert scale was applied to measure enjoyment via the items of 'It's fun to use the website/AR', 'I find the website/AR enjoyable and fascinating', and 'Using the website/AR is so interesting that I don't do anything else while using it.' These items were retrieved from the same advertising study as the items for brand attitude. Within this research, the attributes yielded in a satisfactory Cronbach's alpha of .95. Following, perceived usefulness was measured with the same scale on the items 'The website/AR is useful for seeking information regarding the product', 'The website/AR enhances my effectiveness to seek information', 'I would like to use the website/AR to seek information about the product' and 'Overall, I find the website/AR useful for online shopping'. The items measuring perceived usefulness were retrieved from a study regarding smart technologies by Pal, Funilkul, Vanijja, and Papasratorn (2018). These items were successfully tested towards their reliability with a Cronbach's alpha of .87.

Subsequently, the following variable of consumer informedness was measured on a 7-point Likert scale using the items 'I feel informed about what the product really looks like.', 'I feel informed about the objective characteristics of the product.', 'I feel informed about what the product is really like to use.' as well as 'I feel informed about the extent to which the product meets my requirements.'. These items are grounded in research by Smith, Johnston and Howard

(2011) in their study dealing with virtual online shopping. The consumer informedness items combined reached a Cronbach's alpha of .88. Regarding the variable of purchase intention itself, the measurement items included 'It is very likely that I will buy a Nomatic backpack.', 'I will purchase Nomatic next time I buy a backpack.' and 'I will definitely try Nomatic.', measured on a 7-point Likert scale. This construct was found to be reliable with a Cronbach's alpha of .93.

Following, the participants were challenged in their visual memory of the product's details through three different open-ended questions which asked the participants to indicate how many times the brand name was depicted on the product, as well as how many zippers and lifting handles are found on this backpack. Since these items are of very product-specific nature, they are not grounded in literature but take on a more explorative approach. As these questions were not being measured on a scale, a point system for evaluation was developed. Participants who gave the correct answer were rewarded three points, answers that were +/-1 away from the correct answer were rewarded two points. If an answer was +/- 2 away from the correct answer, it was awarded with one point, whereas any other answer was not rewarded points at all.

Lastly, participants evaluated the product in terms of it being a fit with their lifestyle, namely 'I can evaluate if the product suits my lifestyle.', 'I can evaluate the product details', 'I can evaluate if the product suits my needs.', and lastly 'I can evaluate the product's material.', which measures how well customers feel like they can evaluate the used material and the quality of it. These measures yielded in a satisfactory Cronbach's alpha of .83. The used items are a means to determine the added value that AR has for these concepts.

### *3.4 Analysis*

To test the hypotheses presented in the theoretical framework, the survey results were analyzed using the program SPSS. After utilizing the program to ensure reliability regarding the survey items, a Univariate analysis was conducted for each of the dependent variables in order to determine the significance of existing differences between groups.

## 4. Results

To provide an answer to the aforementioned research hypotheses, seven univariate analyses were conducted. The F-values of each of the dependent variables are reported to determine the significance of the condition on the specific variables.

### *4.1 Purchase Intention*

Table 2

*Descriptive Statistics Purchase Intention*

| Dependent Variable: Purchase_Intention | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 2,89 | 1,13 | 30 |
| Augmented Reality | 4,86 | 1,51 | 30 |
| Total | 3,82 | 1,65 | 60 |

With respect to the purchase intention, the analysis showed a statistically significant main effect for the condition ($F(1,58) = 32.56$, $p = <0.001$). This analysis can be found in Table 17 in Appendix C. Using AR induced a higher likelihood of a purchasing process ($M = 4.86$, $SD = 1.51$) than being exposed to the website of a product ($M = 2.89$, $SD = 1.13$). Thereby, using an AR feature is more likely to trigger a purchase transaction than the conventional method. Subsequently, the first hypothesis H1 can confidently be supported, as AR has proven itself to have a significant effect on the purchase intention of a customer in the context of online shopping.

### *4.2 Enjoyment*

Table 3

*Descriptive Statistics Enjoyment*

| Dependent Variable: Enjoyment | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 3,48 | 1,26 | 30 |
| Augmented Reality | 6,21 | ,80 | 30 |
| Total | 4,84 | 1,73 | 60 |

With the participants' indicated level of enjoyment, a similar pattern emerged. The main effect of the condition on enjoyment was significant (F (1, 58) = 100.80, p = <0.001). The associated ANOVA-table is reported in Appendix C as Table 18. The condition including Augmented Reality (M = 6.21, SD = 0.80) lead to a higher enjoyment of the online shopping process as compared to the condition including the product webpage (M = 3.48, SD = 1.26). Therefore, the hypothesis H2 is supported, as AR has a significant effect on the customer's level of enjoyment while online shopping

*4.3 Usefulness*

Table 4

*Descriptive Statistics Usefulness*

| Dependent Variable: Usefulness | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 5,18 | ,86 | 30 |
| Augmented Reality | 6,26 | ,58 | 30 |
| Total | 5,72 | ,91 | 60 |

With respect to the degree of usefulness that the participants indicated, the main effect of the condition was statistically significant (F (1,58) = 32.25, p = <.001). This analysis can be found as Table 19 in the appendix. Hereby, Augmented Reality (M = 6.26, SD = .58) lead to an increased perception of the usefulness compared to the website (M = 5.18, SD = .86). This analysis leads to support of the hypothesis H3, as AR is significantly influencing the perceived usefulness of the online shopping experience.

*4.4 Brand Attitude*

Table 5

*Descriptive Statistics Brand Attitude*

| Dependent Variable: Brand_Attitude | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 4,93 | ,92 | 30 |
| Augmented Reality | 5,76 | ,70 | 29 |
| Total | 5,33 | ,92 | 59 |

The analysis regarding the participants' attitude towards Nomatic displayed a statistically significant effect of the condition on the variable of brand attitude (F (1,57) = 15.24, p = <0.001). The ANOVA is reported as Table 20 in Appendix C. Hereby, the manipulation group using AR indicated a more positive brand attitude (M = 5.76, SD = .70) compared to the control group using solely the website (M = 4.93, SD = .92). Therefore, the hypothesis H4 can be supported, as a significant effect of AR on brand attitude is found.

*4.5 Consumer Informedness*

Table 6

*Descriptive Statistics Consumer Informedness*

| Dependent Variable: Consumer_Informedness | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 4,51 | 1,14 | 30 |
| Augmented Reality | 5,91 | ,57 | 30 |
| Total | 5,21 | 1,14 | 60 |

As for consumer informedness, the main effect of the condition was significant as well (F (1,58) = 36.00, p = <0.001). The associated analysis is reported within Table 21 in the appendices. Using Augmented Reality resulted in an increased level of knowledgeability regarding the product (M = 5.91, SD = .57) in comparison to solely using the website (M = 4.51, SD = 1.14). In respect to these findings, the hypothesis of H5 is supported, as AR significantly increases the level of informedness that a potential customer experiences in this online shopping context.

*4.6 Product memory*

Table 7

*Descriptive Statistics Product Memory*

| Dependent Variable: Product_Memory_New | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 1,47 | ,86 | 30 |
| Augmented Reality | 1,72 | ,90 | 30 |
| Total | 1,59 | ,88 | 60 |

With respect to the explorative construct of product memory, it is the least fruitful variable of this research, as the main effect of the condition was measured at insignificant values (F (1, 58) = 1.27, p = .265). This analysis can be found in Appendix C as Table 22. Even though the product memory score was found to be increased in the manipulation condition (M = 1,72, SD = .90), this difference is not significant as opposed to the control group (M = 1,47, SD = .86). Therefore, the hypothesis of H6 cannot be supported as Augmented Reality does not significantly increase the product memory of online shopping customers.

*4.7 Product evaluation*

Table 8

*Descriptive Statistics Product Evaluation*

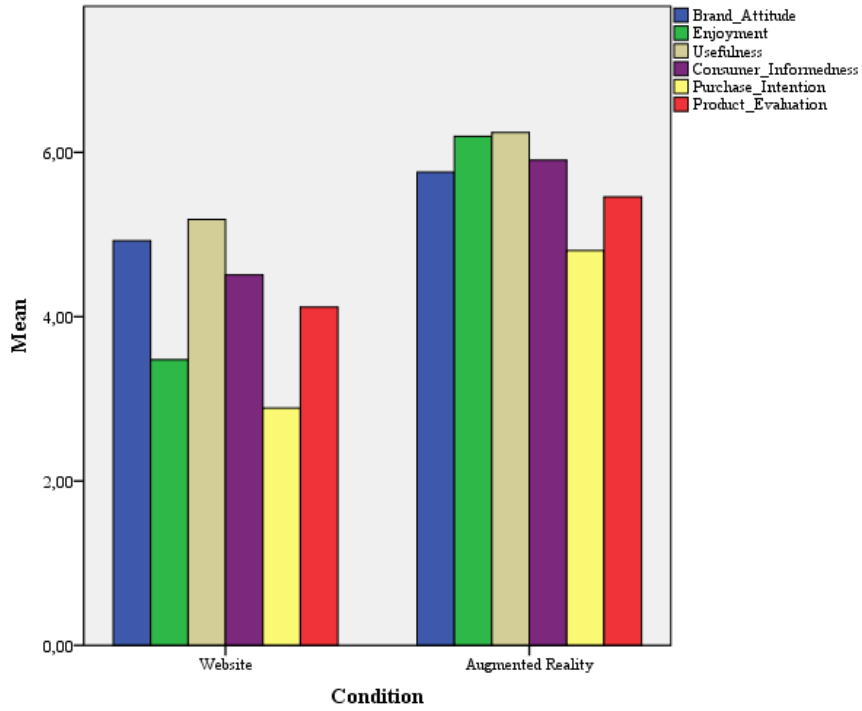
| Dependent Variable: Product_Evaluation | | | |
|---|---|---|---|
| Condition | Mean | Std. Deviation | N |
| Website | 4,12 | 1,13 | 30 |
| Augmented Reality | 5,46 | ,69 | 30 |
| Total | 4,79 | 1,15 | 60 |

In regard to the last variable, being product evaluation, the analysis yielded a statistically significant main effect of the condition on the level of how well a participant could evaluate the backpack depicted online (F (1, 58) = 30.80, p = <0.001). The associated analysis can be found as Table 23 in Appendix C. Using AR lead to a more confident result of product evaluation (M = 5.46, SD = .70) than using the product's website (M = 4.12, SD = 1.13). Lastly, the associated hypothesis H7 is supported as AR does in fact significantly influence the extent to which a customer can evaluate a product in an online shopping environment.

Figure 4 illustrates the significant dependent variables and their mean differences on the 7-point Likert scale between the two conditions. As seen below, the manipulation group shows a visible increase in their indicated means. The mean scores represent the Likert scale indications, ranging from 1 = 'Strongly disagree' to 7 = 'Strongly Agree'.

Figure 4

*Significant dependent variables*




Within Figure 5, the research model is exhibited once again and includes the p-values for the significance of each variable. This illustrates the amount of significant effects and visually emphasizes the impact of AR on the antecedents of purchase intention.

Figure 5

*Research Model with significance*

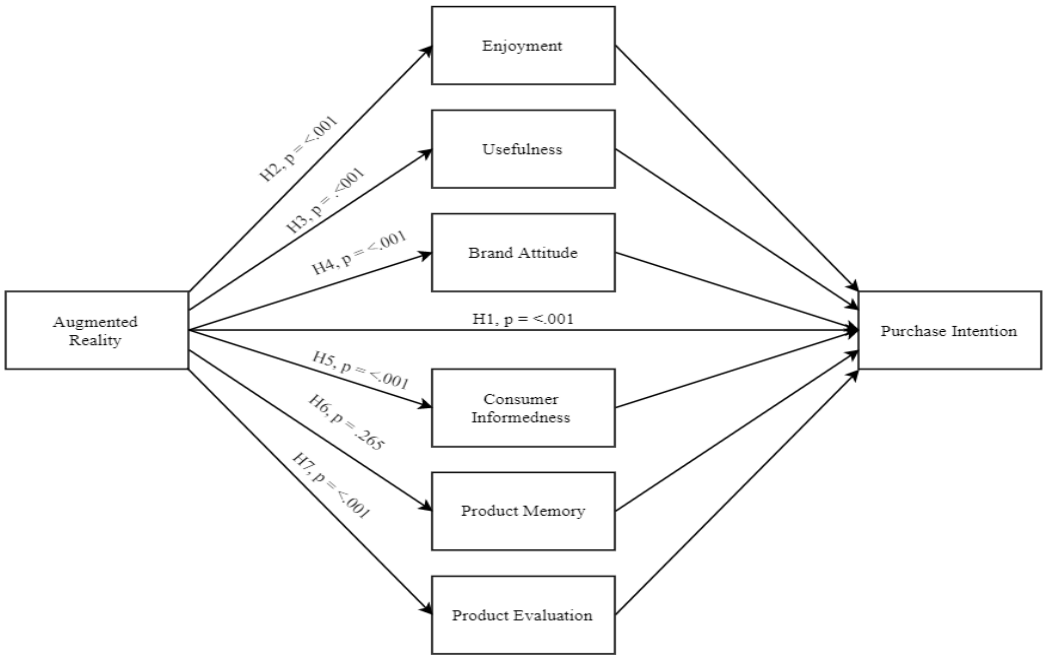


Table 9 reports the previously stated hypotheses after being measured and analyzed. Moreover, the table indicates if or if not the hypotheses are supported by the findings of this study.

Table 9

*Hypotheses with Support*

| Hypotheses | Supported |
|---|---|
| H1: In comparison to a website, Augmented Reality has a higher positive influence on a customer's purchase intention. | Yes |
| H2: In comparison to a website, Augmented Reality has a higher positive influence on a customer's level of enjoyment. | Yes |
| H3: In comparison to a website, Augmented Reality is perceived as the more useful tool for product marketing. | Yes |
| H4: In comparison to a website, Augmented Reality has a higher positive influence on a customer's brand attitude. | Yes |
| H5: In comparison to a website, Augmented Reality will leave a consumer more informed about the product. | Yes |
| H6: In comparison to a website, Augmented Reality has a higher positive influence on a customer's product memory. | No |
| H7: In comparison to website users, consumers using Augmented Reality have an improved feeling of being able to evaluate the product characteristics. | Yes |

## 5. Discussion and Limitations

### *5.1 Discussion*

Reviewing relevant literature and conducting a study into the added value of Augmented Reality in online shopping experiences demonstrates the capability of upcoming innovative technologies for the marketing sectors. This confirms the expectations deriving from reviewed findings in literature that ranks innovative technologies as more fruitful compared to their conventional counterparts. The objective of the research at hand was to scientifically determine if and to what extent the implementation of Augmented Reality has an influence on a customer's purchase intention and its antecedents compared to using the same product's website. Following the previous results and significant effects of the condition, this study can answer the research question by stating that Augmented Reality in fact does generate a higher purchase intention in online shopping compared to a product website. Generally speaking, the findings support the claim that Augmented Reality does positively influence both the purchase intention and its antecedents. To be specific, a statistically significant difference between the two conditions has been found for all constructs except product memory. Within the significant constructs, five of six influence the variable of purchase intention. This discussion will focus on interpreting the previously stated results and their implications for the marketing sector before drawing general conclusions about the findings of this study.

As expected, the biggest difference between the two means was found within the construct of enjoyment (difference of 2,73 points on the 7-point Likert scale). While the average answer of the control group lead to a "Slightly disagree", the manipulation group answered "Agree" on average, leading to a much higher level of enjoyment between the group and shifting from a negative to a positive answer. This phenomenon was expected as a website used for online shopping rarely differs from competing websites and often is focused on functionality and product information instead of providing an enjoyable experience. Augmented Reality however has an innovative nature and invites the user to playfully engage with the feature. The smallest difference between groups was found in the variable of *brand attitude*. This construct had a mean difference of .83 on the Likert scale and thereby makes up the only variable with a mean difference below one point on the Likert scale. This can be explained by the fact that the AR feature is purely focused on the product at hand and has less of a direct connection towards the brand 'Nomatic' itself.

With almost two points difference on the Likert scale, purchase intention is the construct with the second highest difference between the two conditions. The implementation of the

manipulation to the process shifts the average answer of "Slightly disagree" from the website group towards a "Slightly agree" for the group of participants using AR. This change from a negative to a positive sentiment is the most fundamental finding, as this significantly proves that purely the usage of AR obtains the power to convince a potential customer of a product purchase. This study confirms the findings of Pantano, Rese and Bier (2017) which stated that both enjoyment and purchase intention are increased by the usage of Augmented Reality and approves its translation to the online shopping context. Moreover, it is of importance to notice the increase in product evaluation that the participants indicated. The participants reported to be more confident when it comes to evaluating the product, its material and its characteristics. This is especially crucial in the online shopping context, as the lack of physical access to the product can be compensated to a certain extent simply by implementing AR into the online shopping experience. Showing this increase in their evaluative confidence shows the deep urge that online stores have towards a better understanding of their user's needs. Platforms need to cater to these exact wishes and requirements instead of simply staying with whatever worked so far, as steadily evolving times like these do not work that way.

A further remarkable notion is the fact that consumer informedness scored the highest average answer with 6.21 ('Agree', leaning towards 'Strongly agree') in the group using AR. This number illustrates that the implementation of AR has the ability to almost maximize the customer's indication of their feeling of being informed about the product. These findings act as prove to marketing professionals that a purchase does in fact not solely depend on the product itself, but very much so on its contextual presentation. The same product presented in different ways can ultimately lead to a large difference in a company's sales, emphasizing the importance of the marketing platforms and strategies that surround a product. As proposed by Li, Daugherty and Biocca (2002), the simulated experience does in fact create an improved knowledgeability about the product and can be applied to the context of online shopping. Summarizing, there seem to be no apparent downsides or drawbacks to Augmented Reality in marketing. The lack of disadvantages in this study raises the question as to why companies do not have this innovation on their radar yet or even actively decide against it. Obtaining information about a product is one of the main needs and objectives that a user has on a product website, which makes it seem irrational to not maximize the extent to which he or she feels informed. This shows how companies often do not quite maximize their way of catering to the customer's wishes and thereby create an optimized user experience.

Especially in the constantly evolving day and age of online shopping and online marketing, companies have to keep up to the pace of innovation. Even though recent research

suggests similar findings, those studies often theorized AR functions of smartwatches or glasses instead of smartphones, which are the more feasible alternative (Yim, Chu & Sauer, 2017). This study gives reason to assume that Augmented Reality is the appropriate means that can currently catapult companies ahead of their competitors. After all, AR can effectively and positively lead to an improved brand attitude, a more enjoyable online shopping experience and a potential customer that feels more informed, can evaluate the product better and is more likely to turn these beliefs and experiences into an actual purchase. Especially combining the web-based approach with Augmented Reality than can be beneficial on a global level (Schmalstieg, Langlotz & Billinghorst, 2011). Considering these newly acquired facts turns AR into a remarkable marketing tool that should have a place in every marketeer's repertoire, as it can trigger an unparalleled increase of advantages for a company. Taking the significant influence of AR to purchase intention and its antecedents into account makes Augmented Reality not an option, but a necessity.

### *5.2 Limitations*

This research faced various limitations that confined or restricted its success to a certain extent. The novelty of the innovative technology that is AR lead to the limitation of having only very limited knowledge and understanding about the long-term effects that it entails. This scarceness of reference points makes it hard to figure out how AR will perform on the long run (Bulearca & Tamarjan, 2010). However, this means that this research can contribute to the currently evolving body of literature and offer insights for marketeers and scientists in the future.

Additionally, there are several limitations that have to be acknowledge that regard the variables themselves. The first limitation concerns the variable of product memory, which is complicated to measure. This is due to the questions being product-specific, which did not allow for existing and valid items. Additionally, people explored the AR feature and might have easily been overwhelmed by it and therefore did not focus on the product details such as the number of zippers. The number of zippers or the amount of times the brand name is depicted on a product is something that people often would not even know about their current product, let alone an additional one they explored in a simulation for a few minutes. The options within AR enjoy creative freedom and less boundaries than conventional methods, but it has to start somewhere. Even though this research was significant, this only accounts for products such as backpacks and might differ from other products that are more complex to simulate. Therefore, the same research has to be conducted in a broad range of sectors to ensure that AR has an added effect for the different products.

As for many researches, the sample size is a factor that can almost always be increased and thereby improved. Future research should therefore include a higher sample size than the current 60 participants and thereby ensure a higher level of both reliability and validity. Moreover, the intended target group within the sample purely consisted of young students that are technology affined. It would be of interest to prove how other demographics such as an older, less tech-savvy generation or non-students of the same age would indicate their sentiments towards Augmented Reality.

## 6. Conclusion

This research delved into the utilization and benefits of Augmented Reality within product marketing in the online shopping context. This study supports the idea that the proposed interplay between the customer and the AR feature can effectively lead to an improved customer experience, resulting in a higher purchase intention. By generating an improvement in five of six antecedents of purchase intention, being *enjoyment, perceived usefulness, brand attitude, consumer informedness* and *product evaluation*, AR possesses the capacity to positively influence a company's profit. This study contributes to the growing body of work revolving around AR in the context of online shopping and offers a starting point for fellow researchers to consider AR's impact for different products of other sectors. Moreover, this research emphasizes the need for further research on this topic by accentuating the paradox between the limited current research and AR's considerable impact on product marketing. Because now more than ever, it is important to put the 'AR' in 'MARketing'.

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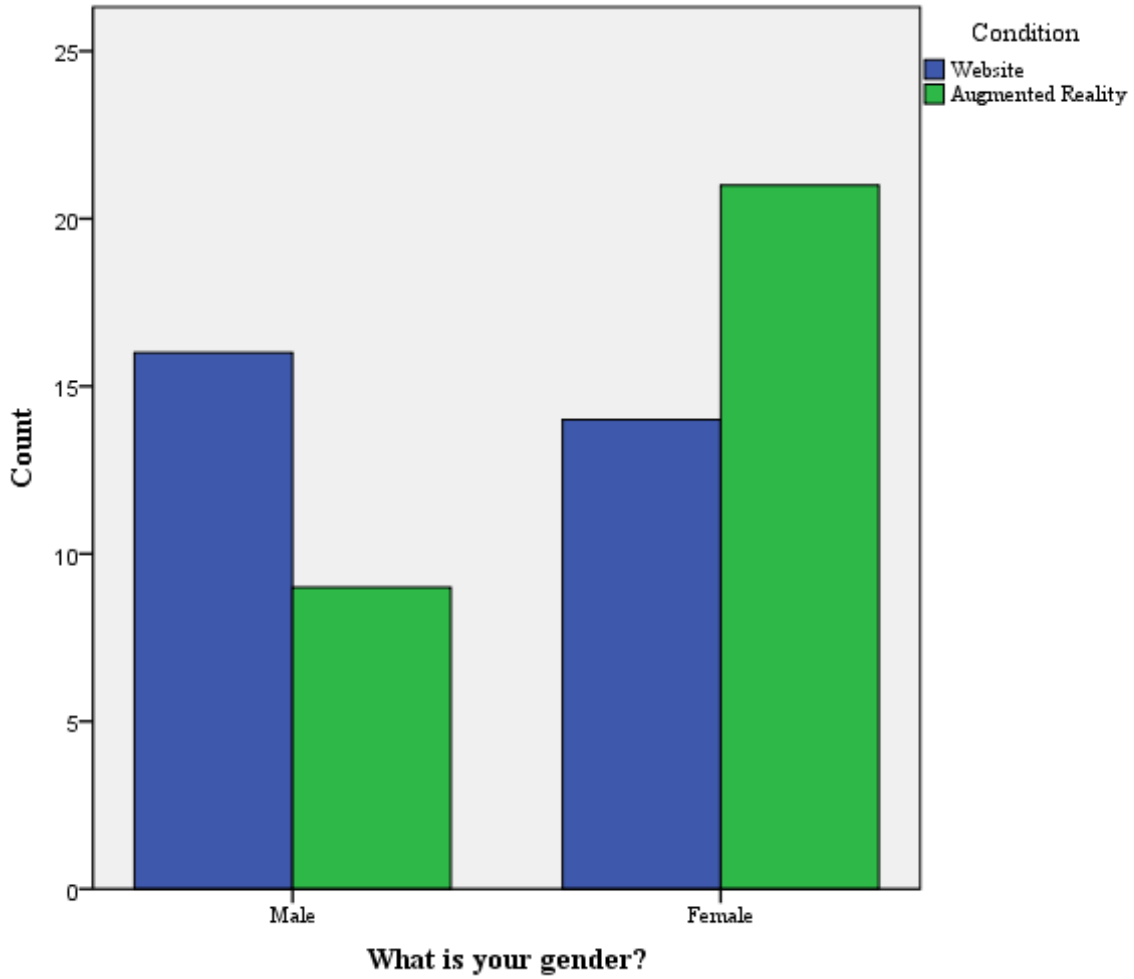
**Enclosures**

Appendix A: Demographics Table

Figure 6

*Gender Distribution*



Appendix B: Reliability Analyses

Table 10

*Reliability Statistics BA*

| Cronbach's Alpha | N of Items |
|---|---|
| ,84 | 4 |

Table 11

*Reliability Statistics EN*

| Cronbach's Alpha | N of Items |
|---|---|
| ,95 | 3 |

Table 12

*Reliability Statistics US*

| Cronbach's Alpha | N of Items |
|---|---|
| ,87 | 4 |

Table 13

*Reliability Statistics CI*

| Cronbach's Alpha | N of Items |
|---|---|
| ,88 | 4 |

Table 14

*Reliability Statistics PI*

| Cronbach's Alpha | N of Items |
|---|---|
| ,93 | 3 |

Table 15

*Reliability Statistics PE*

| Cronbach's Alpha | N of Items |
|---|---|
| ,83 | 4 |

Table 16

*Reliability Statistics PM*

| Cronbach's Alpha | N of Items |
|---|---|
| ,95 | 3 |

Appendix C: F-Test Tables

Table 17

*Tests of Between-Subjects Effects*

| Dependent Variable: Purchase_Intention | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 58,02[a] | 1 | 58,02 | 32,56 | ,00 |
| Intercept | 899,65 | 1 | 899,65 | 504,95 | ,00 |
| Condition | 58,02 | 1 | 58,02 | 32,56 | ,00 |
| Error | 103,34 | 58 | 1,78 | | |
| Total | 1061,00 | 60 | | | |
| Corrected Total | 161,35 | 59 | | | |

a. R Squared = ,36 (Adjusted R Squared = ,35)

Table 18

*Tests of Between-Subjects Effects*

| Dependent Variable: Enjoyment | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 112,07[a] | 1 | 112,07 | 100,80 | ,00 |
| Intercept | 1408,12 | 1 | 1408,12 | 1266,58 | ,00 |
| Condition | 112,07 | 1 | 112,07 | 100,80 | ,00 |
| Error | 64,48 | 58 | 1,11 | | |
| Total | 1584,67 | 60 | | | |
| Corrected Total | 176,55 | 59 | | | |

a. R Squared = ,64 (Adjusted R Squared = ,63)

Table 19

*Tests of Between-Subjects Effects*

| Dependent Variable: Usefulness | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 17,33[a] | 1 | 17,33 | 32,25 | ,00 |
| Intercept | 1963,68 | 1 | 1963,68 | 3653,11 | ,00 |
| Condition | 17,33 | 1 | 17,33 | 32,25 | ,00 |
| Error | 31,18 | 58 | ,54 | | |
| Total | 2012,19 | 60 | | | |
| Corrected Total | 48,51 | 59 | | | |

a. R Squared = ,36 (Adjusted R Squared = ,35)

Table 20

*Tests of Between-Subjects Effects*

| Dependent Variable: Brand_Attitude | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 10,25[a] | 1 | 10,25 | 15,24 | ,00 |
| Intercept | 1683,08 | 1 | 1683,08 | 2502,94 | ,00 |
| Condition | 10,25 | 1 | 10,25 | 15,24 | ,00 |
| Error | 38,33 | 57 | ,67 | | |
| Total | 1727,69 | 59 | | | |
| Corrected Total | 48,58 | 58 | | | |

a. R Squared = ,21 (Adjusted R Squared = ,20)

Table 21

*Tests of Between-Subjects Effects*

| Dependent Variable: Consumer_Informedness | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
| Corrected Model | 29,40[a] | 1 | 29,40 | 36,00 | ,00 |
| Intercept | 1627,60 | 1 | 1627,60 | 1992,81 | ,00 |
| Condition | 29,40 | 1 | 29,40 | 36,00 | ,00 |
| Error | 47,37 | 58 | ,82 | | |
| Total | 1704,38 | 60 | | | |
| Corrected Total | 76,77 | 59 | | | |

a. R Squared = ,38 (Adjusted R Squared = ,37)

Table 22

*Tests of Between-Subjects Effects*

| Dependent Variable: Product_Memory_New | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | ,98[a] | 1 | ,98 | 1,27 | ,27 |
| Intercept | 152,54 | 1 | 152,54 | 197,40 | ,00 |
| Condition | ,98 | 1 | ,98 | 1,27 | ,27 |
| Error | 44,82 | 58 | ,77 | | |
| Total | 198,33 | 60 | | | |
| Corrected Total | 45,80 | 59 | | | |

a. R Squared = ,02 (Adjusted R Squared = ,01)

Table 23

*Tests of Between-Subjects Effects*

| Dependent Variable: Product_Evaluation | | | | | |
|---|---|---|---|---|---|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 27,00[a] | 1 | 27,00 | 30,80 | ,00 |
| Intercept | 1375,21 | 1 | 1375,21 | 1568,51 | ,00 |
| Condition | 27,00 | 1 | 27,00 | 30,80 | ,00 |
| Error | 50,85 | 58 | ,88 | | |
| Total | 1453,06 | 60 | | | |
| Corrected Total | 77,85 | 59 | | | |

a. R Squared = ,35 (Adjusted R Squared = ,34)

Appendix D: Questionnaire

Table 24

*Questionnaire*

| Variable | Items |
|---|---|
| Demographics | What is your age? |
| | What is your gender? |
| | Do you have any experience with Augmented Reality? |
| | What is your country of origin? |
| | What are you currently studying? |
| Brand Attitude | Buying Nomatic is a good choice. |
| | Nomatic is a satisfactory brand. |
| | Nomatic has a lot of beneficial characteristics. |
| | I have a favorable opinion of Nomatic. |
| Enjoyment | It's fun to use the website (+ AR). |
| | I find the website (+ AR) enjoyable and fascinating. |
| | Using the website (+ AR) is so interesting that I don't do anything else while using it. |
| Perceived Usefulness | The website (+ AR) is useful for seeking information regarding the product. |
| | The website (+ AR) enhances my effectiveness to seek information. |
| | I would like to use the website (+ AR) to seek information about the product. |
| | Overall, I find the website (+ AR) useful for online shopping. |

| | |
|---|---|
| Consumer Informedness | I feel informed about what the product really looks like. |
| | I feel informed about the objective characteristics of the product |
| | I feel informed about what the product is really like to use. |
| | I feel informed about the extent to which the product meets my requirements. |
| Purchase Intention | It is very likely that I will buy a Nomatic backpack. |
| | I will purchase Nomatic next time I buy a backpack. |
| | I will definitely try Nomatic. |
| Product Memory | How many zippers does the backpack have? |
| | How many times did u see the brand name on the backpack? |
| | How many lifting handles does the backpack have? |
| Product Evaluation | I can evaluate if the product suits my lifestyle. |
| | I can evaluate the product details. |
| | I can evaluate if the product suits my needs. |
| | I can evaluate the product's material. |

Appendix E: Mandatory Literature Study Log

1. **Research Questions and Main Concepts for the Literature Study:**

**Research Questions**: In comparison to a website, how does Augmented Reality affect the user's product evaluations and purchase intention?

**Variables**: Augmented Reality, Website, Purchase Intention, Brand Attitude, Perceived Usefulness, Enjoyment, Consumer Informedness, Product Memory, Product Evaluation

2. **Materials and Databases**

In order to retrieve relevant articles and build a sufficient theoretical framework as the basis of knowledge used for this research, the right means of searching had to be conducted. In this case, this includes searching and retrieving literature from the databases of Google Scholar and Scopus. Google Scholar is the world's biggest search engine for academic literature and holds more than 400 million documents. Scopus on the other hand is one of the largest databases for literature in the field of social sciences and was therefore expected to be of high value for this research. The reviewed material mostly includes journal articles as well as conference proceedings and books. Included literature was reviewed in English for the sake of coherence with the language of both the language of the study as well as this paper.

## 3. Search Actions and Results

Table 25

*Search Actions and Results*

| Nr. | Date | Database | Action & Terms | Results |
|---|---|---|---|---|
| 1 | 07.03.19 | Scholar<br>Scopus | “Brand Attitude” AND “Augmented Reality” | Scholar: 430<br>Scopus: 4 |
| 2 | 07.03.19 | Scholar<br>Scopus | “Brand Attitude” AND “Purchase Intention” | Scholar: 15.000<br>Scopus: 247 |
| 3 | 12.03.19 | Scholar<br>Scopus | Enjoyment AND “Augmented Reality” | Scholar: 12.200<br>Scopus: 108 |
| 4 | 12.03.19 | Scholar<br>Scopus | Enjoyment AND Purchase Intention | Scholar: 11.800<br>Scopus: 91 |
| 5 | 18.03.19 | Scholar<br>Scopus | Usefulness AND Augmented Reality | Scholar: 21.300<br>Scopus: 263 |
| 6 | 18.03.19 | Scholar<br>Scopus | Usefulness AND Purchase Intention | Scholar: 16.600<br>Scopus: 181 |
| 7 | 25.03.19 | Scholar<br>Scopus | Consumer Informedness AND Augmented Reality | Scholar: 3<br>Scopus: 0 |
| 8 | 25.03.19 | Scholar<br>Scopus | Consumer Informedness AND Purchase Intention | Scholar: 48<br>Scopus: 1 |
| 9 | 01.04.19 | Scholar<br>Scopus | Product Memory AND Augmented Reality | Scholar: 70<br>Scopus: 0 |
| 10 | 01.04.19 | Scholar<br>Scopus | Product Memory AND Purchase Intention | Scholar: 121<br>Scopus: 1 |
| 11 | 05.04.19 | Scholar<br>Scopus | Product Evaluation AND Augmented Reality | Scholar: 754<br>Scopus: 9 |
| 12 | 05.04.19 | Scholar<br>Scopus | Product Evaluation AND Purchase Intention | Scholar: 7.800<br>Scopus: 117 |
| 13 | 05.03.19 | Scholar<br>Scopus | Purchase Intention AND Augmented Reality | Scholar: 1.180<br>Scopus: 25 |
| 14 | 05.03.19 | Scholar<br>Scopus | Augmented Reality AND Product Marketing | Scholar: 813<br>Scopus: 1 |

## 4. Reflection

For the purpose of this study, it was important to review literature regarding the variables in connection to either Augmented Reality or purchase intention as the ultimate variable. While the database of Google Scholar often provided more articles than readable in the given timeframe, the results from Scopus were too limited at times. While the one search engine gave too many results, the other did not give enough, which ended up imbalanced. However, whenever Scopus offered a larger number of results, its filtering options provided specific literature from social sciences as well as recent articles for Augmented Reality topics. For Google Scholar, the search terms were not narrow enough, as they lead to over 20.000 results at times. The terminology was comparatively simple yet lead to the intended results. However, narrowing the Google Scholar search down to additional terms could have possibly led to literature of even higher relevance.