THE E-QUALITY-SATISFACTION-LOYALTY CHAIN AND VIRTUAL FITTING ROOM TECHNOLOGIES – AN EMPIRICAL ANALYSIS AMONG ONLINE SHOPPERS

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„Loyalty is not won with technology. It is won through the delivery of a consistently superior customer experience.
- Reichheld & Schefter, 2000, p.113 -

ABSTRACT

Businesses operating in the e-Commerce industry face severe competition and are reliant on establishing a loyal customer base. The most cited and examined antecedent of customer loyalty is customer satisfaction. Compared to the factors that influence customer satisfaction in a traditional retail store context, additional criteria apply when investigating customer satisfaction in an online setting. While many customers favor online shopping because of the associated convenience, a perceived downside of online shopping is the inability to evaluate garments and their fit before purchase resulting in an increasing amount of packages returned to the retailers. An approach to enable the customer to make a more informed judgment about the fit of a garment has been the introduction of virtual fitting room (VFR) technology. No previous studies have examined the impact of a VFR technology on customer experience. The author filled this void by investigating the effects of a VFR on transactional e-satisfaction while simultaneously exploring the relationships of transactional e-satisfaction, overall e-satisfaction and e-loyalty. In order to examine the impact of a VFR technology, the quality-satisfaction-loyalty chain was utilized and dimensions of quality chosen that could measure the experience with a VFR. An online survey was employed to investigate the relationships. As a means to investigate the hypotheses, multiple regression analysis and IBM's Watson ecosystem is used. The empirical analysis reveals that the e-quality-satisfaction-loyalty chain is applicable in this context. Among the examined e-quality dimensions, informational fit-to-task and visual appearance have the biggest predictive strength in determining transactional e-satisfaction. The impact of the third dimension innovativeness could only be confirmed using IBM Watson. Additionally, respondents with no prior experience with a VFR technology showed higher levels of transactional e-satisfaction and e-loyalty in turn. Gender is found to moderate the relationship of informational fit-to-task whereas prior experience with product return failed to show significance, suggesting that female online shoppers have a higher need of product information than males. As predicted, higher levels of e-satisfaction result in higher levels of e-loyalty providing further support for this widely acknowledged relationship. The findings corroborate the hypothesized mediating effect of overall e-satisfaction on e-loyalty only partially. For this reason, transactional e-satisfaction should remain within the focus of online retailers because it has a direct effect on the dependent variable. The author discusses the managerial implications of these findings and the limitations of the present study and offers directions for future research.

Key words: Customer e-satisfaction, virtual fitting room, customer e-loyalty, e-quality

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List of Abbreviations

3D	Three-Dimensional Space
ACSI	American Customer Satisfaction Index
B2B/B2C	Business to Business/Business to Customer
bn	Billion
DV	Dependent Variable
e-Commerce	Electronic Commerce
e.g.	exempli gratia (for example)
et al.	Et alii (and others)
EUR	Euro
i.e.	Id est (that means)
IIT	Image Interactivity Technology
IV	Independent Variable
LOY	Loyalty
PDP	Product Detail Page
SAT	Satisfaction
SERVQUAL	Service Quality Measurement Instrument
UK	United Kingdom
USD	US-Dollar
VFR	Virtual Fitting Room
WebQual™	WebQuality Measurement Instrument

1 Introduction

1.1 The Importance of Loyal Customers for every Business

Customer loyalty is something every company regardless of the industry they are operating in is thriving for. In times of fierce competition the benefits of having a loyal customer base are multifold and can ensure a businesse's survival in the future. Loyal customers tend to pay more than those seeking the lowest prices (Reichheld & Sasser, 1990, Kim, Jin, & Swinney, 2009), refer the retailer to other customers (Reichheld, Markey, & Hopton, 2000) and are therefore a vital source of long-term profit for online shops (Reichheld & Sasser, 1990, Anderson, Fornell, & Lehmann, 1994). Additionally, they purchase more frequently than newer customers (van Riel, Liljander, & Jurriëns, 2001). Customer loyalty management has therefore been at the focal point of both scholars and practitioners alike over the last decades (Reichheld & Sasser, 1990; Reichheld, 1993; Jones & Sasser, 1995). The definition of what loyalty conceptualizes has developed over time from a behavioral approach where loyalty was merely recognized by repeat purchases (Frank, 1967, McConnell, 1968) to a cognitive approach where attitudinal dimensions of loyalty are the focal point (Day, 1969, Lalaberba & Marzusky, 1973) to finally a combined approach where both are premises to customer loyalty (Dick & Basu, 1994, Jacoby & Kyner, 1973). Most of this literature was investigating the customer loyalty within the offline retail B2C or B2B settings. But what happens to the customer loyalty dynamics if it is settled into the online setting? Are customers still loyal? Are they still important for businesses or has their importance been diminished by the development of a global market place where a company can reach customers at the end of the world? There is undeniable evidence for the former (Park & Kim, 2003, Yang & Peterson, 2004, Toufaily, Ricard, & Perrien, 2013).

Electronic commerce (e-Commerce) is a part of the electronic business involving the purchase and sale of goods and services via online connections (Springer Gabler Verlag, 2011). It is still experiencing high growth rates with a sales volume of EUR 27.6 bn in 2012 in Germany alone (Germany Trade & Invest, 2013). Just recently, the Statistisches Bundesamt (2015) published a press release stating that the e-Commerce industry grew approximately 9% in the first half of 2015 compared to the previous year. According to a study from BITKOM (2014), customers mostly prefer to buy books online followed by apparel, shoes and accessories. Six out of ten customers stated that they have shopped for those items online. According to recent surveys customer prefer online to offline shopping for the following reasons: search for the best price (31% of respondents named it as primary reason (Donthu & Garcia, 1999), convenience of delivery to chosen address or because it can save time (Study by Fits.me, 2014, Farag, Schwanen, Dijst, & Faber, 2006, Chiang &

Dholakai, 2003, Donthu & Garcia, 1999) and the possibility to search for information and products (Chiang & Dholakai, 2003, Wolfinbarger & Gilly, 2001).

1.2 E-Satisfaction and Web Experience

On the one hand there is the importance of customer loyalty for the online industry, on the other hand the ever-rising variety of players in the e-Commerce sector. Dense competition always leads to the development of distinguishing features; for a time this differentiation has been mostly the price of products or services. Over the last decade this assumption evolved and businesses have acknowledged the importance of building a loyal customer base and have switched their efforts from attracting to retaining customers (Reichheld & Schefter, 2000). The loyalty construct is considered as a step-by-step process with the following antecedents: satisfaction, trust, perceived value and quality and corporate image among others (Jones & Sasser, 1995, Gefen, 2002, Cronin, Brady, & Hult, 2000, Andreassen & Lindestad, 1998). In case the focus lies on satisfaction in a digital environment, many factors might play a role that can be described as the web or digital experience of a customer and differ from those of offline settings. The relevance of a customers' digital experience becomes apparent with a multifold of software solutions for businesses (Powers, Grannan, & Yakkundi, 2014) and increasing literature in academia (Loiacono, Watson, & Goodhue, 2002, Wolfinbarger & Gilly, 2003, Constantinides, 2004, Gummerus, Liljander, Pura, & van Riel, 2004). The scope of what comprises the web experience differs between authors but usually involves factors such as usability, interactivity, trust and aesthetics.

1.3 Challenges of Online Retail

If the spotlight is on online retail businesses being part of the whole e-Commerce industry, one major challenge this industry is facing is the inability of customers to try on clothes and other items before purchasing them. This deficiency can result in several unfavorable outcomes for the company. First, customers decide not to purchase the item because they are not satisfied with the information provided about the size and fit of it (Wolfinbarger & Gilly, 2001). Second, customers order the desired item in one size and discover while trying it on, that it does not fit resulting in customer dissatisfaction and product return. Third, customers decide to buy and order multiple sizes to try them on at home thus automatically causing returns and therefore logistic costs for the company as well as dissatisfaction and effort required for returning the items on the customer site.

Recent reports indicate that the return rates differ from country to country. A study by Fits.me (2014) recorded in the UK showed a return rate ranging between 15% to 20% whereas in Germany, most of the retailers have to face a return rate of at least 20% (Statista, 2015). This shows that Germany represents a particularly challenging environment for

online retailing companies (Späth, 2014). Furthermore, the study identified that almost every third customer had already ordered multiple sizes (31%, Fits.me, 2014) with women accounting for 60% of those customers. All the aforementioned outcomes have in common that the customers are unsure about the fit of the items. In this case fit refers to far more than numbers on a sizing chart or a short description of the garment. Fit is dependent on a person's style as well as what they perceive as good looking on them. The online retail industry tries to cater to those needs with enhancing their customers' web experience by providing product images from different angles, model pictures or short product videos where customers can judge the garment in motion. What all these means are lacking is the possibility for customers to try them on their body type as well as see the garment in different sizes. Usually the product is worn by a professional model in a small size, which can in turn enhance the customer's concern of fit (Shin & Baytar, 2014).

1.4 Research Goal and Approach

From a practitioner's point of view it is evident that there is an increased need to find a solution to the aforementioned issue regarding size and fit concerns of customers. From a theoretical viewpoint, research in this area has been diverse and shown that antecedents of customer online satisfaction are different from those of an offline context. The technological possibilities of online shops alone provide enough arguments for that. Nevertheless past research did not cover the specific area of how technology can enhance customer's online experience of online shopping while simultaneously investigating the impact on satisfaction and loyalty in turn. Developments in the area of virtual fitting rooms (VFR) have been diverse; ranging from the usage of body scanners (e.g. Microsoft Kinect) to the creation of a digital avatar with customer's body measurements (Fiore & Jin, 2003, Kim, Fiore, & Lee, 2007). Recent acquisitions of startups in this segment by major e-Commerce players like Rakuten and eBay give reason to the assumption that this technology is of importance for the future of the online retail industry (Lunden & Lomas, 2015, Rao, 2014). Online retailers have to find another way to distinguish themselves from the competition to create customer satisfaction that might in turn result in customer loyalty to this shop. Previous research has shown that customers do prefer online shops that utilize image interactivity technology (IIT) (Kim et al., 2007). Further, scholars and media even suggest 3D virtual models as a mean to attract, retain and motivate customers (Kim et al., 2007, Hausmann & Siepke, 2008, Hessler, 2015).

The purpose of this thesis is to evaluate if the implementation of a virtual fitting room by an online shop can enhance the web experience of a customer which in turn influences the e-satisfaction and ultimately the customer's e-loyalty. This paper argues that the quality-satisfaction-loyalty chain previously established by Anderson & Mittal (2000) can be

applied similar to the way Gummerus et al. (2004) did. This means substituting the quality dimension with factors relevant to the research topic.

Essential to the quantitative research approach is the positivist research philosophy. This view on epistemology by the researcher implies that the "world is observable by collecting objective facts and that it can be reduced to simple elements" (Blumberg, Cooper, & Schneider, 2008, p. 20). Furthermore, the research at hand is of explanatory, predictive nature (Blumberg et al., 2008) using highly structured, large samples and item measurement (Saunders, Lewis, & Thornhill, 2009). Following a deductive approach meaning that general premises (theory) are used to explain specific events (data), after a literature review a set of hypotheses will be derived and later tested with the data collected from an empirical quantitative study. The analysis of the data will be conducted with hierarchical regression and the cognitive capabilities of IBM's Watson ecosystem.

1.5 Outline and Definitions

This paper will explore the previously mentioned objective from a customer's perspective. The remainder of this thesis is structured into 6 chapters. First, conducting an extensive literature and online research will provide a theoretical framework. The sequence of the literature review corresponds with the aforementioned quality-satisfaction-loyalty chain for traceability purposes. In chapter 3, the author will develop a conceptual model and corresponding hypotheses to answer the research questions at hand. The fourth chapter consists of the quantitative study and its methodology, elaborating on data collection and measurement of the constructs. Afterwards, chapter 5 deals with the data analysis, which involves descriptive and statistical results as well as an examination using the IBM Watson ecosystem. A discussion of the research findings and a conclusion will follow in chapter 6. This thesis will finish off with direction for future research and limitations of the present study. Additionally, managerial implications resulting from the conducted survey will be derived in the last chapter.

2 Literature Review

2.1 Introduction of Virtual Fitting Room Technologies

The online retail industry is growing and as a result an ever-growing amount of parcels is sent to customers (Germany Trade & Invest, 2013). Many retailers have the problem of high return rates for these parcels. Among the reasons for returns are dissatisfaction of the fit of an item and the return of items that were ordered in multiple sizes (Divivier, et al., 2004, Fits.me, 2014). Online stores have several options to handle this issue, e.g. by providing customer service hotlines or more detailed product images. Wagner (2007) suggested that the perceived risk of ordering an item online could be reduced for customers by providing dynamic images thus imitating the offline shopping experience.

A survey by Marplan (2007) indicated that a good fit is the second most important criterion after value for money when buying clothes. In light of this, recent work from Shin & Baytar (2014) suggested that female customers are more likely to use a virtual try-on if they are concerned about the garment's size and fit. The virtual fitting room technologies can be divided into two categories: one uses customer's body measurements to configure an avatar with general appearance features (Fits.me, My VirtualModel), whereas the second uses realistic 3D body scans to create a virtual counter part of the customer (Fitnect, Fitting Reality, Team White Mirror).

Figure 1 Virtual fitting room technology from Fits.me used by Michaela Jedinak to design customized dresses
Source: www.michaelajedinak.com/style-advice.html accessed on 07/07/2015.

First efforts to develop and experiment with virtual fitting room technologies can be traced back into the early age of the e-Commerce (Miller & Mueller, 1999) with application in a real retail store (Spanlang, Vassilev, Walters, & Buxton, 2005). Spanlang and colleagues (2005) recorded that customers were willing to use the scanners, trust the results of the scanners and were eager to virtually try-on other garments from the database thus

indicating the economic potential of the application. In general, VFR technologies simulate the offline experience of trying on clothing and thus digitally show how the apparel fits onto the human body that can be seen in Figure 1 and Figure 2. A more detailed overview about technological developments and application within the fashion and retail industry was done by D'Apuzzo (2009). For the purpose of this paper, the technical specifications and features are not further considered.

Figure 2 Interface of VFR technology created by Fitnect
Source: www.blog.anthonybaker.me/2012_09_01_archive.html accessed on 07/07/2015.

2.2 Customer Online Experience

The internet shopper is not a new area of interest and has been studied extensively (Donthu & Garcia, 1999, Wolfinbarger & Gilly, 2001, Chiang & Dholakai, 2003, Wolfinbarger & Gilly, 2003, Farag et al., 2006). Donthu & Garcia (1999) were among the first to research this topic and discovered that the internet shopper is looking for convenience, innovative and more impulsive than a non-internet shopper. More recent work suggests that online shoppers have more similarities with offline shoppers than anticipated before (Ganesh, Reynolds, Luckett, & Pomirleanu, 2010). The same authors found that both groups share shopping motivation dimensions and attribute importance factors indicating that retailers with both online and offline presences might benefit from this the most. Further, Ganesh et al. (2010) suggested a few features for online stores to enable them to distinguish themselves from the competition; interactivity and the ability to offer personalized services were among these features.

A related topic is the website characteristics which have been found to impact the customer (Vila & Kuster, 2011, Kim & Stoel, 2004, Wolfinbarger & Gilly, 2003). Creating a compelling online experience for customers has often been considered crucial in sustaining a business relationship in the future (Wolfinbarger & Gilly, 2003, Constantinides, 2004, Chen, Hsu, & Lin, 2010). Kim & Stoel (2004) used Loiacono's WebQual™ instrument to

measure shoppers' perception of websites. This measure was developed by Loiacono, Watson, & Goodhue (2002) and consisted of twelve dimensions to capture consumers' reuse of the site. The dimensions were: informational fit-to-task, innovativeness, tailored communications, response time, trust, ease of understanding, intuitive operations, visual appeal, emotional appeal, online completeness, consistent image and relative advantage. The findings from Kim & Stoel (2004) suggested that a reduced amount of factors might be sufficient; they only included web appearance, entertainment, informational fit-to-task, transaction capability, response time, and trust. The difference in factors might be explained by the different samples as well as the websites examined. Loiacono and colleagues (2002) were focusing on books, CDs and travel while Kim & Stoel (2004) asked their respondents about their favorite apparel website. This difference is in line with work from McGoldrick, Vasquez, Lim, & Keeling (1999) and Wolfinbarger & Gilly (2003) who suggested that the dimensions of website quality might differ according to the type of product. Similar, Chen et al. (2010) identified three groups of online shoppers categorized according to the two attributes the groups valued the most on retail sites: "usability/delivery-oriented, security/trust-oriented or convenience/trust-oriented" (p.1011). The scholars linked the website attributes directly to reuse and repurchase intentions neglecting the intermediaries, e.g. satisfaction.

Another important finding from Kim & Stoel (2004) was the confirmation of the influence of website quality factors on customer satisfaction; especially information on the site seemed to be a predictor of customer satisfaction. Additionally, they concluded that by enhancing emotional appeal, innovativeness and visual appeal of retail sites, companies could increase their customers' satisfaction levels, which in turn can influence the long-term loyalty of those customers.

Simultaneously, Wolfinbarger & Gilly (2003) developed a measure including only four clusters: website design, customer service, fulfillment/reliability and privacy/security. Their work differed from previous researchers as their eTailQ model included all stages of a consumer online experience, from pre-transaction (information search, product evaluation, decision-making), to transaction and post-transaction (delivery, return, customer service). Wolfinbarger & Gilly (2003) found that the factors related most strongly to website quality were website design and fulfillment/reliability.

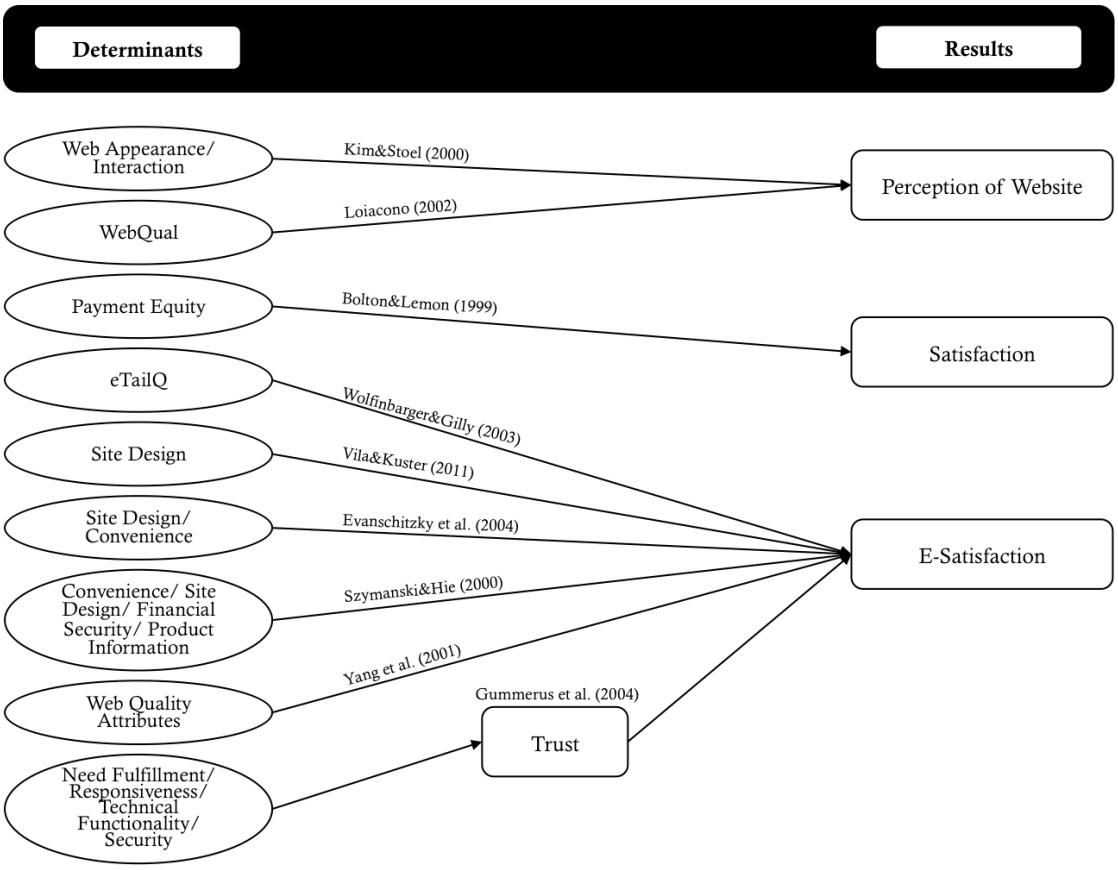

Figure 3 Overview of Determinants of (E-) Satisfaction
Source: Developed for this Research

Another approach to capture website quality for apparel websites was done by Vila & Kuster (2011) with the categorization into system, content and service factors. Their findings suggested that a well designed website leads to short-term customer satisfaction but not ultimately to purchase intentions. Furthermore, Szymanski & Hise (2000) found that convenience and positive perceptions of website design are important to assess e-satisfaction of online purchases. For an extensive but not exhaustive overview of the mentioned determinants see Figure 3. It can be derived that important determinants are innovativeness, information for the task at hand and visual appearance.

2.3 Customer Satisfaction

2.3.1 The Traditional Customer Satisfaction Construct

Scholars have studied customer satisfaction for quite some time (Oliver, 1980, Oliva, Oliver, & MacMillan, 1992, Cronin & Taylor, 1992, Anderson & Sullivan, 1993), Anderson et al., 1994, Bolton & Lemon, 1999, Jones & Suh, 2000). Oliver (1977, 1980) developed the expectation confirmation theory which aims to illustrate how satisfaction, specifically post-purchase satisfaction is formed. According to Oliver, consumer satisfaction is a function of expectations, perceived performance and disconfirmation of beliefs. Consumers form an expectation prior of purchase or consumption of a product or service

that afterwards turns into a certain level of perceived performance. This subsequently leads either to a positive confirmation of expectation and an increase in satisfaction or a negative disconfirmation resulting in a decrease in satisfaction.
The above-mentioned definition is often referred to as transaction-specific satisfaction, in contrast to the overall satisfaction that develops after consumption of a product or service over a period of time (Anderson et al., 1994, Jones & Suh, 2000). According to Jones & Suh (2000), overall satisfaction can be viewed as newly formed average after every service encounter a customer has with a product or service that subsequently leads to high or low transaction-specific satisfaction.

Oliva et al. (1992) derived from previous research that most satisfaction frameworks used are based on the expectancy-confirmation framework. Likewise Anderson & Sullivan (1993) confirmed the relation between disconfirmation and satisfaction, but found no impact for expectations on satisfaction. Furthermore the authors considered perceived quality as an antecedent of customer satisfaction and found evidence for a direct relation. According to their research, companies should pay greater attention to quality falling short of a customer's expectation than to engage in efforts to exceed expectations because the former was found to have a greater impact on satisfaction and repurchase intention. Similarly, Oliva et al. (1992) encourage companies to identify the nonlinear relations with a catastrophe model as they found evidence that the thresholds for satisfaction and dissatisfaction may differ. Anderson & Mittal (2000) even go a step further and propose measures for successful implementations of customer satisfaction programs. According to the authors, the attribute performance, which leads to customer satisfaction, can be divided into maintaining and enhancing attributes. These change over time as enhancing attributes become maintaining ones because customers get used to them.
Frequently mentioned antecedents of satisfaction are therefore: perceived quality or performance (Bolton & Drew, 1991, Cronin & Taylor, 1992, Anderson & Sullivan, 1993, Mittal, Katrichis, & Kumar, 2001, Cronin et al., 2000), expectation (Oliver, 1977, 1980, Bolton & Drew, 1991), disconfirmation (Oliver, 1977, 1980, Bolton & Drew, 1991, Anderson & Sullivan, 1993), and perceived value (American Customer Satisfaction Index, ACSI, Cronin et al., 2000). For an illustration of some of the mentioned relationships see Figure 4.

Cronin & Taylor (1992) examined service quality as an antecedent of customer satisfaction and argued for a change in conceptualization of the former. In relation to Oliver (1980), they concluded that service quality is better conceptualized as an attitude. By doing so, Cronin & Taylor (1992) suggested that instead of using the disconfirmation framework, the

performance dimension of the "adequacy-importance" form is more suitable. Their findings implied that the performance-based measure of service quality is superior to the SERVQUAL scale as it reduces the items included in the survey by 50%.

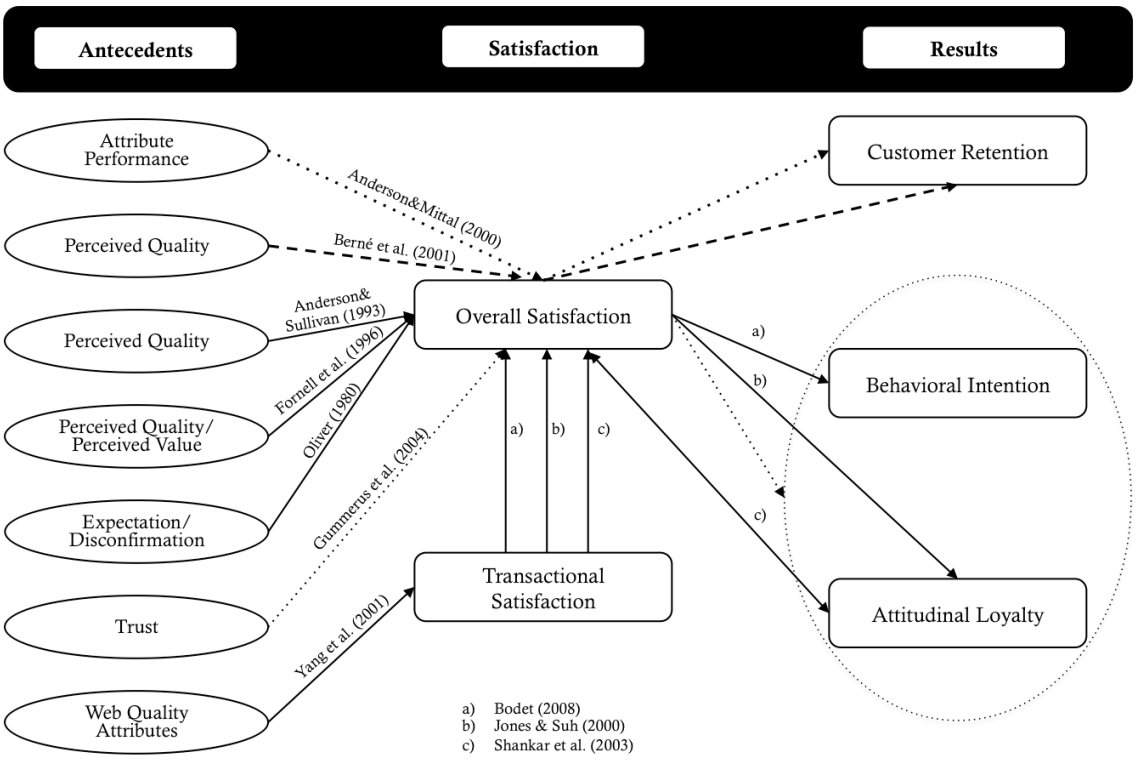

Figure 4 Overview of selected Antecedents and Results of Satisfaction
Source: Developed for this Research

Regarding the results of satisfaction, Anderson et al. (1994) proposed to treat the efforts a company engages in to increase customer satisfaction as an investment because of the long-run nature of the economic benefits. Anderson & Sullivan (1993) concluded that companies' consistently providing high customer satisfaction levels profit from this reputation in the future. Similarly, evidence has been found that increasing the overall satisfaction scores can positively impact repurchase intentions (Anderson et al., 1994, Anderson & Sullivan, 1993, Zeithaml, Berry, & Parasuraman, 1996), Oliver, 1999, Anderson & Mittal, 2000, Mittal et al., 2001) as well as repurchase behavior (Bolton, 1998) and thus provide a future economic benefit for the company (Anderson et al., 1994). Findings from Anderson & Mittal (2000) and The American Customer Satisfaction Index (2015) confirm the link between satisfaction and profit.

Jones & Sasser (1995) argue for the importance of completely satisfied customers, especially in highly competitive industries like retailing. They propose three levels of loyalty according to which customers can be categorized and their respective demands identified.

2.3.2 E-Satisfaction

Customer online satisfaction studies are traditionally grounded in customer satisfaction literature, which is why most of the definitions are similar to the ones used in offline marketing contexts. As Chen, Rodgers, & He (2008) pointed out, e-satisfaction and customer online satisfaction are used interchangeably. Anderson & Srinivasan (2003) referred to e-satisfaction as "contentment of the customer with respect to his or her prior purchasing experience with a given electronic commerce firm" (p. 125). Furthermore, the lack of uniformity regarding the conceptualization of customer satisfaction has a negative effect on the conceptualization of e-satisfaction as well because depending on the authors' field of expertise the definitions vary (Chen et al., 2008). What unites them is the emphasis on affection. Frequently used is the definition based on Oliver (1999) who defines satisfaction as a pleasurable fulfillment by a service or product. Chen et al. (2008) provided evidence that these affect-based conceptualizations are often inconsistent with their corresponding operationalization. This was determined by asking customers to rationally evaluate their prior experiences and expectations rather than answering questions about enjoyment or pleasure experienced during an encounter.

Figure 3 displays that there are some specific determinants of e-satisfaction compared to traditional customer satisfaction. However, not every scholar does consider this. For example, Shankar et al. (2003) explicitly assumed that the antecedents from the offline world should work online as well without further investigation and inclusion of online specific factors. Similar to the traditional satisfaction domain, a common reported consequence is loyalty (van Riel et al., 2001, Anderson & Srinivasan, 2003, Shankar et al., 2003, Harris & Goode, 2004).

2.4 Customer Loyalty

2.4.1 The Traditional Customer Loyalty Construct

The definition of what comprises customer loyalty differs from one scholar to another (Pan, Sheng, & Xie, 2012). Jones & Sasser (1995) described it as "the feeling of attachment to or affection for a company's people, products or services." (p. 7), whereas the Cambridge online directory defines it as the "the fact of a customer buying products or services from the same company over a long period of time." (http://dictionary.cambridge.org/dictionary/business-english/customer-loyalty accessed on 07/04/2015). Additionally, this definition puts an emphasis on the repeat purchase behavior executed by customers with the remark that customer loyalty can be build by consistently matching or exceeding customer expectations which concurs with the definition of customer satisfaction described earlier in the paper. Dick & Basu (1994) were among the first scholars to mention two requirements for loyalty: favorable attitude and

repeat patronage. Before, literature was mostly concerned with measurement issues of customer loyalty and focused on the behavioral dimensions with the exception of Jacoby & Chestnut (1987) who explored this issue with regard to brand loyalty a few years earlier. This means that loyalty was often examined through frequency or size of repurchases or probability to repurchase. With the introduction of the concept of reactive attitude, Dick & Basu (1994) were able to identify four states of loyalty: no loyalty, spurious loyalty which appears when customers are indifferent against brands and choose them because of familiarity or inertia (Assael, 1992), latent loyalty which describes a customer with a favorable attitude but low repeat purchases due to other influences and finally loyalty, when both dimensions are at their maximum.

There are several perspectives customer loyalty can be seen through: brand loyalty (Jacoby & Chestnut, 1987), vendor loyalty or store loyalty, service loyalty (Dick & Basu, 1994) which refer more to subjects attached to the loyalty construct. Another classification is the differentiation into the strength of loyalty: true loyalty and false loyalty (Jones & Sasser, 1995) or as described above latent and spurious loyalty as opposed to loyalty (Dick & Basu, 1994). More recent work from Oliver (1999) investigated the loyalty construct as a process by dividing it into four stages. This means, that to achieve true loyalty or as Oliver calls it "action loyalty" a customer first has to progress through the previous three phases (i.e., cognition, affection and conation). Solely customers at the fourth stage can be considered truly loyal and unaffected by competitive offerings. The first stage represents the acknowledgement of a brand or product preference; the second comprises the liking of that product or brand; at the third stage customers exhibit behavioral intentions towards this brand or product before effectively buying the product or brand again at the fourth and final stage.

Among the frequently mentioned antecedents of loyalty are customer satisfaction (Reichheld & Sasser, 1990, Jones & Sasser, 1995, Oliver, 1999), perceived credibility (Dick & Basu, 1994), perceived service quality (Boulding, Kalra, Staelin, & Zeithaml, 1993, Zeithaml et al., 1996, Sirohi, McLaughlin, & Wittink, 1998), trust (Reichheld & Schefter, 2000, Gummerus et al., 2004, Pan, Sheng, & Xie, 2012), value (Reichheld, 1993, Cronin et al., 2000) and corporate image (Andreassen & Lindestad, 1998). For an overview of selected determinants see Figure 5.

Of particular interest for this paper is the satisfaction-loyalty chain, which has been researched extensively (Jones & Sasser, 1995, Oliver, 1999, Ngobo, 1999, Anderson & Mittal, 2000, Jones & Suh, 2000, Shankar, Smith, & Rangaswamy, 2003). As described earlier, customer satisfaction occurs during each transaction that in turn influences the cumulative satisfaction. Regarding the impact on loyalty, the evidence suggests that overall

satisfaction has the greater influence (Jones & Suh, 2000; Shankar et al., 2003) and that transactional satisfaction only appears to be of importance if overall satisfaction is low.

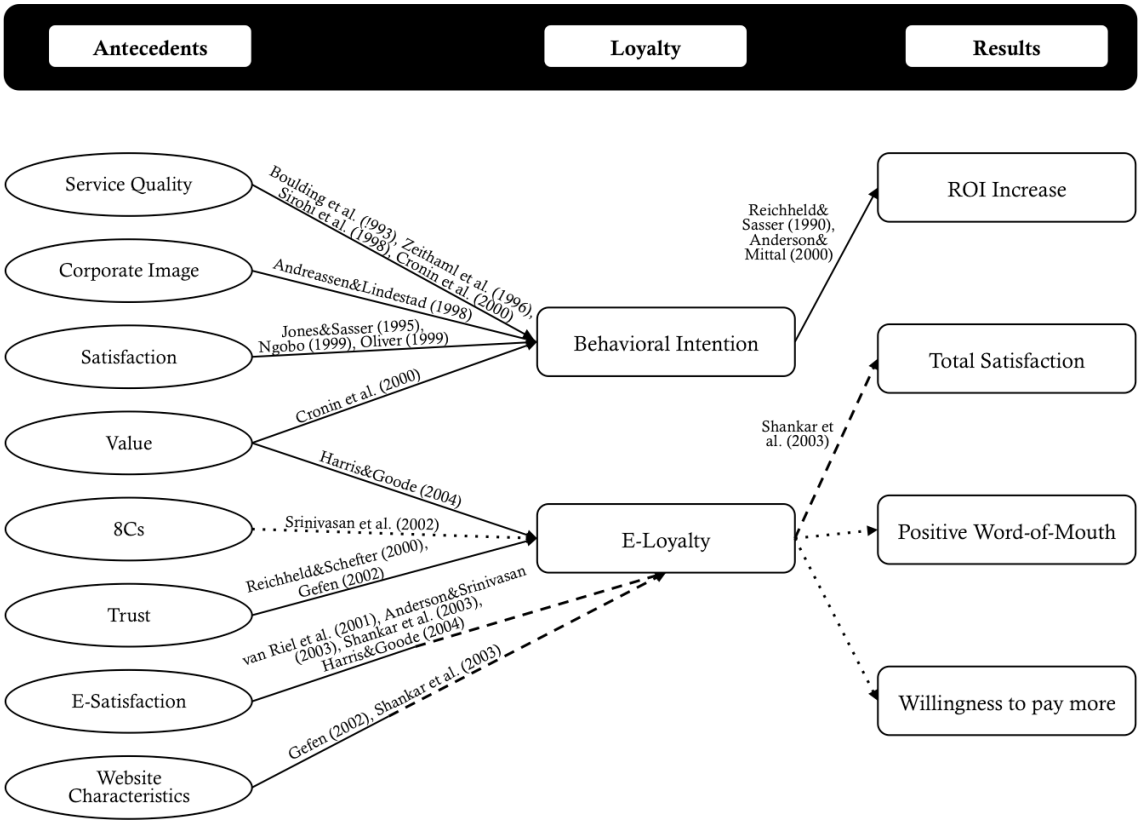

Figure 5 Overview Antecedents and Results of (E-) Loyalty
Source: Developed for this Research

Though some scholars argue for the simultaneous consideration of other antecedents or even do not find evidence for the effect satisfaction has on loyalty (Andreassen & Lindestad, 1998), the majority agrees upon the role satisfaction plays in the development process of customer loyalty (Oliver, 1999).

There is however divergence in regard to the nature of the linkage of satisfaction and loyalty (see Appendix I) for a detailed depiction). Whereas most authors assumed a linear relationship between satisfaction and loyalty, some scholars argue for the consideration of another model. Oliva and colleagues (1992) found evidence of the existence of thresholds in the relationship. According to them, the customer loyalty intentions above and beyond those thresholds seemed to rise steeper than in between, meaning that managers should take a closer look at their merely satisfied customers as was suggested by Jones & Sasser (1995).

Reichheld (1993) put emphasis on the fact that companies should not solely engage in customer loyalty programs, but measure it as well. According to him, loyalty initiatives can only be successful if they are aligned with the company's strategy and core beliefs and every

unit is determined to deliver superior customer value, e.g. through attaching employee bonuses to customer retention rates (Reichheld & Sasser, 1990).

The measurement of customer loyalty is often a mixture of items from three categories: intent to repurchase (Cronin & Taylor, 1992, Jones & Sasser, 1995), actual repurchasing behavior (Jones & Sasser, 1995) and recommendation to others (Jones & Sasser, 1995, Andreassen & Lindestad, 1998). A few years ago, loyalty was solely measured through intent to repurchase (Cronin & Taylor, 1992). Only after the work of Zeithaml et al. (1996), the utilization of multi-item measurement was applied more widely and according to Pan et al. (2012) is highly recommended.

Even though the variety of factors which lead to customer loyalty seems to be abundant and every scholar prefers a set depending on their respective field, they are united by the acknowledgment of the importance of a loyal customer base for companies: In order to replace defecting customers, money has to be invested to acquire new customers (Zeithaml et al., 1996). The relevance of loyal customers is further increased by the fact that these newly acquired customers are merely becoming profitable for the company over a period of time, which depending on the industry can take up to five years (Reichheld & Sasser, 1990).

Common outcomes of loyalty to a brand or store are the reduction of search motivation for alternatives (Dick & Basu, 1994), increase in word of mouth behavior (Reichheld & Sasser, 1990, Zeithaml et al., 1996), resistance to counter-persuasion (Dick & Basu, 1994), increase in profits due to repeat purchases and referrals (Reichheld & Sasser, 1990, Cronin & Taylor, 1992, Reichheld, 1993, Jones & Sasser, 1995), decline of acquisitions costs of new customers (Reichheld, 1993), business opportunity to charge a price premium (Reichheld & Sasser, 1990). Additionally loyal customers tend to be more forgiving of lesser service levels (Shankar et al., 2003, Oliver, 1999).

The consequence of having loyal customers and therefore low defection rates translated for businesses into higher profits. As Reichheld & Sasser (1990) described, in case of a bank's branch system, a reduction in customer defection rates of 5% resulted in a profit increase of 85%, while the same reduction rate resulted in a profit increase of 50% for an insurance brokerage and 30% for an auto-service chain respectively.

2.4.2 E-Loyalty

The essence of the above-described holds true for customer online loyalty as well. As Reichheld & Schefter (2000) described, there is advantage for companies to concentrate efforts to retain customers. The costs of acquiring new customers in the online retail world are high and depending on the area of business a retailer is in can range from USD 14 up to USD 109 (Burstein, 2014). Additionally, Reichheld & Schefter (2000) found evidence that a

pure online apparel retailer has to spend 20% to 40% more for acquiring new customers than a traditional retailer with offline and online presence has to. As mentioned before, the type of product can influence the marketing spending; a credit card company or high-end jewelry shops require more efforts to build trust with potential customers. Furthermore, Shankar et al. (2003) and Harris & Goode (2004) provided evidence that loyalty has a stronger effect in the online environment compared to the offline world. Given that the value of loyalty for the e-commerce sector has been established, the author continues with the introduction of the e-loyalty construct.

For the purpose of this paper, literature mentioning e-loyalty, online loyalty or customer loyalty to websites will be considered without further distinction, as they describe the same phenomenon. According to Toufaily et al. (2013) the research field of e-loyalty is relatively new and only began to grow in the early 2000s. Since then, numerous studies have investigated the B2C relationship in an e-commerce setting (Reichheld & Schefter, 2000, van Riel et al., 2001, Gefen, 2002, Srinivasan, Anderson, & Ponnavolu, 2002, Shankar, Smith, & Rangaswamy, 2003, Anderson & Srinivasan, 2003, Gummerus et al., 2004, Harris & Goode, 2004). The majority of the reviewed research by Toufaily et al. (2013) had its theoretical foundations from relationship marketing and social psychology.

The definitions of what constitutes e-loyalty are diverse, reflecting attitudinal and behavioral dimensions as described earlier for the loyalty construct. For Anderson & Srinivasan (2003) e-loyalty is defined as a "… favorable attitude toward an electronic business resulting in repeat buying behavior."(p. 125). Gefen (2002) on the other hand based his understanding on the work of Zeithaml et al. (1996) by stating that e-loyalty is "the customer's intention to continue doing business with the same online retailer and to recommend this retailer to other clients." (p.29). Most of the definitions are clearly centered in a retail context, which has been criticized by some scholars (Gummerus et al., 2004). To overcome this gap in literature, Touifaly et al. (2014) proposed a comprehensive definition that captures the four loyalty phases of Oliver (1999) and includes both services and products.

Regarding the measurement of e-loyalty, Touifaly et al. (2014) noted the present disparity of previous scales used by scholars. The items included in questionnaires are based on the definitions the researchers designed for their purpose and therefore rely on the behavioral, attitudinal or a composite approach. The frequently used measures are adapted either from Zeithaml et al. (1996) or Oliver (1997, 1999).

The previously described antecedents for offline loyalty also apply for e-loyalty (see Figure 5 for an overview). After a perusal of the existent literature, it is evident that the most prevalent examined determinant is satisfaction (van Riel et al., 2001, Shankar et al., 2003,

Anderson & Srinivasan, 2003, Gummerus et al., 2004, Harris & Goode, 2004). The second most important antecedent appeared to be trust (Reichheld & Schefter, 2000, Gefen, 2002, Gummerus et al., 2004), which can be considered as important in an online environment where prior to purchase a test of goods is not possible. Other mentioned antecedents are perceived value or quality (Gefen, 2002, Harris & Goode, 2004), product or service attributes, company characteristics or website specific factors like interactivity, convenience or e-quality (Srinivasan, et al., 2002, Gefen, 2002; Shankar et al., 2003).

The benefits of achieving customer e-loyalty are assumed to be similar to those of traditional customer loyalty. Among the studied results are word of mouth behavior, willingness to pay more, a reduction in search for alternatives (Srinivasan, et al., 2002) and total satisfaction (Shankar et al., 2003).

2.5 Interim Conclusion and Conceptual Framework

This chapter served as an introduction of the theoretical background this paper is based on. The technology of virtual fitting rooms was briefly introduced and the general problem of ill-fitting apparel was discussed. Furthermore, website factors which influence the customer online experience were presented. After this review, the existence of divergence regarding the conceptualization and measurement of the website quality factors was evident. However, on closer examination, a similarity between most of the factors could be revealed. Regarding the construct of customer satisfaction, the history of the concept was elucidated with some additional more recent developments regarding the differentiation into transactional and overall satisfaction. Work from established authors within this domain was preferred to ensure a high validity. The same method was applied to literature regarding the loyalty construct. For both constructs, extended work was considered which applied the traditional structures to the online world. Concluding, for all three constructs a divergence in research is prevalent.

Based on these theoretical foundations, a conceptual framework (Figure 6) is constructed which serves as a guideline to examine the influence of VFR technology on customer's e-satisfaction and e-loyalty. These relationships are hypothesized and will be tested in a subsequent chapter.

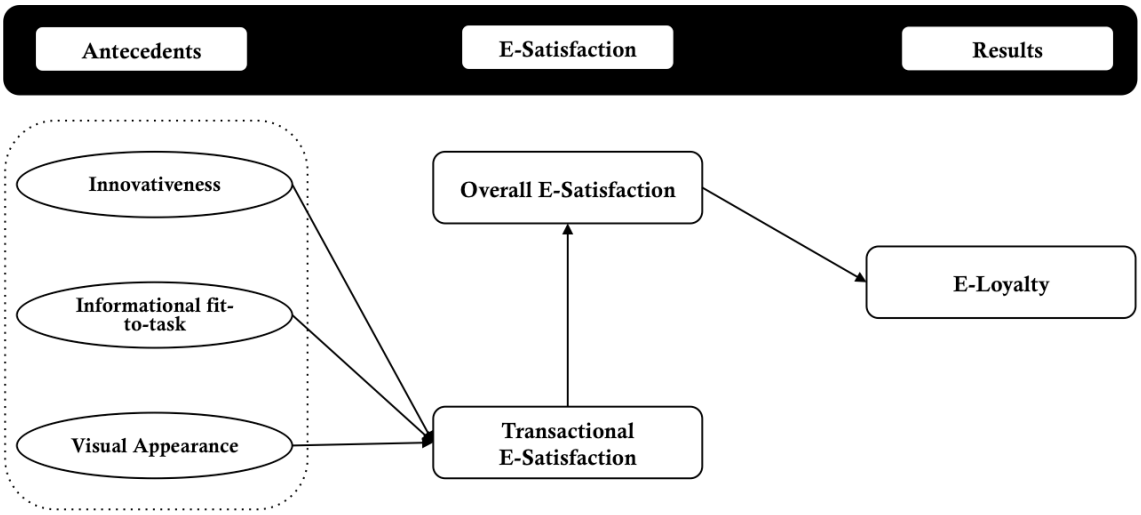

Figure 6 Theoretical Framework
Source: Developed for this Research

3 Development of Model and Hypotheses

3.1 Research Questions

The aim of this paper is to investigate the impact of VFR technologies on customer experience, customer satisfaction and as a result of that, customer loyalty. The thesis at hand will in part replicate the study done by (Gummerus et al., 2004). The authors studied the antecedents of loyalty to content-based web sites by applying the quality-satisfaction-loyalty chain from Anderson & Mittal (2000). The authors further consider trust to be a mediator of e-quality determinants and e-satisfaction. This is where the present study will differ, even though trust is an important antecedent of e-satisfaction. The dimensions of e-service quality, which will be considered in the study, are directly linked to the online experience a customer has with the VFR. This is in line with the definition of e-service quality from Zeithaml, Parasuraman, & Malhotra (2000) who define it as "the extent to which a Web site facilitates efficient and effective shopping, purchasing and delivery" (p.11). Additionally, Harris & Goode (2004) used a similar approach by studying the four phases of loyalty and considering service quality and satisfaction as a sequence. Furthermore, the present study will extend the approach from Gummerus et al. (2004) by integrating a more detailed perspective on e-satisfaction. This is accomplished by using aspects from a study done by Shankar et al. (2003) who investigated the effects of service encounter satisfaction and overall satisfaction in an online environment.

The research questions that derive from the illustrated topic are:

- Does a VFR influence a customer's online experience in terms of the e-service quality dimensions innovativeness, visual appearance and informational fit-to-task?
- Do the determinants of e-service quality innovativeness, visual appearance and informational fit-to-task work as antecedents of transactional e-satisfaction?
- To what extent does overall e-satisfaction work as antecedent of a customer's e-loyalty?
- Does overall e-satisfaction work as a mediator between transactional e-satisfaction and e-loyalty.

3.2 Hypotheses and Conceptual Model

3.2.1 The Satisfaction-Loyalty Link

Satisfaction is an important indicator for customer loyalty; Cronin &Taylor (1992) confirmed that satisfaction appeared to have a stronger and more consistent effect on purchase intentions than did service quality. Following the reasoning of Ngobo (1999), a linear relationship between satisfaction and intention is assumed. The customer satisfaction construct has been conceptualized in two ways over the previous years (Johnson, 2001).

For the purpose of this study customer e- satisfaction is defined as a combination of these streams (Oliver, 1980, Anderson & Srinivasan, 2003, Anderson et al., 1994). Therefore, overall e-satisfaction comprises a customer's contentment with respect to his or her prior purchasing experience with an online retailer. In line with earlier research (Anderson & Mittal, 2000, Anderson & Srinivasan, 2003, Gummerus et al., 2004), the author expects that a higher level of e-satisfaction will lead to a higher level of customer e-loyalty and proposes:

Hypothesis 1 (H1) ***Overall e-satisfaction is positively related to e-loyalty.***

According to Johnson (2001), the simultaneous consideration of both transactional e-satisfaction and overall e-satisfaction is feasible since they complement each other. Transactional e-satisfaction is more likely to be influenced by website performance than overall e-satisfaction. In contrast to overall e-satisfaction, transactional e-satisfaction is conceptualized to be directly influenced by the e-service quality dimensions and is described as a customer's perception of pleasurable fulfillment during a specific transaction. Jones & Suh (2000), Shankar et al. (2003) and Bodet (2008) showed in their studies the mediating role of overall satisfaction between transaction-specific satisfaction and attitudinal loyalty. Thus, the following hypothesis derives:

Hypothesis 2 (H2) ***Customer's transactional e-satisfaction is positively related to e-loyalty with overall e-satisfaction acting as a mediating variable.***

3.2.2 The E-Service Quality Dimensions

As described above, only specific dimensions of e-service quality are to be considered in this study. The reasoning lies with the topic under investigation. The VFR is just utilized once the customers are on a product detail page (PDP) and therefore other dimensions that are concerned with the whole process of a purchase are not touched. The findings of the review done by Chen et al. (2008) and the abundant literature about web site quality attributes presented above lead to the decision to conceptualize the customer online experience with the VFR as a customer's perception of the visual appearance, innovativeness and informational fit-to-task of the feature. The importance of a good customer experience and its impact on satisfaction and loyalty is documented (Pulido et al., 2014).

Virtual Fitting Room Technologies

The technological developments in this area are diverse as was described in 2.1. Hence it is necessary to narrow the definition of VFR technologies that will be used throughout this paper. The used scope for VFR technology will be similar to the technology provided by Fits.me. The customer is able to change the avatar in size and measurement with the help

of a scale and has the opportunity to try on different sizes of an item to observe the different fit. The process of self-scanning or utilizing the webcam which is used by other companies in this business area are purposely excluded. The reasoning for the exclusion is that the former is easier to describe to respondents and the use cases can be used in the questionnaire as well. Additionally, the paper merely considers the application of the VFR technology with regard to apparel, excluding other fashion items like shoes and accessories.

Visual Appearance

Szymanski & Hise (2000) showed that website design has a significant impact on e-satisfaction of US customers. The results have been replicated for German online customers as well (Evanschitzky, Iyer, Hesse, & Ahlert, 2004). Referring to the website as a whole, this is usually associated with quick and easy to follow navigation, uncluttered screens and fast loading times of the site (Szymanski & Hise, 2000). Srinivasan et al. (2002) divide this part into convenience and character of a website where only the latter has a reported impact on e-loyalty. According to the eTailQ instrument, website design is an important predictor of e-satisfaction and e-loyalty and includes elements such as navigation and information search. Reibstein (2002) confirmed the importance of product representation as a means to achieve a repurchase.

Since not a whole website, but only a part of it (VFR) is under investigation the following is assumed:

> ***Hypothesis 3 (H3) Transactional e-satisfaction increases as customer's perceptions of the visual appearance of a VFR becomes more positive.***

Innovativeness

Donthu & Garcia (1999) found evidence that internet shoppers tend to be more innovative than non-internet shoppers. Recalling the results from the study by Novak et al. (2000), an ideal website creates arousal by constantly engaging customer's abilities while simultaneously not being over complicated so that a customer becomes frustrated during browsing. A VFR is assumed to be an innovative website feature since its technological advancements are recent and to date it has just been implemented by a few selected online retailers so far (Dunsby, 2015). Hence, it can be proposed that:

> ***Hypothesis 4 (H4) A VFR's innovativeness is positively related to transactional e-satisfaction.***

Informational fit-to-task

One of the assumed advantages of a VFR is that it enables a customer to make more informed decisions. This assumption is in line with the perceived risk theory according to which individuals faced with a risk situation try to solve it with the acquisition and

handling of information (Cox, 1968). This dimension is an important measure for every website not solely for online retailers and included in most studies (Srinivasan et al., 2002, Gummerus et al., 2004). Other authors describe it as a website's reliability or ability to fulfill the customer needs (Wolfinbarger & Gilly, 2003). In this case, the customer's task is to decide which size he should order, assuming that the initial buying decision has already been made. Further, Shim & Lee (2011) found evidence that the usage of 3D virtual models significantly helped to reduce perceived risk of fit of garments.
Therefore, it is proposed that,

> ***Hypothesis 5 (H5)*** ***A VFR's ability to provide a high level of informational fit-to-task is positively related to transactional e-satisfaction.***

Prior Experience and Gender

As highlighted in the introduction section, the return of apparel items is an often-incurred byproduct of online shopping. This leads to costs on the online retailer's site and additional effort on the customer's site since they have to return the item after an initial evaluation at home. The return of items ordered online requires repackaging, filling out a return form and bringing the parcel to the post office. Moreover, customers often pre-paid the item and have to wait for a refund after the online retailers processed the return. This procedure is time-consuming and therefore impacts the perception of convenience, one of the frequently mentioned advantages of online shopping (Donthu & Garcia, 1999, Anderson & Srinivasan, 2003). Concluding, a customer who experienced the inconvenience attached to the return of an item would want to avoid this from happening in the future to restore the initial advantage of ordering online: convenience. Thus, the more familiar a customer is with the situation of a product return, the more positive the information quality received from a VFR will be rated. The work from Shin & Baytar (2014) suggested that female customers are more likely to use virtual try-on when concerned about size and fit. This leads to the following,

> ***Hypothesis 6 (H6)*** ***The impact of informational fit-to-task on transactional e-satisfaction will be moderated by prior experience of a customer.***
>
> ***Hypothesis 7 (H7)*** ***The impact of informational fit-to-task on transactional e-satisfaction will be moderated by the gender of a customer.***

The conceptual model for the study derived from the hypotheses formulated above is depicted in Figure 7 and Figure 8. For simplifying and better understanding, the model was divided into two parts, one concerned with the determinants of transactional e-satisfaction and the latter with the relationship of both satisfaction constructs and e-loyalty.

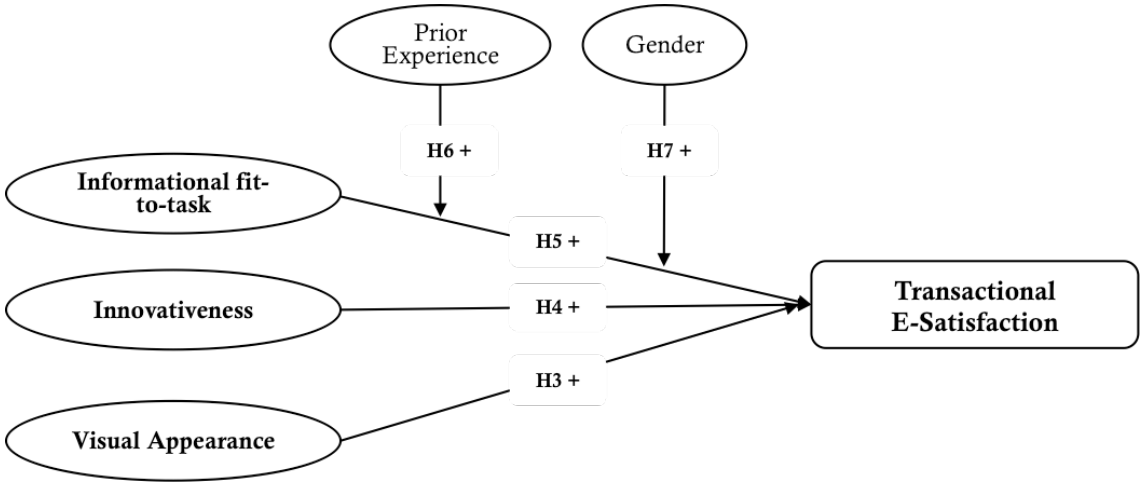

Figure 7 Conceptual Model, Part 1
Source: Developed for this Research

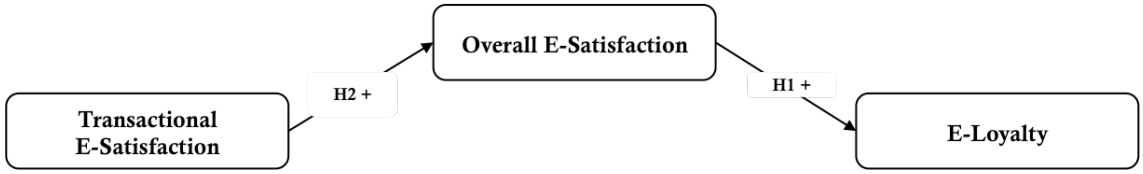

Figure 8 Conceptual Model, Part 2
Source: Developed for this Research

4 Methodology

4.1 Data Collection and Sample Design

An online questionnaire was chosen as data collection method. The questionnaire was implemented with the LimeSurvey software and hosted on a privately owned server for better control and protection of the data. This approach has several advantages. First, the topic of the study is settled in an online environment, so it is feasible to choose the same context for the survey. Second, the research is concerned with online shoppers, which through this method can be identified and reached easier. Third, the usage of online surveys has been described as more interesting, important and enjoyable than classical surveys (Edmonson, 1997). However, there are some disadvantages of online surveys that had to be kept in mind. These include the limitation of items within a questionnaire because the response rates drop if a survey is perceived as too long by the respondent (Szymanski & Hise, 2000). Furthermore, sampling is of general concern within the online environment as well as the threat of multiple entries by one participant. However, Shankar et al. (2003) mentioned that this threat is negligible and that online surveys typically evoke reasonably representativeness. To overcome the threat of non-response and to create interest and curiosity about the questionnaire an introductory page was developed following the guideline proposed by Dillman, Smyth & Christian (2009) by providing information about the survey context.

Moreover, participants were ensured that the data were collected anonymously and only used for the study at hand. Regarding the issue of offering financial rewards for respondents, which is a frequently used incentive to get data, the author decided not to offer any apart from the results. Baruch & Holtom (2008) found evidence, that the use of incentives was not related to response rates. They further concluded, that web surveys delivered response rates as high as traditional mail methodology.

As Wright (2005) stated, another major advantage is the time efficiency of web-based surveys. Additionally, Wright (2005) mentioned the usage of online statistical software packages like Surveymonkey, HostedSurvey or Zoomerang that enable a researcher to implement the collected data without the threat of wrongful copy and pasting which can be the case with data collected through email. After careful consideration of both sides (see Table 1) the online survey approach was maintained. Additionally, the usage of non-probability sampling is more time and cost efficient.

LimeSurvey offered the advantage of having full control over the data by not involving a third party. Furthermore, the software provided flexibility regarding the design and layout of the survey, an export to various statistical analysis programs as well as the setting of a cookie. The latter insured that a respondent participated once only. Furthermore, the

software enables the administrator to see from which referrer URL the respondents came, thus allowing for a limited insight into the response rates of the different channels used to recruit the respondents.

Advantages	Disadvantages
Time Efficient	Nonresponse
Cost Efficient	Untruthful Respondents
No Interviewer Bias	Sampling Issues
No Geographic Constraint	Limitation due to Internet Access
Access to Unique Populations	
Less Processing Error	
Possibility to Send Reminder	

Table 1 Overview Advantages and Disadvantages of Web-Based Surveys
Source: Adopted from Wright (2005)

Participants were invited on social media platforms like Facebook, Twitter, XING, Linkedin, Reddit (see Appendix II for a detailed list). Additionally, the survey was sent to an email distribution list with approximately 1,200 recipients. This type of open-area approach implies that it is not possible to calculate an accurate response rate as mentioned before. The link was first posted on 11/17/2015 at 13:30 pm. In total, the link was active for four weeks. The email invitation was sent on Wednesday, the 11th November. The response rate cannot be calculated because the included survey URL did not differ from the ones posted on social media channels. However, 179 email addresses were not longer in service or reachable in time due to absence of the recipients.

A total of 231 respondents participated in the survey while 115 of those filled out the questionnaire completely. 110 of these respondents qualified through previous online shopping experience for the analysis phase. To ensure the representativeness of the sample, demographic data were collected at the end of the survey and afterwards compared with studies researching e-commerce from BITKOM (2014), Institut für Demoskopie (2014) and AGOF e.V. (2015). The majority of respondents were female accounting for 72.73% or 80 in total, compared to 27.27% or 30 male participants. This distribution was expected and owed to the topic researched in the survey. The age dispersion in the sample was as followed: 8.18% were under 18 years, 26.3 % were between 19 and 24, the majority of

respondents, 43.64% was in the age group 25-30, 10.91% were between 31 and 39, 6.36% were between the ages 40 and 49, 3.64 % were between 50 and 64 and one respondent (0.91%) was over the age of 65. Most of the respondents indicated having a Bachelor's degree (26.36%) or higher, Master's or Doctorate degree (31.82%). Only three individuals (2.73%) stated that they did not complete any schooling. Almost a quarter of respondents (22.73%) owned at least a General Certificate of Education, and the remaining 15.45% owned a lower level of education.

A comparison of the sample with those reported in the studies mentioned above revealed a good match of characteristics. BITKOM (2014) reported that in general, more women (67%) than men (54%) buy apparel products online. A closer look at the age groups showed that 3 out of 4 respondents under 49 have ordered apparel items whereas in the group above 50 this number drops to 47% and even lower for respondents above 65 (26%). A similar distribution can be seen in the sample of the ACTA 2014 study, with women accounting for 62% and men 38% of sales for apparel products (Institut für Demoskopie Allensbach, 2014).

The self-reported order history was almost normally distributed. Eleven people or 10% of respondents indicated, that they have ordered more than 10 times in the last six months, 10.91% (12 individuals) at least six to nine times, 31.82% (35 individuals) reported order amounts ranging from three to five, the majority of people, 35.45% (39 individuals), stated they ordered once or twice and only 11.82% or 13 people indicated no order in the requested period.

4.2 Questionnaire Design

Couper (2000) mentioned the significance of a questionnaires' design because of its possible influence on the respondents. Thus the questionnaire was developed following the guidelines proposed by Dillman et al. (2009), Dillman (2007) and Babbie (2007). For example, this entailed the requirement that the answer categories should be exhaustive and mutually exclusive. Furthermore, the author chose to follow the approach by Couper, Traugott, & Lamias (2001) and display the survey as a mixture of interactive and scrolling design rather than display the whole questionnaire on one long page (method preferred by Dillman). Additionally, the matrix format was used for most of the questions to facilitate a fast completing by respondents, structure the space efficiently and increase the comparability of responses.

According to Couper (2000) generally agreed major sources of errors include: sampling, coverage, nonresponse and measurement error. The first issue has been discussed in detail in the previous subchapter. The second, coverage, means the mismatch between target and frame population. According to Statistisches Bundesamt (2014 a), 84% of households have

access to the internet. 80% of the population in Germany (approximately 58.6 M people) have used the internet in the first quarter of 2014 (Statistisches Bundesamt (2014 b)) suggesting that the error of coverage should be minimized. Furthermore, since the survey is limited to respondents who have previous experience in shopping apparel online, this is not an issue at all. Third, nonresponse error as pointed out by Couper (2000, p.473) is "a function of both the rate of nonresponse and of the differences between respondents and nonrespondents on the variables of interest" and can only by measured and evaluated sufficiently if a probability sampling was used for the survey. This means, it is not possible for the study at hand and has therefore little meaning. The fourth type of common source of error will be discussed in the next subchapter.

Following Dillman's (2007) tailored design method, the questions were grouped according to topic (demographics at the end, salient at the beginning). This approach is considered as being helpful for the respondents and takes them less time to answer (Couper et al., 2001). It has to be mentioned at this point, that due to the research context, the premise of opening with the most interesting questions could not be followed completely. Furthermore, extra information required to facilitate answering the questions were provided directly in context to the question and not at the beginning of the survey. More specifically, the survey consisted of 16 questions divided into six groups. The introduction was aimed at getting information regarding the respondent's gender and prior online shopping experience. The former was necessary because the questionnaire displayed targeted questions contingent on the respondent's gender. The wording of two questions and the shown picture of an exemplary virtual fitting room were adjusted according to the respondent's gender to ensure relevancy and identification for the respondent. The second section was used to establish previous online shopping behavior, whereas the third introduced the virtual fitting room technology. The fourth part involved questions about the online shopping experience, the fifth about online shopping satisfaction and e-loyalty. The last part included questions about demographics.

The questionnaire was pre-tested with volunteers from the target group to check for potential sources of error and ambiguities regarding the wording and design of the study. This resulted in the adjusting of wording of some questions and a more detailed explanation of the virtual fitting room concept. The whole questionnaire as shown to respondents can be seen in Appendix III and IV.

4.3 Measurement of Constructs

4.3.1 Main Constructs

The main constructs as introduced in part 1 and part 2 of the conceptual model serve as independent and dependent variables. In general, it is assumed that the dependent variable is influenced by one or more independent variables (Blumberg et al., 2008). An overview of the operationalization of the constructs can be found in Table 2. All mentioned items were measured on a 5-point Likert-Scale that ranged from *completely disagree* to *completely agree* and were validated by other researchers.

In chapter 3 the customer online experience with a VFR has been defined as a customer's perception of the informational-fit-to-task, the visual appearance and innovativeness of it. In the following section, the selected items for these constructs will be introduced, followed by the e-satisfaction constructs and finally the e-loyalty construct.

Informational-fit-to-task

The construct was measured with five items. Informational-fit-to-task was picked from Loiacono's (2002) WebQual-instrument because of its matching definition as well as the reported correlations of the construct with purchase and revisit intentions. Loiacono (2002) described it as "the extent to which users believe the website meets their needs and provides accurate, updated and appropriate information." (p.19). Additionally, two items from Srinivasan et al. (2002) and one from Wolfinbarger & Gilly (2003) were chosen as an extension to the measure. The former authors developed their own scales and categorized them into eight clusters to measure the impact on e-loyalty directly. The chosen items were from two different clusters but both reported impact on the e-loyalty items and fitted the research purpose best ("tailor-made products" and "enabling to look at product from different angles"). The included item from the eTailQ instrument by Wolfinbarger & Gilly (2003) was their final item to measure informativeness of a website and was concerned with "in-depth information". The additions were necessary to account for the assumed benefit of a virtual fitting room, namely the "in-depth information" and the possibility "to look at a product from different angles". The former has been utilized as a control variable by Shankar et al. (2003) and had a positive impact on service encounter satisfaction. The latter item has seen a wide adoption by other scholars (Kim & Stoel, 2004, Hausman & Siepke, 2008, Vila & Kuster, 2011).

Innovativeness

Because the technology of a virtual fitting room is currently not a widely applied feature, the construct of innovativeness was chosen to assess a customer's rating of the "creativity and uniqueness of a Web site. " (Loiacono, 2002, p.20). Loiacono's analysis confirmed innovativeness as a distinct construct with significant impact on purchase and revisit

intentions respectively. The relevance of innovativeness as a construct has been confirmed by other scholars as well (Wolfinbarger & Gilly, 2003, Kim & Stoel, 2004). The wording of the items was adjusted to include the VFR. Initially, all of the items included in Loiacono's scale were considered but reduced after a pre-test due to comprehension issues by respondents and only contained "the VFR is innovative". Multi-item measurement was ensured by adding one item from Srinivasan et al. (2002) that contained the interaction element: "I feel that this is a very engaging website." (p. 48).

Visual Appearance

The respondent's assessment of the visual appearance of the pictured exemplary VFR was captured with four items. Srinivasan et al. (2002) go a step further and cluster the visual appearance-related items together and define those as a website or e-retailer's character. Findings from their research suggest that character has the most significant impact on predicting e-loyalty. Furthermore, their definition highlights the importance of creating a unique experience through website design related to a brand's reputation as well as the impact the experience has on shopper's attitude. This finding and the assumed impact of website design on e-satisfaction and e-loyalty respectively has been a topic of research for a long time (Wolfinbarger & Gilly, 2003, Evanschitzky et al., 2004, Harris & Goode, 2004, Kim & Stoel, 2004, Hausman & Siepke, 2008, Vila & Kuster, 2011). Szymanski & Hise (2000) found that website design was a dominant factor in predicting e-satisfaction. Evanschitzky et al. (2004) replicated the research design from Szymanski & Hise in Germany. Similarly, they found site design as an important factor for predicting e-satisfaction in retail and finance industry. Therefore, "VFR design is attractive", "shopping with VFR is fun" and "VFR does not look appealing to me" were chosen from Srinivasan et al. (2002) and slightly adjusted in wording. Wolfinbarger & Gilly (2003) defined website design as consisting of "all elements of the consumer's experience at the website (except for customer service), including navigation, information search, order processing, appropriate personalization and product selection." (p.193). In establishing their eTailQ measure, they used amongst others the same items to measure website design as the ones mentioned above. Additionally, the authors mentioned the need for a "professional look of a website" for customers who are new to a website. Assuming that most respondents will not have used a VFR technology before, the judgment of professional appearance of the exemplary VFR by customers is included.

Customer Transactional and Overall E-Satisfaction

A differentiation between the conceptualizations of transactional and overall e-satisfaction has emerged in recent years (Jones & Suh, 2000, Shankar et al., 2003, Bodet, 2008) and therefore was applied in this research as well. Transactional e-satisfaction was specified

after Oliver (1999) who comprised it as a customer's perception of pleasurable fulfillment during a specific transaction. In case of this paper, the transaction is the imaginary situation of a purchase with the help of a VFR. Overall e-satisfaction in contrast is defined as all of a customer's previous experiences and his or her contentment with respect to these experiences with an online retailer (Anderson & Srinivasan, 2003).

As Oliva et al. (1992) did, customer e-satisfaction is treated in this paper as a latent construct with multiple indicators. According to Chen et al. (2008), previous research into e-satisfaction often lacked a fit between conceptualization and operationalization of the construct. With this in mind, the construct was assessed using scale items from Oliver (1980) as well as more emotion-based items from Cronin et al. (2000). The former are well established in traditional consumer research, as well as in online environments (Szymanski & Hise, 2000, Wolfinbarger & Gilly, 2003, Anderson & Srinivasan, 2003, Bodet, 2008). Because emotion-based responses are assumed to occur immediately after an encounter, they were used for the measurement of transactional e-satisfaction. The items were taken from Cronin et al. (2000) and adapted to the research setting and consisted of "feelings of enjoyment and surprise". A similar adaption of these scales was done by Harris & Goode (2004) who also included evaluation-based items from Oliver (1980). In contrast, Jones & Suh (2000) suggested using the same items for both constructs and merely changing the directions to customers. This approach has been applied by Bodet (2008) as well.

Overall e-satisfaction was measured with three items after Oliver (1980). These included statements of "making the right choice", "satisfaction with the decision of purchase" and of "making a wise choice with buying from this online shop". All of those have been widely adopted in service and marketing research (Cronin & Taylor, 1992, Bolton & Lemon, 1999, Anderson & Srinivasan, 2003, Wolfinbarger & Gilly, 2003, Bodet, 2008, Vila & Kuster, 2011).

Customer E-Loyalty

E-loyalty is defined as the combination of behavioral loyalty intentions and a favorable attitude towards the online shop. This definition incorporates the components behavior and attitude as described by Dick & Basu (1994) and has seen similar application by other scholars (Srinivasan et al., 2002, Anderson & Srinivasan, 2003). Likewise, Gummerus et al. (2004) suggested measuring loyalty through behavioral intentions, preference for the service provider and positive word-of-mouth behavior. The authors reasoned that a pure measure of purchase intentions lacked the attitudinal element of loyalty such as preference and willingness to recommend the service.

A 6-item battery was developed on basis of Zeithaml et al. (1996) and Chen & Wells (1999). The items developed by Zeithaml et al. (1996) are widely accepted and used across

Construct	Code	Item
Visual Appearance	**VISAP1**	The VFR design is attractive to me.
	VISAP2	For me, shopping with a VFR is fun.
	VISAP3	The VFR does not look appealing to me.*
	VISAP4	The VFR's appearance is professional.
Informational fit-to-task	**INFO1**	The VFR enables me to order products that are "tailor-made" for me.
	INFO2	The VFR enables me to look at an item from different angles.
	INFO3	The VFR provides in-depth information.
	INFO4	The information obtained from the VFR is effective.
	INFO5	The information obtained from the VFR is pretty much what I need to order the right size.
Innovativeness	**INNO1**	I feel that the VFR is very engaging.
	INNO2	The VFR is innovative.
Customer Overall E-Satisfaction	**OSAT1**	I think I did the right thing by buying from this online shop.
	OSAT2	I am satisfied with my decision to purchase from this online shop.
	OSAT3	My choice to purchase from this online shop was a wise one.
Customer Transactional E-Satisfaction	**TSAT1**	When purchasing from this shop I feel pleased, delighted or happy.
	TSAT2	When purchasing from this shop I feel surprised, amazed or astonished.
Customer E-Loyalty	**LOY1**	The VFR makes it easy for me to build a relationship with this online shop.
	LOY2	I would like to visit this online shop again in the future.
	LOY3	Say positive things about this shop to other people
	LOY4	Encourage friends and others to do business with this site.
	LOY5	Consider this site to be your first choice for future purchases.
	LOY6	Do more business with this shop in the coming months.

Table 2 Operationalization of Constructs
Source: Established for this Research

different domains, offline and online (Sirohi et al., 1998, Ngobo, 1999, Gefen, 2002, Srinivasan et al., 2002, Anderson & Srinivasan, 2003, Wolfinbarger & Gilly, 2003, Gummerus et al., 2004, Kim & Stoel 2004, Bodet, 2008, Hausman & Siepke, 2008, Rafiq, Fulford, & Lu, 2013). In Table 2 the items *LOY 3* up to *LOY 6* are the ones adapted from Zeithaml et al. (1996). In addition, two items were taken from Chen & Wells (1999) because they capture the aspect of entertainment provided by a website, which is a rare exception amongst scales. One item was adjusted in wording to account for the assumed relation between VFR and the online shop. The scales from Chen & Wells (1999) have seen implementation in studies by Wolfinbarger & Gilly (2003), Kim & Stoel (2004) and Hausman & Siepke (2008) among others.

4.3.2 Auxiliary Constructs

As introduced in chapter 3, two more factors are assumed to have a significant effect on model 1. Prior experience and gender were introduced as moderating variables between the hypothesized relationship of informational-fit-to-task and transactional e-satisfaction. Prior experience is referring to a customer's history with returning online ordered apparel products. This was established by asking the respondents about their last online clothing purchase and whether they had to return at least one item due to fit-related concerns. Gender was asked at the beginning of the questionnaire and refers to the sex of an individual (male or female).

4.3.3 Control Variables

In general, control variables are included to ensure that the results are not biased by not including them. Furthermore, their inclusion is especially relevant if the research is conducted in a positivist approach (Blumberg et al., 2008). Shankar et al. (2003) pointed out that control variables such as prior experience could influence overall satisfaction and loyalty. At this point, prior experience has to be distinguished from the prior experience with online shopping, which was a pre-condition to participate in the survey. More accurately, prior experience as a control variable refers to respondent's background in usage of a VFR technology and was integrated into both models. The background was inquired with a yes=0/no=1 question and included as a control variable in both models.

Touifaly et al. (2013) specifically mentioned that demographic data should be integrated into future research into online loyalty. *Gender* was introduced as a control variable in model 2, with a dummy variable (0 for female, 1 for male).

Income may influence the customer's e-loyalty. An individual with a lower level of income might be more inclined to compare prices and look out for special promotions thus not ultimately being able to exercise loyalty to a specific online shop (Shankar et al., 2003). *Income* was measured by a ratio scale from 1: ≤EUR 1000, 2: EUR 1001 - 1500, 3: EUR

1501 - 2500, 4: EUR 2501 - 3500, 5: EUR 3501 - 4500 and 6: ≥EUR 4501 and defined as a respondent's monthly net household income and used only in model 2. Following the reasoning above, only the impact on loyalty is controlled for and no effect of level of income on transactional e-satisfaction in model 1 is assumed. *Age* was measured through a ratio scale and used in both models. The intervals were: 1: 0-18, 2: 19-24, 3: 25-30, 4: 31-39, 5: 40-49, 6: 50-64 and 7: 65≤.

4.3.4 Reliability and Validity of the Measures

Reliability of a questionnaire refers to the internal consistency of the measures on recurrent applications (Saunders et al., 2009). For this purpose, Cronbach's alpha coefficients are calculated for all the constructs and reported in Table 3. From these values can be derived that all constructs except one are above the recommended .7 threshold by (Nunally, 1978) which suggests that the items included are reliable. The construct *transactional e-satisfaction* failed to achieve this with a reported α=.55, but as Cortina (1993) and Gliem & Gliem (2003) mentioned a low number of included items can lead to a lower coefficient. Furthermore, Lance, Butts, & Michels (2006) argued that Nunally did not proclaim the .7 threshold as an universal measure of reliability and McCrae, Kurtz, Yamagata, & Terracciano (2011) suggested the reconsideration of using Cronbach's alpha for some scales, especially if they included well-established construct measures. Hence, the items were both retained.

Construct	No. of items	Cronbach's α
Visual Appearance	4	.80
Informational-fit-to-task	5	.81
Innovativeness	2	.73
Customer Overall E-Satisfaction	3	.88
Customer Transactional E-Satisfaction	2	.55
Customer E-Loyalty	6	.90

Table 3 Consistency Measures of Constructs
Source: Analysis of Survey Data

Internal validity refers to "the ability of your questionnaire to measure what you intend to measure." (Saunders et al., 2009, p.372). Saunders et al. (2009) indicated content, criterion-related and construct validity whereas other researchers sometimes add face validity as well (Cronin et al., 2000, Srinivasan et al., 2002). Face validity is defined as the extent to which the questionnaire covers the topic researched from a layperson's perspective. The assessment was done during the pre-test phase by volunteers and revealed no issues with

this type of validity. Content validity captures the extent to which an entire domain of a variable was measured and can be assumed due to the multiple applications of the scales and items used. Construct validity is often considered as the most important one in scientific research and describes the extent to which a measure relates to measures of a similar construct (convergent validity) and is unrelated to measures of different constructs (divergent validity). Table 4 shows the calculated cross-construct correlations for each item. It can be derived that construct validity is given since the items show higher correlations with items from the same construct (convergent) than with different constructs.

4.4 Data Preparation

The collected data were prepared as follows for the subsequent analysis step. As mentioned earlier, previous online shopping experience was defined as a pre-condition for the data to be included into the analysis. After examining all of the 115 completed surveys, a total of 110 remained.

According to De Vaus (2002) and Hair, Black, Babin, & Anderson (2014) four reasons for missing data can be identified:

- data was not required to be entered because of a filter
- respondent refused to answer (non-response)
- a respondent was not able to answer due to lack of opinion or knowledge
- the question was simply overlooked

The first reason applied to two sets of questions. A means to achieve a higher identification of the respondent with the questionnaire at hand was the usage of gender-specific formulation and examples. Because this differentiation is no longer required for the data analysis since the variable gender is included in the data, the relevant items had to be edited accordingly. In detail, this means merging the two sets of variables into one. The other reasons mentioned above did not apply for most of the questionnaire since respondents were forced to answer to continue to the next section of the survey. Furthermore, the options “Don’t know” or “Choose not to answer” were deliberately omitted from the survey. The findings from Krosnick and colleagues (2002) support this approach.

The single part within the questionnaire where respondents were able to leave a question blank was the demographic section. The data coding revealed three cases where respondents choose not to answer the question. These were three individual respondents and questions regarding the highest level of education, income as well as the nationality all of which were coded with a 999 following recommendation from Torres-Reyna (2011). Respondents could manually enter their nationality in a text field if they did not find their country in the pre-selection. This resulted in multiple variations of one and the same nationality (for example US American, US and USA) and therefore had to be edited and

coded respectively. This scheme allowed the respondent to enter a more in depth description of what country or part of a country they felt they belonged to (Smith, 2002). After a careful inspection of the distribution of nationalities in the sample a re-coding of the items was undertaken. This lead to the following clustering: 1: German, 2: Dutch, 3: British, 4: Rest of Europe, 5: North or South American, 6: Australian, 7: African or Asian. Even though the survey was distributed online and therefore accessible worldwide, after a screening the distribution of nationalities revealed a high frequency of German participants. One item was reversely coded and had to be adjusted accordingly (Scherbaum & Shockley, 2015). The customer's background with product returns due to fit concerns was initially asked within an item-battery on a Likert-scale. Due to this approach, the author decided that respondents indicating their agreement with this statement resulting in a "4" and higher could be used for further analysis. This lead to the creation of a dummy variable with 0: no experience and 1: experienced product return.

The identification and assessment of outliers is of particular importance for multiple regression analysis. Hair et al. (2014) mentioned four classes of outliers and their careful consideration within the research context. Data anomalies were identified in four cases for model 1 and six for model 2. A more detailed analysis was conducted using the Cook's Distance (De Vaus, 2002) and Mahalanobis D^2 (Hair et al., 2014). Afterwards these results were combined and the flagged cases thoroughly examined. Last, the decision was made to retain all of the cases following the recommendation from Hair et al. (2014). Finally, new variables were created for the regression analysis: the mean of constructs as well as the interaction terms of predictor and moderator. The data editing and coding was done for all 42 items included in the questionnaire and the corresponding 110 cases.

	INFO1	INFO2	INFO3	INFO4	INFO5	INNO1	INNO2	VISAP1	VISAP2	VISAP3	VISAP4	TSAT1	TSAT2	OSAT1	OSAT2	OSAT3	LOY1	LOY2	LOY3	LOY4	LOY5	LOY6
INFO1	1																					
INFO2	.557	1																				
INFO3	.383	.260	1																			
INFO4	.515	.508	.593	1																		
INFO5	.384	.399	.420	.705	1																	
INNO1	.454	.412	.404	.578	.660	1																
INNO2	.406	.389	.540	.625	.559	.578	1															
VISAP1	.456	.467	.402	.522	.485	.656	.589	1														
VISAP2	.362	.411	.505	.638	.652	.618	.599	.647	1													
VISAP3	.279	.303	.339	.431	.354	.415	.403	.604	.497	1												
VISAP4	.316	.271	.481	.380	.385	.450	.514	.507	.406	.350	1											
TSAT1	.487	.318	.299	.505	.537	.569	.450	.558	.540	.310	.366	1										
TAST2	.330	.345	.298	.380	.297	.384	.343	.378	.375	.224	.459	.377	1									
OSAT1	.424	.380	.302	.487	.596	.564	.516	.567	.488	.378	.489	.654	.462	1								
OSAT2	.391	.410	.362	.534	.505.	.439	.528	.497	.479	.335	.506	.553	.457	.719	1							
OSAT3	.477	.425	.298	.548	.555	.546	.517	.478	.415	.232	.471	.587	.472	.743	.684	1						
LOY1	.273	.318	.210	.391	.433	.484	.350	.364	.418	.168	.384	.329	.516	.441	.396	.527	1					
LOY2	.373	.274	.453	.494	.520	.525	.509	.584	.656	.387	.506	.540	.418	.622	.603	.556	.578	1				
LOY3	.356	.352	.518	.561	.564	.528	.572	.553	.627	.404	.497	.439	.500	.561	.520	.484	.527	.708	1			
LOY4	.203	.321	.397	.437	.439	.429	.506	.407	.484	.199	.423	.397	.468	.422	.448	.461	.593	.636	.727	1		
LOY5	.383	.270	.489	.509	.561	.539	.454	.467	.525	.384	.570	.496	.388	.630	.570	.562	.469	.693	.596	.573	1	
LOY6	.301	.333	.325	.512	.543	.558	.485	.509	.521	.308	.426	.513	.381	5.90	.674	.661	.526	.687	.573	.570	.673	1

Table 4 Cross-Item Correlations
Source: Analysis of Survey Data

5 Data Analysis

5.1 Data Analysis Method

As introduced in earlier chapters, the hypothesized relationships indicate multiple regression as analysis method for both models while simultaneously testing for moderation in model 1 and mediation in model 2. Hair et al. (2014) suggested that multiple regression is the right method to use when two or more independent variables are presumed to have an influence on one dependent variable. The author refrained from using structural equation modeling (SEM) as an analysis technique due to its complexity and inability to test for moderating relationships. In order to sustain consistency in the analysis, the statistical analysis was limited to one technique. In this case, model 1 will be tested with a moderated hierarchical regression. Multiple regression is usually seen as part of multivariate analysis (Backhaus, Erichson, Plinke, & Weiber, 2016).

The equations for the moderated multiple hierarchical regression are developed below. The first equation (1) is compiled with the control variables specified (*Age* and *VFR experience*) as well as regression constant and error term. Equation (2) includes the predictors *INFO, INNO* and *VISAP* and tests for H3, H4 and H5.

$$\text{Transactional E-Satisfaction} = \alpha_0 + \beta_1 VFR\ Exp. + \beta_2\ Age + \varepsilon \tag{1}$$

$$\text{Transactional E-Satisfaction} = \alpha_0 + \beta_1\ VFR\ Exp. + \beta_2\ Age + \beta_3\ INNO + \beta_4\ INFO + \beta_5\ VISAP + \varepsilon \tag{2}$$

Finally, to measure the hypothesized moderating effects of *gender* and *product return experience*; in equation (3) the interaction terms are entered to test H6 and H7.

$$\text{Transactional E-Satisfaction} = \alpha_0 + \beta_1\ VFR\ Exp. + \beta_2\ Age + \beta_3 INNO + \beta_4\ INFO + \beta_5\ VISAP + ReturnExp \times INFO + Gender \times INFO + \varepsilon \tag{3}$$

For model 2, four conditions have to be fulfilled to support the hypothesis of a mediation effect (Baron & Kenny, 1986). Validating these conditions involves several separate regression analyses that are illustrated in Figure 9 and follow the recommendation by Judd & Kenny (1981). For a detailed description of how to test for mediation with the relations

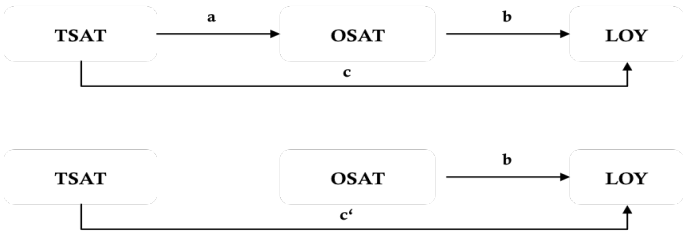

Figure 9 Steps for Mediation Analysis
Source: Adopted from Baron & Kenny (1986)

depicted in Figure 9 and the corresponding equations see appendix VI).

In summary, mediation is present if the results of the regression show that the c' path is not significant when simultaneously including the b-path. If the effect is still significant but lessened, the findings support partial mediation (MacKinnon, Fairchild, & Fritz, 2007, Meyer, Gamst, & Guarino, 2013). Beforehand, the paths a,b and c have to be tested for with significant results. A frequently used significance test for the indirect effect is the Sobel test (1982). Because this method requires a normal distribution of the sample, scholars developed other approaches, for example bootstrapping. This alternative approach is a "… nonparametric approach to effect-size estimation and hypothesis testing…" (Preacher & Hayes, 2004, p.721-722) which is especially suited for small samples.

5.2 IBM Watson as an additional analysis method

As an additional tool to analyze data IBM's Watson ecosystem was chosen. According to IBM, Watson "is a cognitive system enabling a new partnership between people and computers." (IBM Watson product page, www.ibm.com/us/en/Watson, last accessed on 02/27/2016.) One of the advantages is the natural posing of questions that Watson answers with the data loaded onto its system. First developed to compete on the TV show Jeopardy, IBM Watson is now widely used across domains to answer queries regarding campaign performance, sales or employee satisfaction amongst others. The ecosystem is available over the IBM cloud and features three distinct fields: Explore, Predict and Assemble. This unique approach offered an additional insight into the data and the hypothesized relationships as well as further validation of the results obtained from the regression analysis.

The previously prepared data were loaded into the system and subsequent analysis was focused primarily on the two models introduced in chapter 3. A key distinction from the analysis with SPSS is that Watson chooses the predictors that fit the data for a criterion best. Moreover, an exploration of the relationships was done. As a means to uncover new insight, two approaches of analysis were chosen. First, the previously introduced models will be examined similar to the regression models from the previous sub chapter and only include the hypothesized predictors as well as the control variables. The second approach will include additional variables. This means that Watson will be enabled to predict the two outcomes (LOY and TSAT) with other factors such as the demographic data, purchase frequency, last purchase behavior and more.

5.3 Assessment of Assumptions of Regression Model

Before continuing with the analysis, which will be done with IBMs SPSS software package, some assumptions about regression models have to be confirmed first. According to

Saunders et al. (2009), Greene (2012), Hair et al. (2014) and Backhaus et al. (2016) these involve the following:

1) Linearity of Parameters
2) Homoscedasticity
3) Absence of Multicollinearity
4) Normal Distribution

Assumption 1 refers to the relationship of independent and dependent variable and assumes that a change in the independent variable is related to a change in the dependent variable. This can be easily observed with scatterplots. Outliers can influence the linearity of the relationship and should be examined carefully and eventually be omitted from the regression analysis. The scatterplots for the underlying model are shown in **Fehler! Verweisquelle konnte nicht gefunden werden.** and **Fehler! Verweisquelle konnte nicht gefunden werden.**. From these figures a linear relationship between the variables can be deducted, concluding that the first assumption is met.

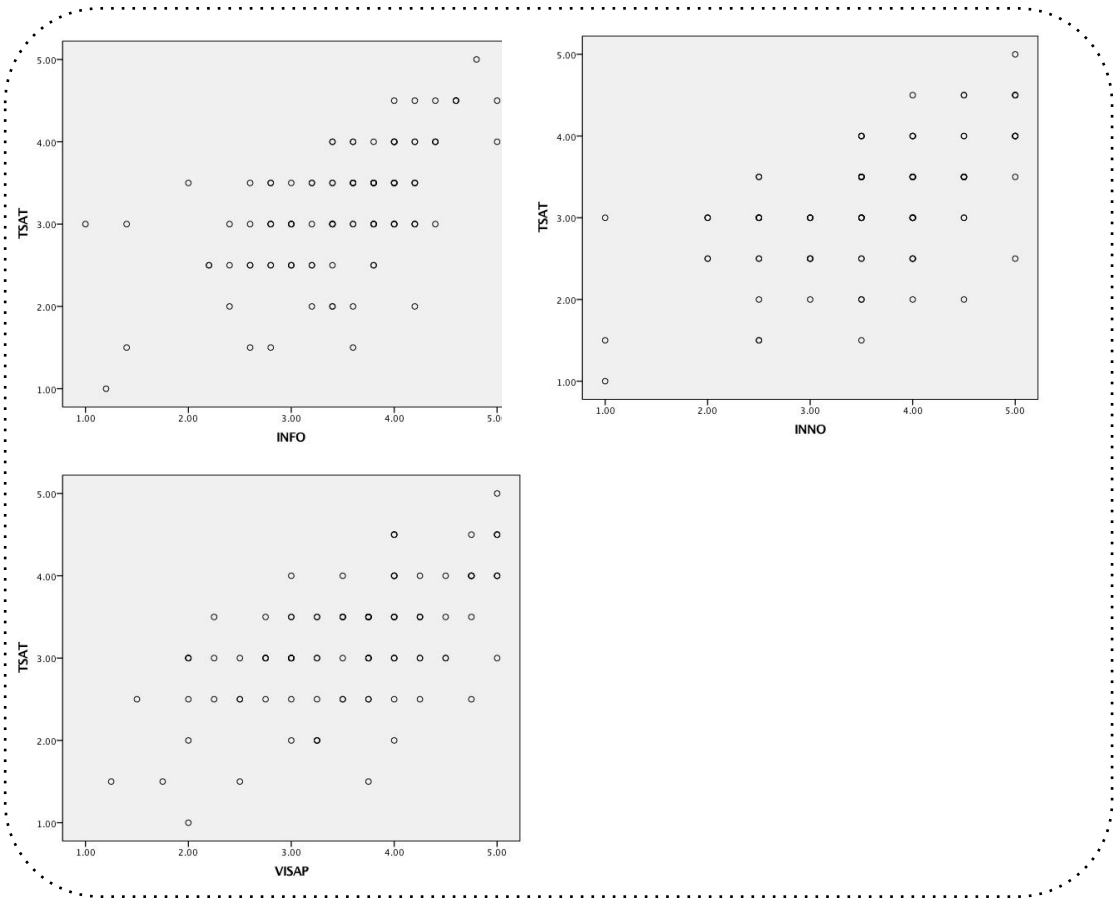

Figure 10 Scatterplots for Model 1
Source: Analysis of Survey Data

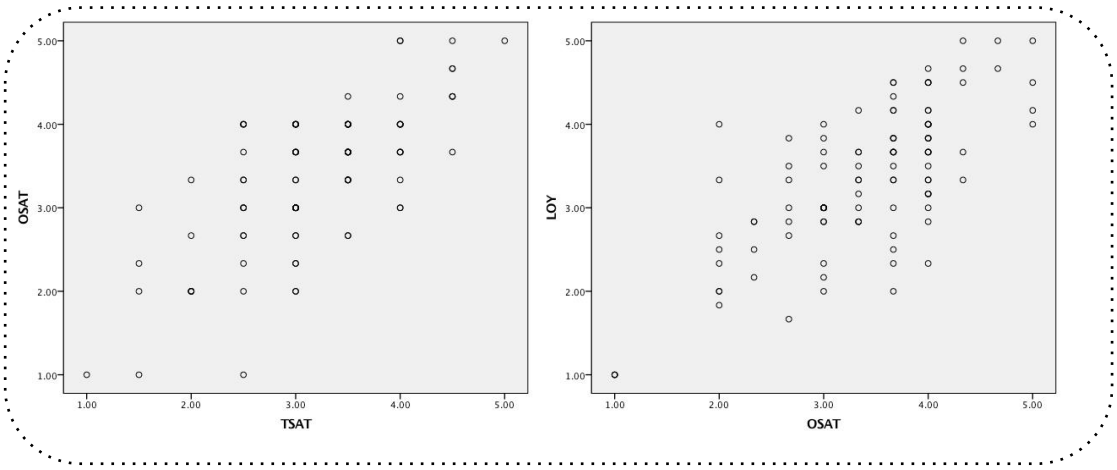

Figure 11 Scatterplots for Model 2
Source: Analysis of Survey Data

Assumption 2 requires homoscedasticity of the variables, which is given if a constant variance of error terms across all values of the IV is present. If this assumption is violated, heteroscedasticity is present which is indicated by a cone-shaped pattern in the residual plot. Alternatively to the visual diagnosis by using a residual plot, a range of mathematical tests exists: Goldfeld/Quandt-test (Backhaus et al., 2016), White-test or the Breusch-Pagan-test (Greene, 2012). The assumption was first assessed with a scatterplot for each relationship (Figure 12). Even though the graphs suggest that homoscedasticity is present, the Breusch-Pagan-test was computed (χ_1^2= 2.074 for the first plot, and χ_2^2 = 2.064 for the second). Both χ^2-values are not significant and below the threshold corresponding with the respective degree of freedom. It is therefore assumed, that homoscedasticity is present and the assumption fulfilled.

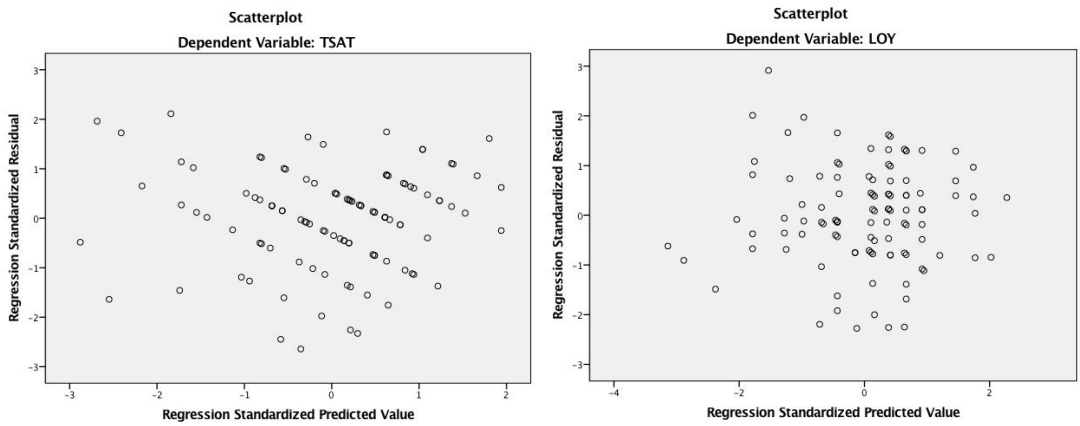

Figure 12 Scatterplots testing Homoscedasticity
Source: Analysis of Survey Data

Assumption 3 is the premise of absence of correlation between the independent variables. According to Saunders et al. (2009), the simplest test is to have a look at the correlation coefficient tables where perfect multicollinearity is present with a coefficient of 1 and a value of .90 and above indicating high collinearity of the factors. Other scholars make

additional use of the variance inflation factor (VIF) test (Saunders et al., 2009, Greene, 2012, Backhaus et al., 2016). The results for the VIF for both models are presented in Table 5. A high collinearity is characterized either by a very low tolerance value (.10 or below) or a very high VIF (10 or above) (Backhaus et al., 2016, Hair et al., 2014). None of these critical values are reported in the table, and therefore it can be assumed that no significant multicollinearity is present.

Model 1

	Tolerance	VIF
INFO	.390	2.563
INNO	.324	3.089
VISAP	.377	2.653
GENDER	.895	1.118
VFREXP	.952	1.050
AGE	.916	1.092
RETURN EXP	.975	1.026

Dependent Variable: TSAT

Model 2

	Tolerance	VIF
OSAT	.438	2.282
TSAT	.460	2.174
GENDER	.889	1.125
INCOME	.850	1.117
AGE	.790	1.266
VFREXP	.898	1.113

Dependent Variable: LOY

Table 5 Multicollinearity Statistics
Source: Analysis of Survey Data

At last, assumption 4 needs to be verified which requires a normal distribution of both the predictor and criterion (Saunders et al., 2009). Alternatively, Backhaus et al. (2016) and Greene (2012) review the normal distribution of the error terms, which are also referred to as standardized residuals. As a means to visually assess the distribution histograms or boxplots are typically used. The distribution of the error terms of the respective variables can be seen in Figure 13. This examination allows the conclusion that the data appears to be normally distributed. Further, Backhaus et al. (2016) specifically mentioned that this assumption is only essential for significance testing.

Additionally, the authors noted that a small deviation of the residuals from the aspired bell curve of normal distribution does not negatively impact the validity of significance testing. Following the argumentation and presented histograms, the premise of a normal distribution is given and no mathematical test like the Kolmogorov-Smirnov Z-test of normality is needed.

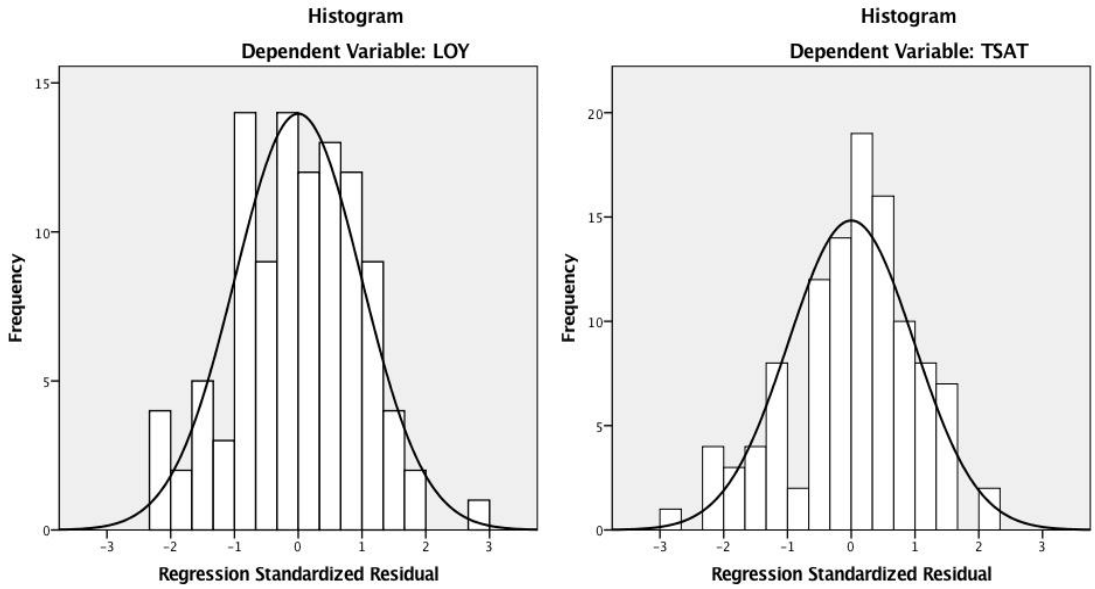

Figure 13 Normal Distribution of Error Terms
Source: Analysis of Survey Data

5.4 Results

5.4.1 Descriptive Analysis

This subchapter presents the results from the descriptive analyses that are mostly concerned with sample characteristics. Further, means, standard deviations and correlations are introduced. A depiction of an average female and male respondent can be found in appendix V.

The distribution of age within the sample seems normal (see Figure 14). Further no mean or median is calculable since only a range had to be indicated by respondents. The age group 25-30 has the highest share in the sample with 43.64%. The second largest group is from 19 to 24 with 26.36%. This distribution is explainable with the research topic at hand as well as the distribution channels of the survey. Another variable of importance is *income*. An individual with higher income has the more means to demonstrate loyalty than someone with a lower income who has to be price-conscious. The distribution as shown in Figure 15 illustrates a large portion of the sample (28.18%) has a monthly income of less than EUR 1,000. On the other end of the scale, 38.18% of the sample has more than EUR 2,501 per month available.

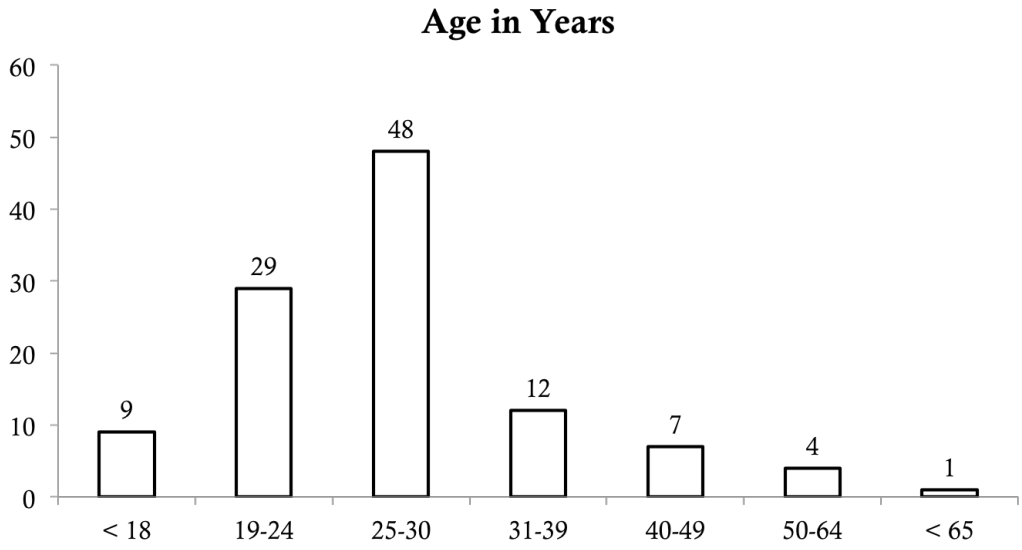

Figure 14 Age Distribution of Sample
Source: Analysis of Survey Data

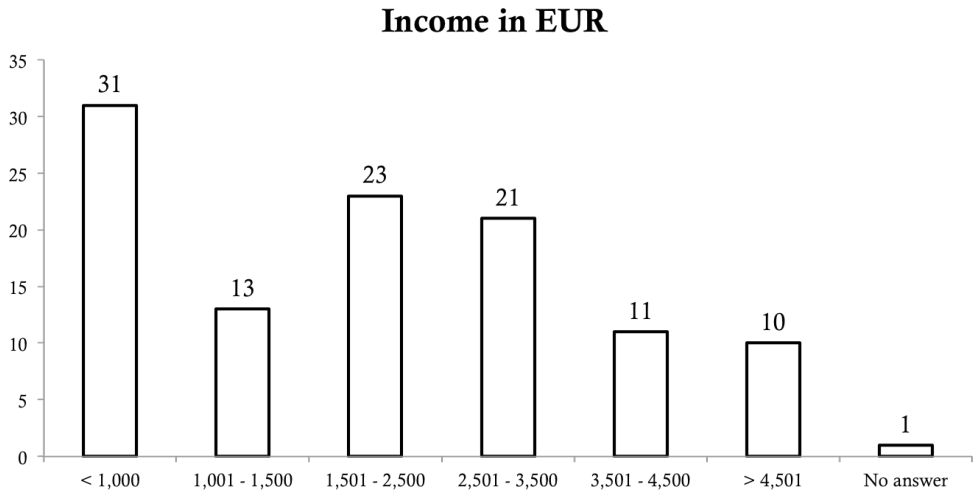

Figure 15 Distribution of Monthly Household Income of Sample
Source: Analysis of Survey Data

Looking at the sample and Figure 16, it can be derived that three types of online shopping behaviors can be identified. The first behavior is characterized by rare occurrences of online shopping or a total lack of them. 52 respondents fall within this category. On the other end of the scale, there are people who frequently purchase online; these will be referred to as "power shoppers". 46 respondents fall within this category. The middle group with three to six orders within six months is small. A closer look at the group of power shoppers reveals that these respondents seem to value the traits of online shopping compared to offline shopping higher than the rest of the sample (see Figure 17).

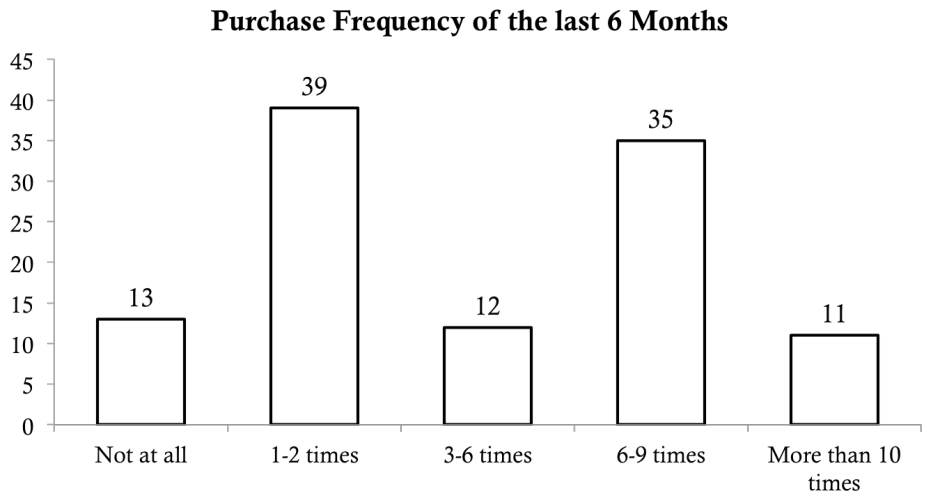

Figure 16 Distribution of Online Shopping Purchase Frequency
Source: Analysis of Survey Data

The variables pictured in Figure 17 reflect a respondent's agreement with the statement that online shopping compared to offline shopping is more convenient in terms of price, product choice, time efficiency and product return policies. The mean for product choice is nearly identical (4.08 for the general sample and 4.11 for the power shopper), whereas price has a mean of 3.48 in the general sample compared to a mean of 3.74 in the sample of power shoppers. The difference regarding time efficiency is .27, the biggest disparity occurs in regard to product return policies with 2.96 for the average shopper and 3.42 for a power shopper. Overall, product choice and time efficiency are the highest rated convenience factors for respondents.

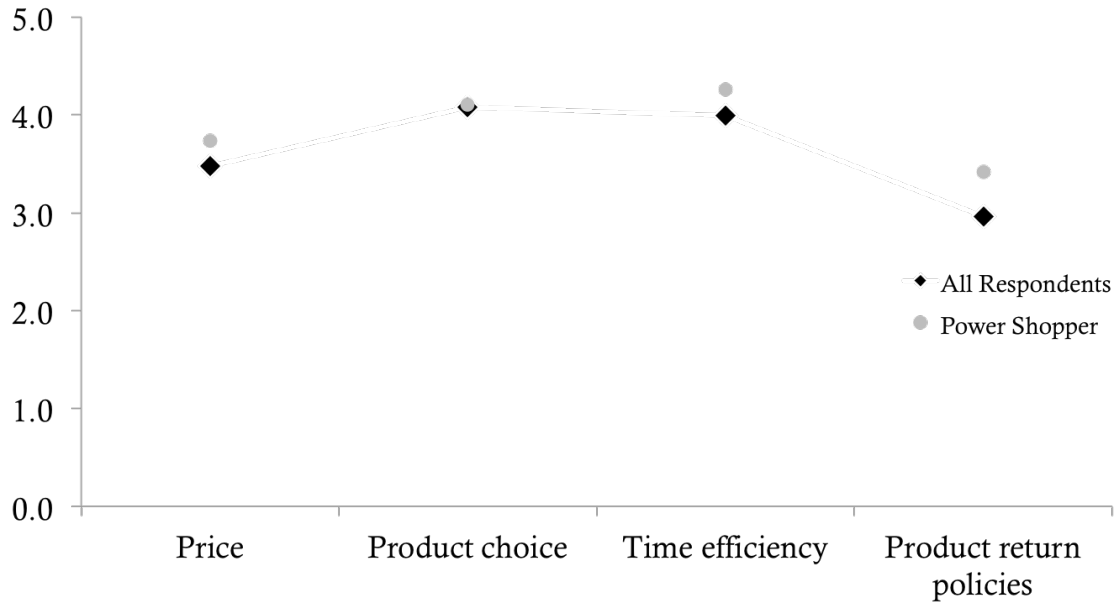

Figure 17 Comparison of Means for Respondent's Rating of Online Shopping Convenience compared to Offline Shopping
Source: Analysis of Survey Data

A summary of the means, standard deviations and correlations is displayed in Table 6. For the dichotomous variables *product return experience, gender* and *experience with VFR* the rank biserial correlation coefficient was computed to express any strength of relationship with the rest of the variables. However, the phi coefficient was used for the dummy variables themselves. For the rest of the variables the Spearman rank correlation coefficient was calculated (It is noted, that often the Pearson product-moment correlation coefficient is used for variables stemming from a Likert-Scale although they are measured on an ordinal scale. However, a perfect Pearson correlation only results from linear relationship between two variables whereas the Spearman ρ only requires any monotonic function and is equipped to handle ordinal data.).

As described in the previous chapter, the *product return experience* is a transformed variable with 0 indicating no experience and 1 indicating previous experience with the return of an item. In total, 75 respondents (68.2% of the sample) are familiar with returning an item. However, when interpreting the means reported in Table 6, one has to keep in mind that *income* and *age* was asked on an interval scale. For *income*, this translates to an average between EUR 1,501 and EUR 2,500 and for *age* 24-30. Furthermore, *gender* naturally has no mean value, the .27 indicating as mentioned earlier, that more women participated. A closer look at the respondent's *prior experience with a VFR* reveals, that seven people had a previous encounter with such a technology (6.4% of the sample).

Looking at the constructs which where measured on a 5-Point Likert-Scale, *innovativeness* has the highest reported mean (3.609), followed by *visual appearance* (3.566) indicating a slight tendency of a respondent's rating in favor of a VFR. However, the variables have the highest standard deviation as well (.922 and .889 respectively), indicating their dispersion among the scale. In general, all constructs are positively correlated to each other at a significance level of $p<.01$. Following the reasoning from chapter 3, a positive correlation between *overall e-satisfaction* and *e-loyalty* as well as between *transactional e-satisfaction* is confirmed.

The highest significant correlation exists between *innovativeness* and *visual appearance (*.714*).* This suggests that the respondents seemed to be pleased visually with innovative features. Additionally, *age* seems to be positively correlating with *income* and gender in the sample. This seems plausible, because of the distribution of gender within the sample and a higher age indicating a level of career progression corresponding with a higher income than younger adults/students. Contrary to the literature, *income* has no significant effect on the levels of *e-loyalty*. Further, the experience of *product return* seems not to be significantly correlated with any of the constructs. Interesting is the positive correlation of .218 ($p<.05$) between *overall e-satisfaction* and *VFR experience*. This can be seen as a first indication of the importance of a VFR technology for customers' e-satisfaction.

	Construct	Mean	Std. dev.	N	1	2	3	4	5	6	7	8	9	10	11
1	E-Loyalty	3.350	.845	110	1	.665**	.616**	.605**	.644**	.662**	.029	-.040	.109	-.088	.160
2	Overall E-Satisfaction	3.397	.820	110		1	.640**	.621**	.598**	.568**	.093	-.031	-.015	-.092	.218*
3	Transactional E-Satisfaction	3.191	.752	110			1	.603**	.568**	.591**	-.061	-.115	-.085	-.058	.042
4	Informational-fit-to-task	3.482	.766	110				1	.678**	.647**	.027	-.141	-.002	-.115	.057
5	Innovativeness	3.609	.922	110					1	.714**	.017	-.106	-.016	-.101	.132
6	Visual Appearance	3.566	.889	110						1	-056	-.132	-.003	-.108	.019
7	Product Return Experience	.682	.468	110							1	.112	-.130	.040	.062
8	Gender (female)	.270	.447	110								1	.161	.274**	-.091
9	Income	2.98	1.644	109									1	.356**	-.116
10	Age	2.95	1.199	109										1	-.087
11	VFR Experience	.000	.000	110											1

* correlation is significant at the 0.05 level (2-tailed) ** correlation is significant at the 0.01 level (2-tailed).

Table 6 Means, Standard Deviation and Correlations
Source: Analysis of Survey Data

5.4.2 Statistical Analysis

The regression analysis was conducted after defining the general model (see Figure 7 and Figure 8) and development of the regression equations in the previous subchapter. The latter are used to estimate the regression parameters as well as to test for the hypotheses developed in chapter 4. The objective of multiple regression analysis is to predict the outcome of the criterion with two or more predictors. When interpreting the findings, three parts can be distinguished: the significance of the independent variables, the direction of the found relationships and whether all of them together predict a sound model (Hair et al., 2014). The evaluation is realized by examining the regression weights and their corresponding significance level for the predictor variables and the determination coefficient R^2 for the complete model.

MODEL 1

Regarding model 1, the final results from the moderated hierarchical regression are presented in Table 7. An overview of the values of each parameter estimate at each step of the regression and the corresponding statistics can be found in appendix VII. The final model explains 43.8% (adjusted R^2, p<.001) of variance of transactional e-satisfaction. The initial R^2=.002 was not significant, by adding the predictor terms in the second block a change of ΔR^2=.442 (p<.001) (F-value of 16.609 at p<.001) resulted. At the final step, the moderator terms were entered which resulted in a ΔR^2=.030 which failed to be significant (p=.061). Even though, the F-statistic for the final model is highly significant (p<.001) with a F-value=13.115 which is very unlikely to happen by chance. The t-values are significant and positive for *informational-fit-to-task* (p<.001) and *visual appearance* (p<.05), suggesting these variables make a significant contribution to the prediction of the dependent variable *transactional e-satisfaction*. Further, a higher t-value and a lower significance level indicating the strength of this impact. This suggests that H3 and H5 can be accepted, whereas H4 has to be rejected since the correlation of *innovativeness* failed to be significant (p=.175). From the magnitude of the t-statistics as well as the estimates it is evident, that *informational-fit-to-task* has the biggest impact on the DV (β=0.406), followed by *visual appearance* (β=0.283).

Block	Construct	b-Estimate	St. Error	β	t-value
	Intercept	.347	.398		.870
1 Control variables	VFR Experience	-.080	.228	-.026	-.350
	Age	.053	.046	.085	1.171
2 Predictors	Informational-fit-to-task	.398**	.125	.406**	3.181**
	Innovativeness	.140	.103	.172	1.365
	Visual Appearance	.239*	.098	.283**	2.432*
3 Interaction Term	Gender × INFO	-.267*	.116	-.205*	-2.303*
	ReturnExp × INFO	-.039	.057	-.051	-.695
	Significant at *p<.05; ** p<.01; *** p<.001; N=110				

Table 7 Regression Results Model 1
Source: Analysis of Survey Data

Regarding the interaction effect of both *gender* and *return experience* with *INFO*, only the former is significant (β=-.205, p<.05). This means, that H6 has to be rejected. A closer examination of the moderating effect of *gender* on the link between *INFO—TSAT* is pictured in Figure 18. Though the hypothesized moderator effect was positive and the computed β-coefficient is negative, H7 holds still true. *Gender* was introduced into the model as a dummy variable where females were coded as "0", therefore a negative regression coefficient does confirm the hypothesis that female respondents tend to have higher *transactional e-satisfaction* (Hair et al., 2014). The same reasoning applies for interpreting the regression coefficient of the second moderator *ReturnExp* × *INFO*. This means that people who experienced a product return rate significantly higher on this linkage, but the relationship failed to be significant (p=.489) and the null hypothesis cannot be rejected.

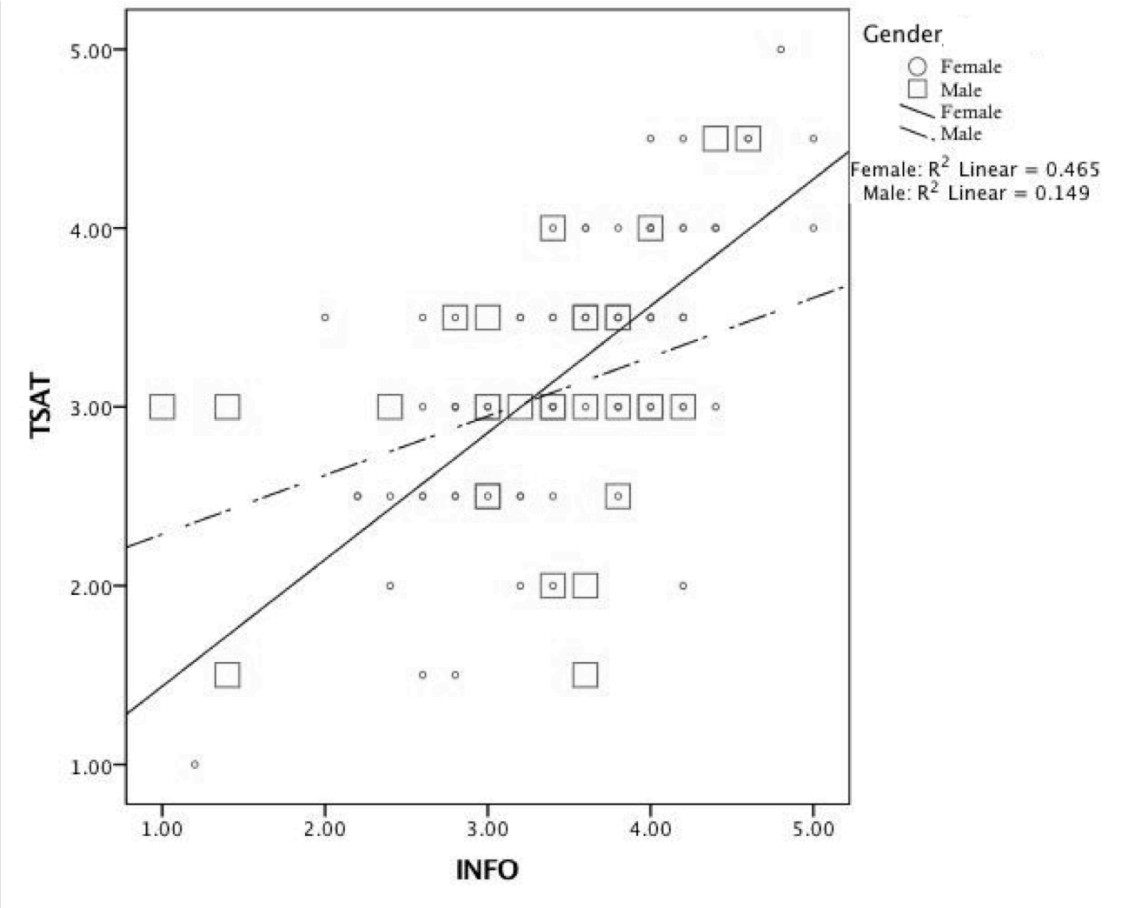

Figure 18 Moderating effect of Gender on INFO-TSAT linkage
Source: Analysis of Survey Data

MODEL 2

Testing for model 2 was achieved by leveraging the PROCESS macro for SPSS from Preacher & Hayes (2004) and includes the bootstrapping method to assess the indirect effect, the normal theory approach (Sobel-test), as well as the approach by Baron & Kenny (1986). H1 and H2 were tested simultaneously. *Overall e-satisfaction* has a strong positive relation to e-loyalty (b=.540, p<.001) and the complete model is significant at the p<.001 level with an adjusted R^2=.565 and superior to the base model (equation 4) only including control variables (R^2=.062, p=.150). This confirms H1. Regarding the mediation effect, the indirect effect calculated with the Sobel test was significant (Z=5.0771, p<.001). Another indicator for the mediating effect of *overall e-satisfaction* was revealed through the results of bootstrapping the sample (n=5000). A 95% confidence interval for the indirect effect (c-c'=.417) were LLCI=.2566 and ULCI=.6075 and therefore confirm the presumed effect of mediation since the interval does not contain zero (Preacher & Hayes, 2004). In summary, partial mediation was evident since both paths (c and c') were significant and therefore it can be concluded that H2 is partially supported. Figure 19 displays the results of equations 4-8.

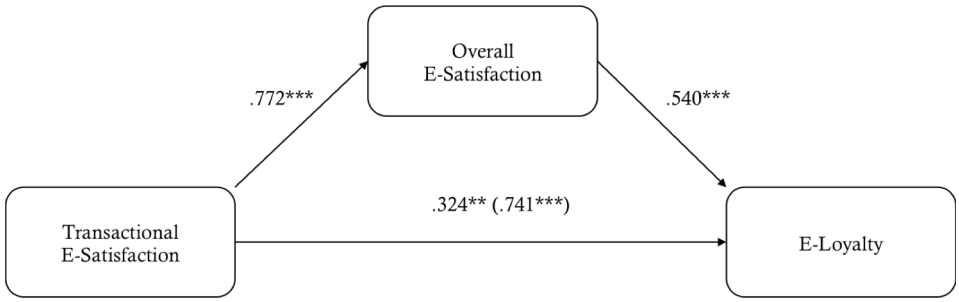

Figure 19 Results of Mediation Testing
Source: Analysis of Survey Data

5.5 Exploring Data and Predicting Outcomes with IBM Watson

MODEL 1

When predicting transactional e-satisfaction, three levels of predictive power are offered by Watson: one, two or a combination of fields predicting the criterion. A comparison of both approaches is presented in Figure 20, with dots indicating each model. Blue stands for the strongest predictor, green the second and yellow the third. In general, the closer the models are to the center, the more predictive strength they possess. Additionally, the dots should be read clock-wise and their distance interpreted as a difference in predictive strength.

BASE MODEL 1

(1) Three single predictors were observed: *INNO* (35%, F(4,105)=14.24, p<.0001), *VISAP* (34%, F(4,105)=13.34, p<.0001) and *INFO* (34%, F(4,105)=13.24, p<.0001).

(2) The inclusion of two predictor changed the models to the following: The strongest predictive strength resulted from *INFO* × *INNO* (54%, F(12,89)=1.87, p<.05). The second model contained *VISAP* and *INFO* as predictors (50%) and had the same strength as the third model which included *VISAP* and *product return experience* (50%). Additionally, at this stage a significant interaction effect of *innovativeness* and *VFR experience* on *TSAT* was observed (ps=39%, p<.05).

(3) No changes to the models reported in (2) were observed.

EXTENDED MODEL 1

(1) At this stage, the strongest predictor of *TSAT* is *OSAT* with ps=50% (F(4,105)=25.93, p<.0001). *E-loyalty* was reported as the second best predictor with ps=38% (F(4,105)=15.33, p<.0001), closely followed by *INNO* (35%), *VISAP* (34%) and *INFO* (34%) which were significant at the p<.0001 level.

(2) At ps=65% the combination of *income* and *OSAT* is now the most predictive model. As second best, a model including *INNO* and *OSAT* with a ps=64% was found. As third best, the model contained *OSAT* and *VISAP* (60%). None of these models reported significant interaction effects.

(3) At this stage no change of the models reported in (2) was found. The first two significant predictors remained *OSAT* and *LOY* (as reported in (1)). Additionally, *INNO* was found to predict 35% with F(4,105)=14.24, p<.0001, *VISAP* predicted 34% with F(4,105)=13.34, p<.0001 and *INFO* 34% at F(4,105)=13.24, p<.0001. Thus supporting H3, H4 and H5.

SUMMARY FOR MODEL 1

Figure 20 illustrates a comparison of the above-mentioned models. Both approaches support the hypotheses 3, 4 and 5 that *informational-fit-to-task, innovativeness* and *visual appearance* are influencing the *transactional e-satisfaction* of customers. Further, the base model found evidence for an interaction effect of *product return experience* with *visual appearance* rather than the expected *informational-fit-to-task*. Thus not supporting H6. *Gender* was no reported impact factor in both approaches; therefore H7 has to be rejected.

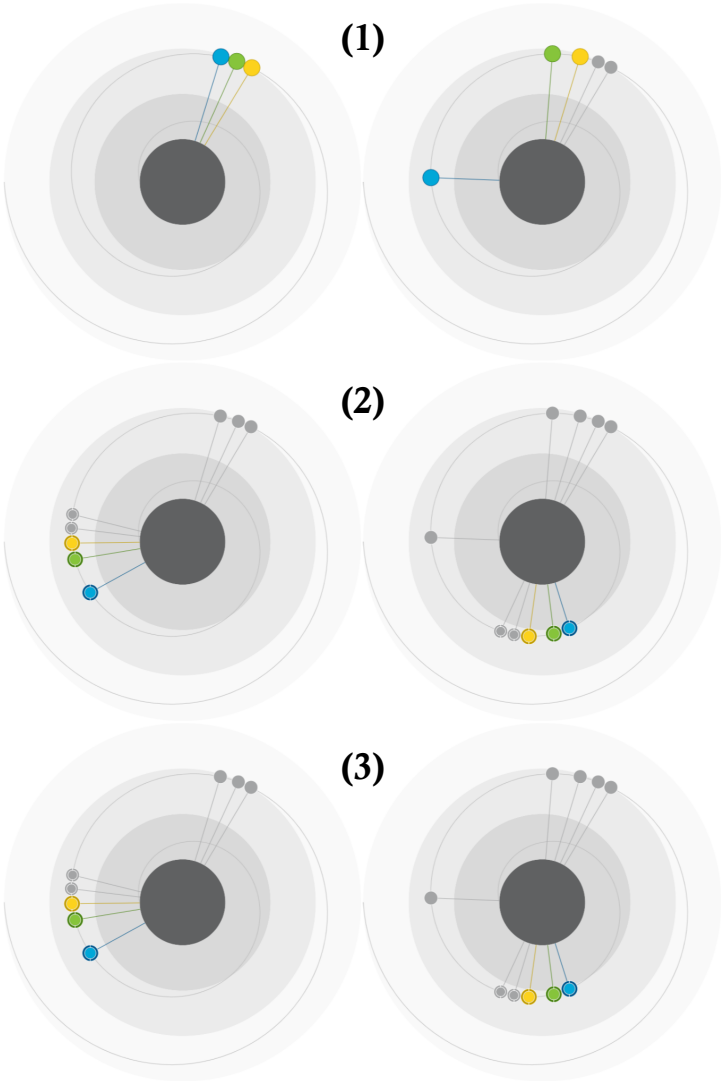

Figure 20 Comparison of model 1 predictions, left: base model, right: extended model
Source: Assemble tool IBM Watson

MODEL 2

Similar to the approach for model 1 introduced above, the prediction of model 2 was tested. First, the base model was entered with the respective variables and then compared with a more complete model. The latter enabled the examination of reciprocal effects reported in the literature (Shankar et al., 2003).

BASE MODEL 2

(1) *OSAT* is the strongest predictor of *LOY* with ps=44% and is significant (F(4,105)=20.87, p<.0001), see Figure 21 for an overview of the relationship. The second driver with ps=41% is *TSAT* with a strong main effect on *LOY* (F(4,105)=17.99, p<.0001).

(2) When including two factors, the model with the best predictive strength at 56% changed and now includes *TSAT* and *OSAT* as the predictors. The second best model at ps=45% features *VFR experience* and *TSAT* and the third *OSA*T as the single influencing factor and ps=44%. It is interesting to note, that respondents with no *VFR experience* generally rated higher on *TSAT* and *LOY* respectively, lending support to the implementation of a VFR (shown on the right side of Figure 21).

(3) At this step, the models and their strength did not change. Therefore, the findings provide support for H1 and H2.

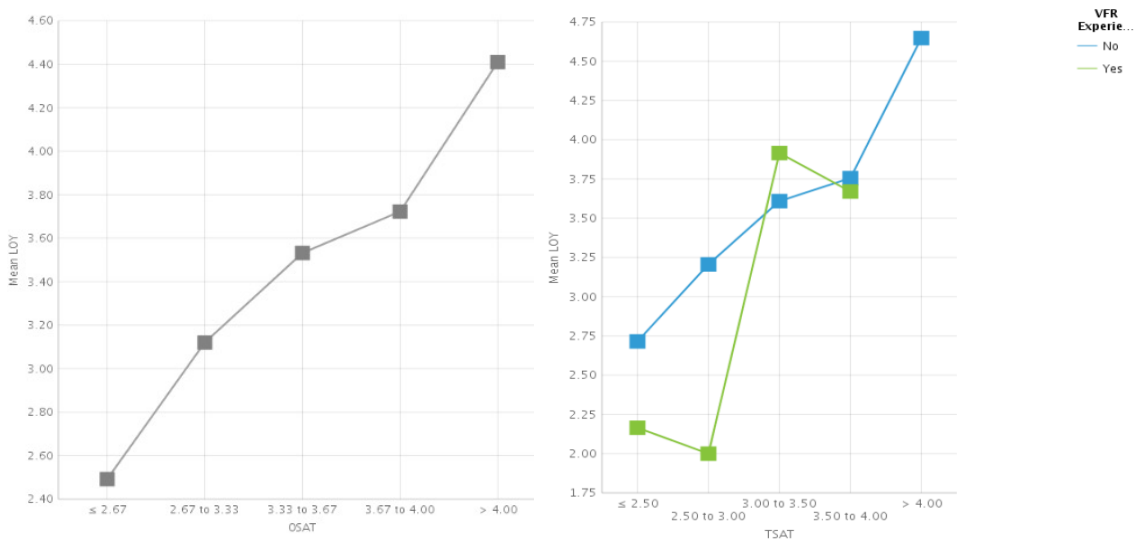

Figure 21 Predictors of E-Loyalty
Source: Assemble tool IBM Watson

EXTENDED MODEL 2

(1) *OSAT* drives *LOY* (blue) with F=(4,105)=20.87, p<.0001) and a predictive strength (ps) of 44%. Therefore lending support for H1. The second strongest driver at this level is *innovativeness* with ps=44%, (F(4,105)=20.32, p<.0001), and the third is *visual appearance* with ps=43% (F(4,105)=20.10, p<.0001). *Transactional e-satisfaction* ranks on the fourth place with ps=41% (F(4,105)=17,99, p<.001).

(2) On the second level, the models with the highest and second highest predictive strength include *income* × *VISAP* (ps=62%, F(18,82)=1.88, p<.05) and *overall e-satisfaction* and *innovativeness* (ps=62%). The third includes *VISAP* and *OSAT* as predictors with a reported strength of 61%.

(3) At this step, the models mentioned in (2) remain with their predictive power, but again, the 2nd and 3rd failed to report significant interaction effects. An interesting finding is the effect of *OSAT* × *Online shopping advantage of product choice* with ps=60% (F(11,90)=2.14, p<.05)

Additionally, correlations between most of the examined constructs were observed in both instances.

SUMMARY FOR MODEL 2

Overall e-satisfaction and *transactional e-satisfaction* were of importance for both types of predictions, lending support for H1 and H2. A difference was observed at every step of the testing, the model with more variables reported more relationships with higher predictive strength. A comparison of the models shown in Figure 22 revealed a higher absolute predictive strength for the second approach (closer located at the spiral's core). Another interesting finding is the impact of *VFR experience* on *transactional e-satisfaction* and *e-loyalty*, which was not evident from regression analysis.

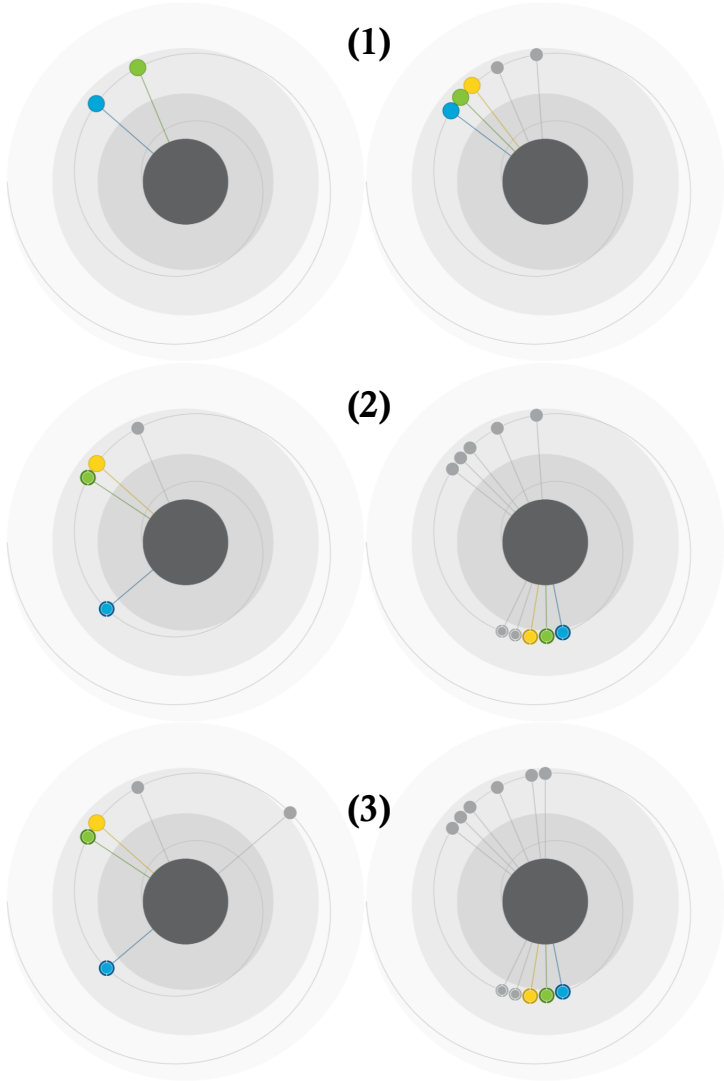

Figure 22 Comparison of model 2 predictions, left: base model, right: extended model
Source: Assemble tool of IBM Watson

6 Discussion and Conclusion

The present paper's aim was to investigate the proposed influence virtual fitting room technologies can have on web experience, customer e-satisfaction and in turn e-loyalty. This was achieved by transferring the e-quality-satisfaction-loyalty chain to the research setting and substituting the e-quality dimensions for three categories a VFR can influence as explained in chapter 3. The research questions were explored using the hypotheses developed in chapter 4. The results from the statistical analyses are presented below in Table 8. The discussion will be divided into each research question.

	Relationship	Hypothesized	Result
H1	OSAT−LOY	+	+***
H2	TSAT−OSAT	+	(+)***
H3	VISAP−TSAT	+	+*
H4	INNO−TSAT	+	n.s.
H5	INFO−TSAT	+	+**
H6	ReturnExp × INFO−TSAT	+	n.s.
H7	Gender × INFO−TSAT	+	+*

Significance level * p<.05; ** p<.01; *** p<.001

Table 8 Summary of Hypotheses
Source: Analysis of Survey Data

- Does a VFR influence a customer's online experience in terms of the e-service quality dimensions innovativeness, visual appearance and informational fit-to-task?

Online customers experience some major disadvantages compared with offline customers. Results from the present study confirmed that customers prefer online over offline shopping because of the convenience factors like price comparison, product choice and time saving, but are faced with consequences of returning an ill-fitting item. As introduced in chapter 3, gender and prior experience with product return was hypothesized to influence a customer's rating of one of those dimensions. This was examined using H6 and H7. The former argued, that the experienced inconvenience resulting from a product return might offset the mentioned advantages of online buying and therefore moderates the relationship of *informational fit-to-task* and *transactional e-satisfaction*. However, the study failed to report any significant support for this link, even though the regression weight was in the

hypothesized direction. However, this might be caused by the fact that the measurement of the question of *product return experience* was not optimal.

Shin & Baytar (2014) argued that women are more prone to use a VFR due to their greater concern regarding the fit of garments. The present study confirmed this effect with testing of H7. The results suggest that female customers have in general a bigger need for information on products that they buy online. A recent study about the shopping behavior by GIM Gesellschaft für Innovative Marktforschung GmbH & RASCASSE GmbH (2015) further confirmed the relevance of informational content for female shoppers. Another study found the website quality dimension "information fit-to-task" to be a significant predictor of customers satisfaction (Kim & Stoel, 2004).

One of the biggest limitations for answering this research question and the study in general is the low participation amount of experienced VFR users. As reported earlier, just 6.4% of all respondents had previously used a VFR technology preventing a generalization. From regression analysis, no difference between these groups was evident. However, the analysis using IBM Watson revealed that respondents with no *VFR experience* rated higher on *transactional e-satisfaction* and *e-loyalty* than respondents with prior *VFR experience* thus lending slight support for the implementation of the VFR technology used in this paper. As described in previous chapters, the developments in this area are diverse and conclusions are limited to the VFR technology described in the questionnaire.

- Do the determinants of e-service quality innovativeness, visual appearance and informational fit-to-task work as antecedents of transactional e-satisfaction?

It was argued that a VFR could significantly influence website quality dimensions; three dimensions were chosen for this research. The statistical analysis confirmed two of three linkages. *Informational-fit-to-task* was the dimension with the highest regression results. The analysis using IBM Watson provided support for all three relationships. This finding corroborates the results from Kim and Stoel (2004) who confirmed that content of a website to be an important determinant of increasing customer satisfaction (respondents were asked to rate their favourite online apparel shop) whereas innovativeness failed to be a significant predictor of satisfaction. Shankar et al. (2003) reported similar significant results for the effect of information on service encounter satisfaction. However, the authors failed to confirm significant impact of interactivity (operationalization in part comparable to the *innovativeness* dimension) on service encounter satisfaction. A reason for the rejection of hypothesis H2 *(INNO*), could be the inappropriateness of the dimension. McGoldrick et al. (1999) suggested that the web quality dimensions differ by type of product. In contrast, the analysis with IBM Watson indicated that innovativeness is an important predictor, suggesting that this linkage needs to be examined in more depth in the future.

Especially noteworthy is the confirmation of the information-e-satisfaction relationship in view of the results from Evanschitzky et al. (2004) who failed to find support for this link in a German retail context. Their rationale was the price consciousness of German online shoppers. Though the present study did find support that German customers tend to favor online over offline shopping because of the price comparison possibilities, they still value the informational details provided.

The second significant predictor was *visual appearance*. Szymanski & Hise (2000), Wolfinbarger & Gilly (2003), Evanschitzky et al. (2004), Kim et al. (2009) and Vila & Kuster (2011) confirmed the impact of good website design (*visual appearance*) on e-satisfaction. This means that the more a customer is pleased with the visual elements on a website, the higher this customer's e-satisfaction levels. Further, Gefen (2002) found evidence that the visual appeal of a website can directly influence customer loyalty. The results from analysis using IBM Watson provide support for this finding. The interaction term of *income* and *visual appearance* showed the highest predictive strength when all variables were included in the extended model stage to predict e-loyalty. Respondents with higher *income* rated higher on *visual appearance* and *e-loyalty* consequently. This is an interesting finding suggesting that the design element of a VFR directly impacts on e-loyalty and this linkage is enhanced for customers on higher income levels. Online retailers should pay attention to this. It is important to note that the items used to measure *visual appearance* in this study had resemblance with the ones used to measure playfulness in the study from Ahn et al. (2007). Their results reported the relevance of playfulness on user acceptance of online retailing and intention to use thus lending further support to the research findings.

- To what extent does overall e-satisfaction work as antecedent of a customer's e-loyalty?

According to Toufaily et al. (2013), e-satisfaction is the most researched determinant of e-loyalty. Indeed, the literature base confirming this link is huge in online settings (Anderson & Srinivasan, 2003, Shankar et al., 2003, Gummerus et al., 2004, Bodet, 2008, Kim et al., 2009, Rafiq et al., 2013) and in traditional settings (Zeithaml et al., 1996, Mittal et al., 2001). The findings from this study confirmed this relationship with regression analysis as well as with IBM Watson. Thus emphasizing the importance of developing and maintaining customer e-satisfaction when e-loyalty is the target. Especially in the light of findings from Jones & Sasser (1995), the relevance of e-satisfaction for online retailers prevails. The authors provided evidence that under certain conditions the impact of satisfaction on loyalty differs. This means that particularly businesses operating in a highly competitive market should consider this, because they can profit from loyal customers and

should adjust their efforts to achieve a very satisfied and loyal customer base. Additionally, Shankar et al. (2003) discovered that e-loyalty has a reciprocal effect on e-satisfaction further providing support for the focus on those two constructs.

However, several scholars argue for the consideration of service quality as the influencing factor on loyalty. According to their reasoning, the impact of service quality on loyalty is mediated by satisfaction (Andreassen & Lindestad, 1998, Bolton & Lemon, 1999, Cronin et al., 2000). The next section will deal with this issue.

The analysis using IBM Watson revealed two surprising findings in addition to the one mentioned above. If only the variables from regression analysis are inserted into the tool, the results are similar. First, a disparity occurs if every questionnaire item is allowed to be included into the predictive model. Then the interaction effect of *income* and *visual appearance* becomes the best predictor of *e-loyalty*. This can be explained by findings from Gefen (2002) as discussed above. Results indicated that higher levels of *income* and positive perceptions about the *visual appearance* lead to higher levels of *e-loyalty*. Second, the interaction term of *overall e-satisfaction* and *product choice* showed explanatory strength. This means that respondents who agreed that they have a better *product choice* online than offline rated higher on *e-satisfaction* and *e-loyalty* in turn. This is an interesting fact in view of suggestions from Reichheld & Schefter (2000) who urged online retailers to broaden their product range. They proposed that customers tend to consolidate their online purchases with a handful of suppliers and retailers like Amazon.com profit from this.

- Does overall e-satisfaction work as a mediator between transactional e-satisfaction and e-loyalty?

Overall e-satisfaction was conceptualized as a customer's contentment with his prior experiences with an online retailer and therefore includes the accumulation of satisfaction experienced by a customer during each transaction. A similar demarcation was used by Shankar et al. (2003) who find support for the impact of transactional e-satisfaction on overall e-satisfaction and in turn on e-loyalty. This paper confirmed these findings. Service quality researchers distinguish between those types of satisfaction as well (Parasuraman, Zeithaml, & Berry, 1994). Further, the author based the hypothesis of mediation on the full mediation model proposed and validated by Jones & Suh (2000). This means that the satisfaction experienced during each transaction only has an impact on the mediating variable overall e-satisfaction that follows the conceptualization of those two constructs. The results obtained from statistical analysis provided support for partial mediation of the observed variables. The findings are in contrast to results from Bodet (2008) who confirmed the validity of the full mediation model when investigating customer transaction-specific and overall satisfaction with a gym. This might be attributed to the research setting. It can

be argued that transaction-specific satisfaction of a gym member does not have a direct effect on loyalty (intentions) because the amount of visits compared to online shopping experiences is bigger and a single transaction therefore is of no consequence to this member's loyalty.

Partial mediation further strengthens the proposition of implementing a VFR technology to enhance *e-loyalty* because of the observed direct effect of *transactional e-satisfaction* on *e-loyalty*. This can be explained through the emotional response of a customer during this interaction. The advantages perceived through the usage of a VFR technology have an impact on both types of *satisfaction* and l*oyalty* subsequently. This effect was also observed by Westbrook (1987). When investigating students repurchase intentions in a service context (barber/hair stylist), Jones & Suh (2000) found that the model that explained the most variance was the one that included partial mediation and moderation. Thus the authors highlighted the importance of creating and maintaining high levels of overall customer satisfaction. However, when comparing the findings from this paper with those from Jones & Suh (2000) and Bodet (2008), the different measurements of the two types of satisfaction have to be considered. The findings are strengthened through the usage of two distinct sets of items for each construct. Additionally, this paper examined the mediating effect in an online setting.

CONCLUSION

The findings from the study strongly support the usage of a VFR technology in achieving customer loyalty to an online shop. The influence of a VFR technology on *transactional e-satisfaction* was examined using e-service quality components. In terms of the dimensions of e-service quality that were measured as *informational fit-to-task*, *visual appearance* and *innovativeness*, only the first two showed indication of being a significant predictor in both analysis methods. Evanschitzky et al. (2004) confirmed the influence of design elements and convenience features on e-satisfaction and extended the research setting and validation of Szymanski & Hise (2000) for Germany. Online retail companies should therefore consider factors such as site design and convenience for shoppers. As mentioned by Chen et al. (2009), product return services are the most important feature of convenience for customers and should be at the focal point of considerations of online retailers. A VFR can enhance customer loyalty through *e-satisfaction* while simultaneously providing the informational detail needed to avoid product returns and therefore inducing inconvenience for the customers. Further, it was put forward that online shops could use a VFR as a tool to distinct themselves from the competition. This notion was validated by the present study as well as by fellow scholars (Hausman & Siepke, 2008, Ganesh et al., 2010).

Discussion and Conclusion

In general it can be concluded that online retailers need to identify their current and target customers before planning measures to attract and retain them. As Reichheld (1993) and Reibstein (2002) noted, price-sensitive customers might not be the most loyal ones therefore businesses should focus their initiatives on the needs of the kind of customers they want to retain. This paper gave some insight into what one measure to establish e-loyalty through e-satisfaction could be.

7 Contribution and Implications

7.1 Theoretical Contribution

This research is in line with Jones & Suh (2000) and Bodet (2008) who examined two distinct satisfaction constructs. This paper expands this conceptualization by transferring it in an online setting, which has seen rare application amongst scholars (Shankar et al. (2003) consequently broadening the scientific basis for the distinction of both constructs. Furthermore, by following the recommendation from Cronin et al. (2000), emotion-based measures stemming from Bagozzi's theory (1992) were used to measure the construct transactional e-satisfaction. This approach was also suggested by Chen et al. (2008) and allowed to capture the playful nature of a VFR (Bodet, 2008) and further extends the framework of e-satisfaction. A novelty done by this research is the usage of different items for both satisfaction constructs. Most researchers tend to use the same itmes for both constructs (Jones & Suh, 2000, Bodet, 2008). Additionally, the dimensionality of e-satisfaction was extended by examining the impact a VFR can have on three aspects (Chen et al., 2008).

Similar to the findings of Yang, Peterson, & Huang (2001) and Szymanski & Hise (2000) this study did confirm the impact of web quality dimensions on e-satisfaction. An extension as proposed by Szymanski & Hise (2000) was the consideration of moderating effects on e-satisfaction. The authors suggested that product information could be moderated by customer's expertise, an adapted view of this was included into this paper by investigating the moderating effect of prior product return experience on the levels of transactional e-satisfaction.

The findings of this paper support the linear relationship of satisfaction and loyalty observed in traditional retail context and extends this linkage to the online environment (Ngobo, 1999).

7.2 Managerial Implications

In light of growing competition in the online retail sector, companies have grown interested in retaining customers. The presented findings have several implications for managers in this area. First, e-satisfaction is an important antecedent of e-loyalty. If achieving customer loyalty is the goal, managers need to identify the conditions that influence the customer's e-satisfaction with an online retailer. From analyzing the age, occupation and income structure of the sample it is evident that a major part of respondents will become part of the workforce in a few years and their increased income will result in increased spending. Online retailers should act now to retain these customers. Second, e-satisfaction of a customer can be viewed as an accumulation of satisfaction experienced during each transaction a customer has. This is especially important, since it emphasizes that each

transaction of a customer with an online shop needs to be flawless from a customer's perspective. The preferences of customers as to what contributes to transactional e-satisfaction vary. One way to tackle this issue could be the classification of customers into shopping types and after identifying the target customer group, companies can develop and implement measures targeted at this customer group's needs. Third, the implementation of a VFR technology can enhance e-loyalty through e-satisfaction. The examined dimensions informational fit-to-task and visual appearance show direct impact on transactional e-satisfaction and e-loyalty. A VFR is therefore a useful tool for online retailers to differentiate themselves from the competition. Fourth, women tend to have a higher need for product information and information about garment fit. Retail companies should accommodate this by providing detailed information about products and facilitate the decision-making by enabling customers to exchange opinions. The latter can be implemented multifold, for example by installing a comment function of each product or an integration of social media channels that allows users to upload pictures of them wearing the purchased items. Companies operating in the online marketing sector have approached this topic from the reverse. Their service offering for users involves an email notification with products from each picture they liked on a social media channel (Boyd, 2014). Fifth, though the evidence points towards the importance of content (Shankar et al., 2003), the relevance of a visually pleasing implementation should not be disregarded. The findings of this research attest to that, and considerations regarding design requirements and choices should be made in accordance with what customers' want, need and value (Randall, 2015). Additionally, pure online businesses should keep in mind that customer prefer trying items on before buying it and therefore should accommodate this need (Mahoney, 2015).

7.3 Limitations and future research

When interpreting the research findings and the consequential implications for management and businesses, certain limitations of the study have to be kept in mind. This section reflects upon these restrictions and ends with recommendation for future research topics into this area.

RESEARCH DESIGN

The data used for this study was gathered in a cross-sectional survey, which means they represent the opinion of the participants at a specific point of time and therefore lack the generalizability of the findings. A study with longitudinal data prior and post implementation of a VFR technology in an online shop could shed light into a customer's change of certain parameters and enhance the argument of causality. Additionally, the interpretation of findings is limited to retailers operating an online shop. The advancements

in VFR technology (e.g. virtual mirror technology) show great promise for multi-channel-retailers and are a separate area of research.

Data collection and sample

The study was self-administered and the use of self-reported measures might skew the results. Therefore future researchers should cooperate with online retailers to replicate the study and provide more insight. An approach to isolate the impact a VFR has on customers in a real life application is an A/B testing. Either a retailer or a research project or a cooperation of both could implement a VFR technology on the site and redirect a group of customers to the new site. After a purchase customers then would be asked about their recently purchased items, their thoughts about the product information and pictures etc. Another area for improvement is the sample strategy; a probability sampling could enhance the representativeness of the research. Though the study was posted on international sites, the majority of the respondents were from Germany and therefore the findings have to be interpreted in that cultural context.

Measurement of constructs

As mentioned earlier, the measurement of one of the satisfaction constructs did not yield overly satisfying reliability that should be a topic for further investigation. Jones & Suh (2000) and Bodet (2008) used the same items for both the transactional satisfaction and overall satisfaction construct, which might have been applied in this study as well and could be a direction for further research. The reasoning was to capture more emotion-based judgments of customers by using different items for the transactional e-satisfaction construct (Chen et al., 2008). Regarding the operationalization of e-loyalty, Zeithaml et al. (1996) mentioned another method to increase the measurement of the construct can be achieved by asking respondent's about their actual behavior and not only about their behavioral intentions. Moreover, Rafiq et al. (2013) noted that the usage of actual purchasing behavior might be preferable to measure behavioral loyalty. Additionally, cooperation with a retailer could increase available data by adding actual buying records of customers. Further, the questionnaire as an entity could be reduced to less questions. For the present study, only completed surveys were considered. A screening of the uncompleted surveys revealed that many respondents lost interest at the same stage of the questionnaire. A reduction and restructuring of items might lessen this issue.

In chapter 2, a range of factors which influence loyalty were introduced, but measurement was limited to satisfaction. The author tried to control for other often cited variables like income. Due to limitations other important constructs like trust (Reichheld & Schefter, 2000) or factors like customer support of an online shop or on-time delivery (Reibstein, 2002) were not included in the questionnaire design.

Data analysis

As a means of data analysis the author choose multiple hierarchical regression. Another technique to analyze a complex model with many latent variables and relationships is structural equation modeling (SEM). This way the model can be analyzed as a whole and does not need dividing into two parts (Hair et al., 2014). Further, Baron & Kenny (1986) mentioned the superiority of this analysis technique when testing for a mediation effect.

Directions for Future Research

The paper has shown that e-commerce is a study-worthy topic and the relevance of VFR technology is expected to increase in the future (Chapman, 2014) and several areas for further investigation arise. The prediction of the applied model with IBM Watson revealed a reciprocal effect of satisfaction on loyalty. This effect is documented in literature as well (Shankar et al., 2003). Given that the implementation of a VFR could enforce this dynamic, a more thorough examination is needed. The current paper examined the formation of loyalty through the quality-satisfaction-loyalty chain, other approaches like the technology acceptance model (TAM) or the innovation theory could enhance the knowledge regarding what customers want and require to use a VFR.

According to Oliver (1999) the formation of e-satisfaction and e-loyalty can be described as a process and should be examined accordingly. Wolfinbarger & Gilly (2003) tried to incorporate every aspect of a customer's online journey into their measure. Further research could reveal insights at which of theses touch points are critical for a customer's digital experience and at which stage a VFR could support the development of satisfaction and loyalty. A study from Ahn, Ryu, & Han (2007) showed that consumers value playfulness and usefulness while shopping online.

Additionally, the incorporation of trust into the research model could be an interesting topic. Some scholars provided evidence for the relevance of trust in e-retailing settings (Gefen, 2003, Rafiq et al., 2013). This fact was further supported by Reichheld & Schefter (2000), who recommended that online retailers should try to foster customer trust first and then invest in broadening their product offering. Their findings showed that customers tend to consolidate their online shopping with a handful of retailers. Amazon is an exemplary case of this dynamic.

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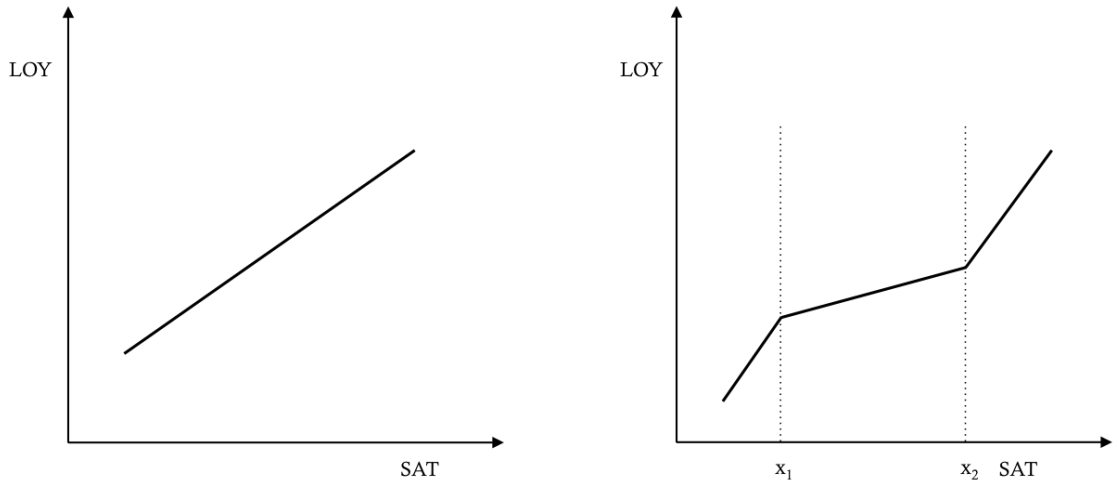
Appendix

I. Model Overview of Satisfaction-Loyalty Relationship



(a) Linear Relationship (b) Relationship with Thresholds

Source: Adapted from Ngobo (1999, p. 470)

II. Detailed list of link distribution in alphabetical order

Facebook Profile

(posted on 11/22/2015)

Facebook "Smart Marketing Group"

(posted on 12/10/2015)

The post had 36 views until 12/17/2015.

Intranet of eResult Research & Consulting

(posted on 11/25/2015)

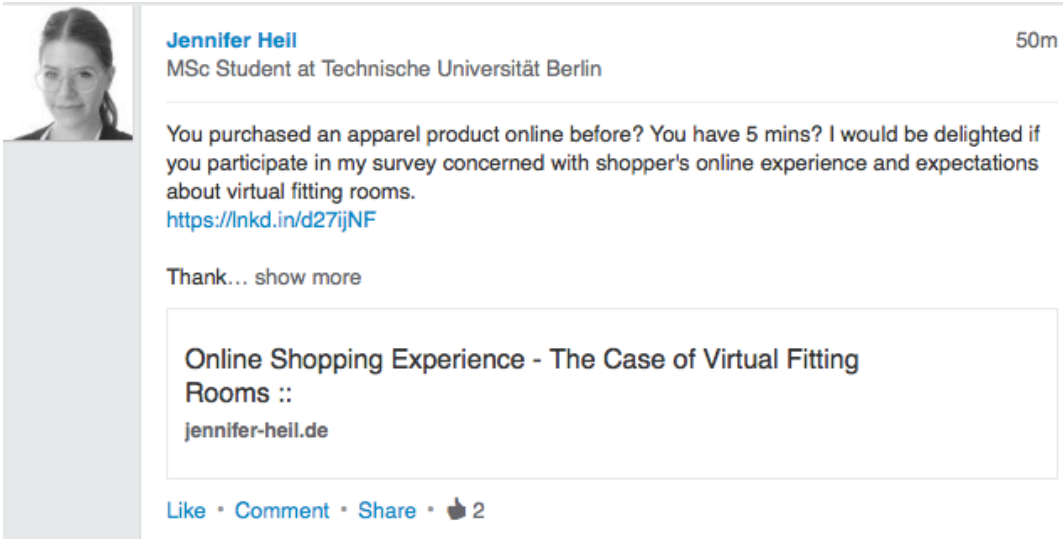
Kleiderkreisel Forum

(posted on 11/17/2015, German Pre-Loved Fashion Platform)

http://www.kleiderkreisel.de/foren/rat-und-tat/schule-studium-and-beruf/3367296-umfrage-zu-virtual-fitting-rooms-schenkt-mir-wenige-minuten

Linkedin Profile

(posted on 11/23/2015)



The author has 129 connections on this site.

Own website

(linked to about.me, posted on 11/18/2015)

http://jennifer-heil.de

The site had 685 impressions until 12/16/2015.

Reddit I

(posted on 11/21/2015)

https://redd.it/3tphs0

Reddit II

(posted on 11/21/2015)

https://redd.it/3tpj63

Reddit III

(posted on 12/01/2015)

https://redd.it/3uzjze

Twitter I

(posted on 11/17/2015 as pinned tweet)

https://twitter.com/JennyatFG

The tweet had 54 impressions and 1 interaction until 12/16/2015.

Twitter II

(posted on 11/21/2015)

http://twitter.com/madmen_Fan

The tweet had 133 impressions and 3 interactions until 12/16/2015.

Twitter III

(posted on 11/22/2015)

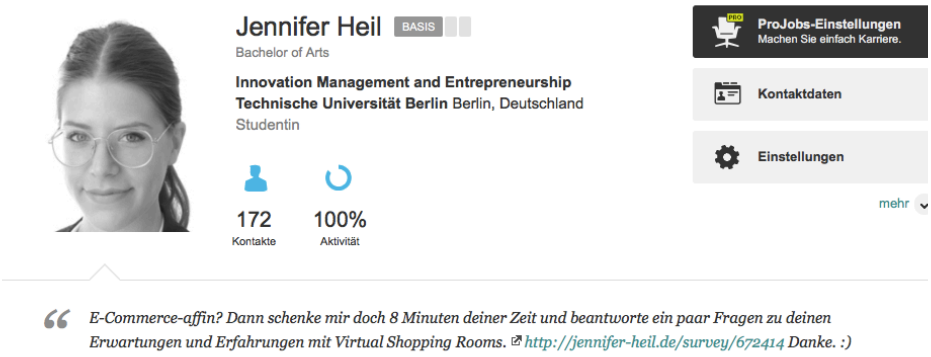
http://twitter.com/walkingdead1_1er

The tweet had 111 impressions and 2 interactions until 12/08/2015.

Xing Profile

(posted on 11/18/2015)

https://www.xing.com/profile/Jennifer_Heil2?sc_o=as_p



The profile had 8 impressions until 12/16/2015.

Xing Update

(posted on 11/19/2015)

The author has 172 contacts on the site.

Xing e-fellows forum (6,533 members)

(posted on 11/17/2015)

https://www.xing.com/communities/posts/e-fellows-stipendiaten-1010483290

The post had 122 impressions until 12/16/2015.

III. Screenshots survey female version

Online Shopping Experience - The Case of Virtual Fitting Rooms

Dear participant

as part of my Master's Thesis at the University of Twente and the Technical University of Berlin an empirical study on the topic of "Online Shopping Experience - the case of a Virtual Fitting Room and its consequences" is undertaken.
Thank you in advance for your participation. Filling in the questionnaire will take less than 8 minutes. Your contribution is highly valuable for my research. Since I am interested in your personal opinion there are no wrong or right answers. All given data will of course remain confidential and will not be shared with third parties. I hope you enjoy participating in my research.

Kind regards,

Jennifer Heil

Technische Universität Berlin

UNIVERSITY OF TWENTE.

Exit and clear survey

Next

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

What is your gender?

Please indicate your gender to ensure the right questions will be displayed.

Female Male

Have you ever purchased an apparel product online?

Yes No

How often have you purchased an apparel product online in the last six months?

Choose one of the following answers

Not at all 1 - 2 times 3 - 5 times 6 - 9 times > 10 times

Exit and clear survey

Previous Next

2

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

To what extent do you agree with the following statements: "I think that online shopping is more convenient than offline shopping in terms of..."

(1 = completely disagree to 5 = competely agree)

	1	2	3	4	5
Price	○	○	○	○	○
Product choice	○	○	○	○	○
Time efficiency	○	○	○	○	○
Product return policies	○	○	○	○	○

Imagine you find an apparel product online which you like (e.g. a dress). To what extent do you agree to the following statements:

(1 = completely disagree to 5 = completely agree)

	1	2	3	4	5
I inspect the shirt online but hesitate to purchase it right away.	○	○	○	○	○
I would like to try it on before ordering it.	○	○	○	○	○
I order two different sizes to make sure I will get one that fits me and will send the other one back.	○	○	○	○	○
I will look offline for the dress to try it on.	○	○	○	○	○
I order my usual size.	○	○	○	○	○

Please recall your last online clothing purchase. To what extent do you agree with the following statements:

(1= completely disagree to 5 = completely agree)

	1	2	3	4	5
I ordered multiple sizes because I was unsure about the fit of the product.	○	○	○	○	○
I had to return at least one of the ordered items due to fit problems.	○	○	○	○	○
I ordered my usual size.	○	○	○	○	○

Exit and clear survey

‹ Previous Next ›

0% 100%

A Virtual Fitting Room (VFR) is an online tool which brings the changing room into the digital environment. After indicating your basic measurements like height, weight, bust and hip size the tool renders your virtual body. Then you are able to try on different sizes of a selected product and view it from different angles.

Additionally, the VFR indicates if an item is of tight or loose fit.

Have you ever used a Virtual Fitting Room before?

○ Yes ● No

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

Please recall the exemplary image of the Virtual Fitting Room presented before. To what extent do you agree with the following statements:

(1 = completely disagree to 5 = completey agree)

	1	2	3	4	5
The VFR provides in-depth information.	○	○	○	○	○
The VFR enables me to order products that are "tailor-made" for me.	○	○	○	○	○
The VFR enables me to look at an item from different angles.	○	○	○	○	○
The information obtained from the VFR is effective.	○	○	○	○	○
The information obtained from the VFR is pretty much what I need to order the right size.	○	○	○	○	○
I feel that the VFR is very engaging.	○	○	○	○	○
The VFR is innovative.	○	○	○	○	○
The VFR design is attractive to me.	○	○	○	○	○
For me, shopping with the VFR could be fun.	○	○	○	○	○
The VFR does not look appealing to me.	○	○	○	○	○
The VFR's appearance is professional.	○	○	○	○	○

Exit and clear survey ‹ Previous Next ›

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

Imagine you used the Virtual Fitting Room for your last online clothing purchase. To what extent do you agree with the following statements:

(1 = completely disagree to 5 = completely agree)

	1	2	3	4	5
When purchasing from this shop I feel pleased, delighted or happy.	○	○	○	○	○
When purchasing from this shop I feel surprised, amazed or astonished.	○	○	○	○	○
I think I did the right thing by buying from this online shop.	○	○	○	○	○
I am satisfied with my decision to purchase from this online shop.	○	○	○	○	○
My choice to purchase from this online shop was a wise one.	○	○	○	○	○
The VFR makes it easy for me to build a relationship with this online shop.	○	○	○	○	○
I would like to visit this online shop again in the future.	○	○	○	○	○

You used the Virtual Fitting Room during your last online purchase. Please indicate the likelihood of the following statements with respect to that online shop.

(1 = very unlikely to 5 = very likely)

	1	2	3	4	5
Say positive things about this shop to other people.	○	○	○	○	○
Encourage friends and others to do business with this online shop.	○	○	○	○	○
Consider this shop to be your first choice for future purchases.	○	○	○	○	○
Do more business with this shop in the coming months.	○	○	○	○	○

Exit and clear survey

Previous Next

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

What is your age?
Choose one of the following answers

○0-18 ○19-24 ○25-30 ○31-39 ○40-49 ○50-64 ○65+

What is the highest level of education you achieved?
Choose one of the following answers

Please choose...

What is the monthly net income of your household?
Choose one of the following answers

○<1000 EUR ○1001 EUR - 1500 EUR ○1501 EUR - 2500 EUR ○2501 EUR - 3500 EUR ○3501 EUR - 4500 EUR ○>4501 EUR

What is your nationality?
Choose one of the following answers

○German ○Dutch ○Austrian ○Polish ○British ○Swiss ○French ○Other:

IV. Screenshots survey male version

(only differences are pictured)

Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

To what extent do you agree with the following statements: "I think that online shopping is more convenient than offline shopping in terms of..."

(1 = completely disagree to 5 = competely agree)

	1	2	3	4	5
Price	○	○	○	○	○
Product choice	○	○	○	○	○
Time efficiency	○	○	○	○	○
Product return policies	○	○	○	○	○

Imagine you find an apparel product online which you like (e.g. a shirt). To what extent do you agree to the following statements:

(1 = completely disagree to 5 = completely agree)

	1	2	3	4	5
I inspect the shirt online but hesitate to purchase it right away.	○	○	○	○	○
I would like to try it on before ordering it.	○	○	○	○	○
I order two different sizes to make sure I will get one that fits me and will send the other one back.	○	○	○	○	○
I will look offline for the product to try it on.	○	○	○	○	○
I order my usual size.	○	○	○	○	○

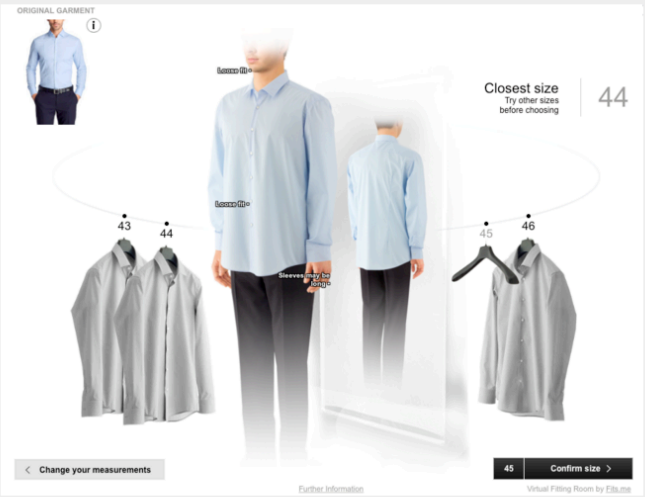
Online Shopping Experience - The Case of Virtual Fitting Rooms

0% 100%

A Virtual Fitting Room (VFR) is an online tool which brings the changing room into the digital environment. After indicating your basic measurements like height, weight, chest and hip size the tool renders your virtual body. Then you are able to try on different sizes of a selected product and view it from different angles.

Additionally, the VFR indicates if an item is of tight or loose fit.

Have you ever used a Virtual Fitting Room before?



○ Yes ○ No

V. Characteristics of an average Respondent by Gender

The average Female Respondent

An average female respondent is less likely to order multiple sizes (mean=2.2), orders her usual size (mean=4.2) and more likely to return an item (mean=3.1)

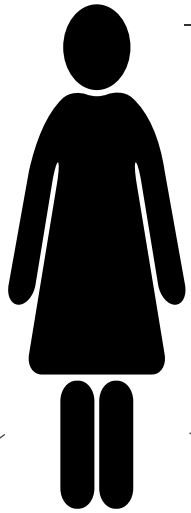
Online Shopping Traits

Women value product choice (mean=4.1) and time efficiency (mean=4.0) when ordering online

Age

The average female respondent is between 19 and 30 years old

< 18	11.2%
19 - 24	28.8%
25 - 30	45%
31 - 39	7.5%
40+	7.5%



Income

On average, a female has a monthly net household income of EUR 1,500

Purchase Frequency

Male respondent ordered on average two to three times in the last six months

Not at all	10.00%
1-2 x	32.50%
3-5 x	11.25%
6-9 x	35.00%
> 10 x	11.25%

Education and Nationality

The average female respondent has a General Certficate of Education and is from Germany

The average Male Respondent

An average male respondent is less likely to order multiple sizes (mean=2.0), orders his usual size (mean=4.2) and less likely to return an item (mean=2.7)

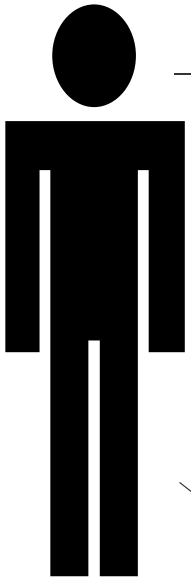
Online Shopping Traits

Men value product choice (mean=4.03) and time efficiency (mean=3.99) when ordering online

Age

The average male respondent is between 25 and 39 years old

< 18-24	20.00%
25-30	40.00%
31-39	20.00%
40-49	16.67%
50+	3.33%



Income

On average, a man has a monthly net household income of EUR 2,500

Purchase Frequency

Male respondents ordered on average two to three times in the last six months

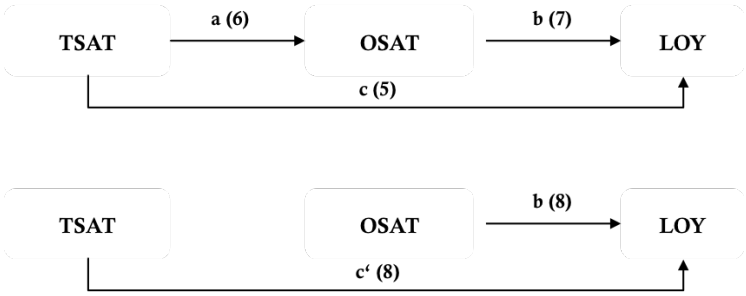
Not at all	16.67%
1-2 x	43.33%
3-5 x	10.00%
6-9 x	23.33%
> 10 x	6.67%

Education and Nationality

The average male respondent has a Bachelor's degree and is from Germany

VI. Detailed process of mediation analysis

As described in chapter 5, the testing for mediation involves several separate regression analyses that are depicted in the figure below.



In general, the regression formula is constituted by the constant α_0, the corresponding coefficients β_i and the error term ε_i. At the beginning, the control variables (*Gender, Age, Income* and *VFR Experience*) are entered into the equation (4). The first step to test for a mediating effect is conducting a simple regression with *transactional e-satisfaction* as IV and e-loyalty as DV (equation 5) to test for path c alone. Afterwards, a simple regression with *transactional e-satisfaction* as the IV and *overall e-satisfaction* as the DV is performed to test path a (equation 6). The next step is the testing of path b by conducting a regression with *overall e-satisfaction* as the IV and *e-loyalty* as the DV, which simultaneously will be used to test H1. Concluding with the final step, a multiple regression to evaluate whether the regression coefficient established through equation (5) is higher in absolute value than the corresponding c'-path in (8) while controlling for *overall e-satisfaction*. An overview of the relationships is depicted below.

$$\text{E-Loyalty} = \alpha_0 + \beta_1 Gender + \beta_2\, Age + \beta_3\, Income + \beta_4\, VFR\ Exp. + \varepsilon \tag{4}$$

$$\text{E-Loyalty} = \alpha_0 + \beta_1 Gender + \beta_2\, Age + \beta_3\, Income + \beta_4\, VFR\ Exp. + \beta_5\, TSAT + \varepsilon \tag{5}$$

$$\text{Overall E-Satisfaction} = \alpha_0 + \beta_1 Gender + \beta_2\, Age + \beta_3\, Income + \beta_4\, VFR\ Exp. + \beta_5\, TSAT + \varepsilon \tag{6}$$

$$\text{E-Loyalty} = \alpha_0 + \beta_1 Gender + \beta_2\, Age + \beta_3\, Income + \beta_4\, VFR\ Exp. + \beta_5\, OSAT + \varepsilon \tag{7}$$

$$\text{E-Loyalty} = \alpha_0 + \beta_1 Gender + \beta_2\, Age + \beta_3\, Income + \beta_4\, VFR\ Exp. + \beta_5\, TSAT + \beta_6\, OSAT + \varepsilon \quad (8)$$

VII. Detailed statistics for model 1

	Construct	b	SE	β	p	adj. R^2	F-statistic
Step 1	Intercept	3.079***	.344		.000	-.017	0.94
Control variables	VFR Experience	.127	.296	.042	.429		
	Age	-.0002	.061	-.004	.968		
Step 2	Intercept	.699	.373		.064	.417***	27.572***
Control variables	VFR Experience	.001	.228	.000	.997		
	Age	.055	. 046	.089	.234		
Predictors	Informational-fit-to-task	.266	.114	.271*	.022		
	Innovativeness	.147	.104	.181	.162		
	Visual Appearance	.244	.100	.289*	.016		
Step 3	Intercept	.677	.367		.068	.438***	2.881*
Control variables	VFR Experience	-.080	.228	-.026	.727		
	Age	.053	.046	.085	.244		
Predictors	Informational-fit-to-task	.398	.125	.406**	.002		
	Innovativeness	.140	.103	.172	.175		
	Visual Appearance	.239	.098	.283*	.017		
Interaction Term	Gender × INFO	-.267	.116	-.205*	.023		
	ReturnExp × INFO	-.039	.057	-.051	.489		

Significant at *p<0.05; ** p<0.01; *** p<0.001; N=110