

# Presenting products on websites – the importance of information quality criteria for online shoppers

The importance of information quality

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## Abstract

**Purpose** – Online shoppers make product purchase decisions based on product information shown on a retailer's website and potentially in comparison to that seen on competitors' websites. Insufficient, poor quality or missing information about a product can lead to reduced retailer sales. Measuring online product information quality (PIQ) is therefore an essential element in helping retailers maximize their potential success. This paper aims (1) to identify directly quantifiable PIQ criteria, (2) to assess the effects of PIQ and (3) to evaluate the moderating effect of product involvement.

**Design/methodology/approach** – The authors conducted a scenario-based experiment within 3,544 do-it-yourself (DIY) online shoppers from the United Kingdom (UK). Within an  $8 \times 2 \times 2$  between-subjects design, the authors manipulated the factors PIQ criteria (8), PIQ level (2) and product type (2).

**Findings** – The findings support that poor PIQ has a negative impact on consumers online shopping outcomes. The authors also found that the effects of PIQ differ between the various criteria, the product category and the level of consumer involvement in the selling process. In the context of product depiction, title readability and product attribute comparability with other retailers' websites a high level of PIQ is required. Moreover, high involvement products need a higher level of PIQ than low involvement products.

**Originality/value** – This research expands website quality and service failure literature by introducing PIQ criteria and its effects in the context of online retailing. The authors also establish actionable managerial recommendations to assist retailers to embrace and utilize PIQ to better understand their own potential website and thus business improvements.

**Keywords** Product information quality, Website quality, Online service failure, DIY retailing, Product involvement

**Paper type** Research paper

## Introduction

The increase in retail digitalization and online shopping received a significant boost during the Covid-19 pandemic (Gupta and Mukherjee, 2022; Caboni and Pizzichini, 2022). By 2021



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there were 2.83 billion e-commerce users worldwide, with an increase to almost 3.69 billion online shoppers expected over the following five years (Statista, 2021). Online sales currently represent nearly 20% of general retail sales (eMarketer, 2021) while global online retail sales are expected to reach USD 7.4 tn per year by 2025 (eMarketer, 2022).

With the rise of online commerce, there are related challenges that warrant attention (Ratchford *et al.*, 2022). For instance, online retailing is often characterized as risky (Johnson and Ramirez, 2020) and untrustworthy (Irshad *et al.*, 2020) by consumers, since the products are intangible (Basu and Sondhi, 2021) and a direct, personalized interaction with the retailer is missing (Kumar and Kashyap, 2018). Online shoppers are left to make their purchase decisions mainly on the basis of the website, its design and the information it offers (Daroch *et al.*, 2021). Thus, 83% of shoppers report that they find product information very important for their online purchase decision (Ecommerce News, 2021). In addition, 53% state that if they receive poor product information they will abandon their shopping at the site and buy elsewhere (Ecommerce News, 2022). It follows that high quality and accurate product information is needed, since information on websites affect customers perception of e-service quality (Tan *et al.*, 2016; Trabold *et al.*, 2006).

Accordingly, the overarching aim of all online retailers should be to offer high e-service quality (Alnawas and Al Khateeb, 2022) and thus high product information quality (PIQ). This is not always found in practice and hence, insufficient, poor quality or missing information are widely considered as an online service failure (Tan *et al.*, 2016; Holloway and Beatty, 2003). Service failures describe the perception of consumers, that a provided service does not meet their expectations (Zeithaml *et al.*, 1993). This leads to negative behavioral and attitudinal consequences such as (online) shopping cart abandonment or negative word-of-mouth (Bitner *et al.*, 2000). Clearly then, insufficient product information leads to direct and indirect costs for online retailers (Bitner *et al.*, 2000; Bleier *et al.*, 2019), meaning that comprehensive and accurate information provision is crucial.

While extant research has focused on websites general information and quality concerns (Alnawas and Al Khateeb, 2022; Rahman *et al.*, 2022) a research focus on website product information is less evident. To the best of our knowledge, there is no research concerning the quality of product information on websites and its impact on customers. Based on existing literature, we therefore introduce the construct of PIQ.

Accordingly, this research makes the following contributions. First, we introduce a conceptualization of the construct PIQ. In doing so, we identify a distinction between high and low PIQ in a specific online shopping context. Second, we provide evidence that low PIQ is an online service failure that has a negative impact on customer willingness to continue shopping and customer attitude towards the retailer. Third, we identify eight specific types of PIQ criteria (product images, product video, title length, title readability, detail readability, attribute consistency, attribute relevancy, detail relevancy) and assess consumers' perceptions and the degrees of severity relating to each of them. Whereas all types of PIQ criteria are relevant, some are more severe than others. In general, product images, product title and product attributes are of the greatest importance, exhibiting the strongest impacts. Fourth, we evaluate the influence of a product's degree of customer involvement as a moderating variable. The following work demonstrates that, in the context of high involvement products, the PIQ is more important than with low involvement products. Finally, we provide managerial recommendations for utilizing PIQ in online shopping environments to improve retailer sales performance.

To achieve these contributions the structure of this paper is as follows: Following this introduction, we evaluate prior research concerning website quality and service failure. Subsequently we derive the hypotheses and present the research model. We then outline the methodology of our experimental study and investigate the results. We then draw conclusions with respect to existing literature and suggest managerial implications. Finally, we conclude with the limitations of the research and offer recommendations for future studies.

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## Literature review

### *Online service failures and e-service quality*

Service failures generally occur when a service does not meet the customer expectations (Zeithaml *et al.*, 1993). Service failures have a negative influence on consumer shopping behavior (Hess, 2008; van Vaerenbergh *et al.*, 2014) and lead to considerable costs for retailers, including foregone sales and thus profit losses or indirect costs such as negative word-of-mouth and non-returning customers (Bitner *et al.*, 2000). Customers moreover expect forgiveness and retention after a service failures occurred (Frasquet *et al.*, 2021).

Previous research on online service failures has derived and assessed different classifications. Holloway and Beatty (2003) investigated six major categories of online service failure in retail environments relating to delivery, web site design, customer service, payment, security and miscellaneous. Forbes *et al.* (2005) expanded this classification and defined ten different types of failures, which were then be divided into two categories: response to service delivery system/product failure and response to customer needs and requests. Tan *et al.* (2016) introduced an e-commerce service failure classification system containing information, functional and system failures. They further outlined the occurrence and proposed negative effects of inaccurate, incomplete, irrelevant and untimely information in electronic environments. In the context of online retail service failure Roy *et al.* (2022) draws upon Holloway and Beatty (2003) and Forbes *et al.* (2005) and distinguishes between logistic and non-logistic service failures (see Table 1).

Service failures are closely connected with service quality issues (Sousa and Voss, 2009). If the delivered service quality does not meet the customers' expectations negative consequences follow (Petre *et al.*, 2006). Thus, the service delivery procedure in online environments corresponds with the dimensions of e-service quality (Zeithaml *et al.*, 2002; Sousa and Voss, 2009). Yoo and Donthu (2001) developed a scale for assessing quality of shopping sites. Loiacono *et al.* (2002) first investigated a construct for measuring website quality (WebQual). Meanwhile, Zeithaml *et al.* (2002) reviewed the following dimensions of e-service quality in general (e-SQ): information availability and content, ease of use, privacy/security, graphic style and fulfillment. This measurement scale was subsequently revised by Parasuraman *et al.* (2005). The E-S-QUAL scale includes the dimensions efficiency, system availability, fulfillment and privacy. The availability and content of product information is especially important at online retailers websites (Ariely, 2000). Furthermore, the dimensions efficiency and fulfillment are key aspects of consumer online shopping experiences (Parasuraman *et al.*, 2005). In the meantime, Wolfenbarger and Gilly (2003) investigated the construct eTailQ, which categorized the e-service quality into four dimensions: customer service, privacy/security, website design and fulfillment/reliability. In view of the amount of e-service quality measures, Blut *et al.* (2015) conducted a meta-analysis that emphasized the four most common and important dimensions: website design, customer service, security/privacy and fulfillment (see Table 2).

To conclude, there remains a lack of research focused on the issue of inferior product information on retail websites. Existing research addresses online service failure with a specific focus on website design problems, like confusing navigation (Holloway and Beatty, 2003; Roy *et al.*, 2022), information failure in general, e.g. hidden charges (Tan *et al.*, 2016) and lacking overall website quality, e.g. correct technical functions (Loiacono *et al.*, 2002; Parasuraman *et al.*, 2005). To the best of our knowledge, there is no study dealing specifically with PIQ on online retailers' websites (see Table 3). Therefore, we implement the framework of PIQ.

### *Product information quality*

Based on online service failures classifications (Table 2) and existing e-service quality measures (Table 2), we now introduce the construct of PIQ. PIQ focuses on product

Author	Category	Type of service failure
Holloway and Beatty (2003)	Delivery problems	Purchase arrived later than promised Purchase never delivered Wrong item delivered Wrong size product delivered Purchase damaged during delivery
	Web site design problems	Navigational problems at site Product poorly presented at site Insufficient information provided at site Products incorrectly listed at site Incorrect information provided at site
	Customer service problems	Poor customer service support Poor communication with the company Unfair return policies Unclear return policies
	Payment problems	Credit card overcharged Web site purchasing process confusing Difficulties experienced while paying Problems with product quality
	Security problems	Consumer dissatisfied with product quality Credit card fraud Misrepresented merchandise
	Miscellaneous	E-mail address released to e-marketers Respondent unintentionally made mistake at site Retailer charged some customers more than others Lack of personalized information at site
	Forbes <i>et al.</i> (2005)	Response to service delivery system/ product failure
Response to customer needs and requests		Special order/request Customer error Size variation
Tan <i>et al.</i> (2016)	Information failure	Inaccurate information Incomplete Information Irrelevant information Untimely information
	Functional failure	Needs recognition failure Alternatives identification failure Alternatives evaluation failure Acquisition failure
	System failure	Post-purchase failure Inaccessibility Non-adaptability Non-navigability Delay Insecurity

**Table 1.**  
Service failures  
typologies

(continued)

Author	Category	Type of service failure	
Roy <i>et al.</i> (2022)	Logistic service failure	Delivery problems	Purchase arrived later than promised
			Wrong item delivered
			Wrong size product delivered
			Purchase damaged during delivery
			Purchase never delivered
	Non-logistic service failure	Product-related problems	Delivery promises unfulfilled
			Product defect
			Problems with product quality
			Packaging errors
			Customer service problems
Non-logistic service failure	Customer service problems	Poor customer service support	
		Poor communication with the company	
		Unfair return policies	
		Unclear return policies	
		Payment Problems	
Non-logistic service failure	Payment Problems	Overcharged	
		Web site purchasing process confusing	
		Difficulties experienced while paying	
		Website design problems	
		Website design problems	
Non-logistic service failure	Website design problems	Navigational problems at the site	
		Product poorly presented or misrepresented at the site	
		Insufficient information provided at site	
		Products incorrectly listed as in stock	
		Incorrect information provided at the site	
Non-logistic service failure	Other problems	Web site system failure	
		Other miscellaneous issues	

Source(s): Table by author

Table 1.

information on websites, similar to previous literature on web site design problems (Holloway and Beatty, 2003; Roy *et al.*, 2022) and information failures (Tan *et al.*, 2016). In view of the hierarchical e-service quality model (Parasuraman *et al.*, 2005), we address website design issues relating to the provision of sufficient and accurate information, since information quality influences customers behavior and attitudes (Kim and Niehm, 2009). PIQ is thus defined as an indicator of the occurrence or absence of online service failures and is directly linked with e-service quality. Low PIQ leads to the perception of a service failure, whereas high PIQ does not. Since not all criteria of a website have a direct influence on consumers' shopping behavior (Alnawas and Al Khateeb, 2022) and that the intensity of the influence varies across different criteria (Kumar and Kashyap, 2018), we will focus on the most important ones. Following Petre *et al.*'s (2006) findings, one of the most important requirements of a retailer's website is the provision of quality information. This includes the depiction, availability and accuracy of information along with its consistency across the site and comparability to other websites (Rahman *et al.*, 2022).

Drawing on these assumptions, the PIQ construct comprises four dimensions and eight criteria. The dimensions include the visual product depiction, product information, product details and product attributes. Furthermore, the eight criteria rely on the number of product images, the provision of a product video, the title length and its readability, the product detail readability and relevancy, as well as the product attribute consistency and relevancy (see Table 4).

Author	Scale	Dimensions
Yoo and Donth (2001)	SITEQUAL	Ease of use Aesthetic design Processing speed Security
Loiacono <i>et al.</i> (2002)	WebQual	Informational fit to task Interaction Trust Response time Design Intuitiveness Visual appeal Innovativeness Flow-emotional appeal Integrated communication Business processes Substitutability
Zeithaml <i>et al.</i> (2002)	e-SQ	Information availability and content Ease of use or usability Privacy/security Graphic style Reliability/fulfillment
Wolfenbarger and Gilly (2003)	eTailQ	Customer service Privacy/security Website design Fulfillment/reliability
Parasuraman <i>et al.</i> (2005)	E-S-QUAL	Efficiency System availability Fulfillment Privacy
Blut <i>et al.</i> (2015)	Hierarchical e-service quality model	Website design Customer service Security/privacy Fulfillment

**Table 2.**  
Service quality  
measures

**Source(s):** Table by author

## Hypotheses and conceptual model

### *Effects of low PIQ on E-S-QUAL*

PIQ is defined as an indicator for the occurrence of service failures. Based on disconfirmation theory (Woodruff *et al.*, 1983), a service failure occurs when a delivered service does not fulfill consumers' expectations (Woodruff *et al.*, 1983; Zeithaml *et al.*, 1993). Consumers assess services based on different expectation levels. There is a lower 'adequate level' and a higher 'desired level'. Any service performance below the adequate level results in a service failure. Consequently, service failures have a negative impact on consumer shopping outcomes (Bagherzadeh *et al.*, 2020). Conversely, all service performances above the adequate level conform with consumer expectations and thus satisfaction rises (Zeithaml *et al.*, 1993). Service failures correspond with the dimensions of e-service quality (Sousa and Voss, 2009). Therefore, the occurrence of service failure negatively influences E-S-QUAL. To measure the severity of a service failure, the construct of perceived severity of service failure is used (Hess *et al.*, 2003). Thus, we introduce the perceived severity of service failure as a mediator to describe the effect of low PIQ on E-S-QUAL.

$H_1$ . Low PIQ influences E-S-QUAL negatively.

Research stream	Author	Looks at	Dimensions	Description	Example	Method
Online Service Failure	Holloway und Beatty (2003)	Website design problems	Navigational problems at site	Web site failed to function satisfactorily	Set up is confusing	Mixed
			Product poorly presented at site		Loading is too slow	
			Insufficient information provided at site		No information on order process	
			Products incorrectly listed at site		Product placement inappropriate	
	Forbes <i>et al.</i> (2005)	Response to service delivery system/product failure	Bad information	Information provided was insufficient	Consumer expecting certain capabilities, but the product did not have those capabilities	Qualitative
	Tan <i>et al.</i> (2016)	Information failure	Inaccurate Information	Information provided hinders	Information is unbiased	Qualitative
			Incomplete Information	Consumers in	Missing company policies	
			Irrelevant Information	accomplishing their	Hidden charges	
			Untimely Information	transactional activities	Information is not up-to-date	
	Roy <i>et al.</i> (2022)	Website Design Problems	Navigational problems at the site	Failures of the website system	System failure	Quantitative
			Product poorly presented or misrepresented at the site		Confusing navigation	
			Insufficient information provided at site		Lack of information on order procedure	
			Products incorrectly listed as in stock			
			Incorrect information provided at the site			
			Web site system failure			

(continued)

Table 3. Literature review on PIQ

Research stream	Author	Looks at	Dimensions	Description	Example	Method
E-Service Quality	Loiacono <i>et al.</i> (2002)	Website quality	Information usefulness Information ease of use	Delivered information helps to conduct task Delivered Information is designed pretty	Information provided meets customers information needs Website pages are easy to read	Mixed
	Parasuraman <i>et al.</i> (2005)	E-S-QUAL	Visual appeal Information efficiency	Rating of websites performance in view of website information Retailer provides inferior PIQ	Information is easy to find, well organized	Mixed
PIQ	Current work	Product information quality	Visual product depiction Product information Product details Product attributes		Product depiction is incomplete (Pictures/Video) Too long product title Bad title readability Product attributes are inconsistent	Quantitative

Source(s): Table by author



PIQ dimensions	PIQ criteria	Website quality dimensions	Literature
Visual product depiction	(1) Images	Completeness of Information	Zeithaml <i>et al.</i> (2002) Holloway and Beatty (2003) Petre <i>et al.</i> (2006) Tan <i>et al.</i> (2016)
	(2) Video	Completeness of information	Zeithaml <i>et al.</i> (2002) Holloway and Beatty (2003) Petre <i>et al.</i> (2006) Tan <i>et al.</i> (2016)
Product information	(3) Title length	Relevancy of information	Tan <i>et al.</i> (2016)
	(4) Title readability	Accuracy of information	Holloway and Beatty (2003) Forbes <i>et al.</i> (2005) Petre <i>et al.</i> (2006) Tan <i>et al.</i> (2016) Roy <i>et al.</i> (2022)
Product details	(5) Detail readability	Accuracy of information	Holloway and Beatty (2003) Forbes <i>et al.</i> (2005) Petre <i>et al.</i> (2006) Tan <i>et al.</i> (2016) Roy <i>et al.</i> (2022)
Product attributes	(6) Attribute consistency	Accuracy and relevancy of information	Holloway and Beatty (2003) Forbes <i>et al.</i> (2005) Petre <i>et al.</i> (2006) Tan <i>et al.</i> (2016) Roy <i>et al.</i> (2022)
			Relevancy of information
Product details	(8) Details relevancy	Relevancy of information	Tan <i>et al.</i> (2016)

Source(s): Table by author

Table 4. Dimensions of PIQ

$H_{2a}$ . Low PIQ leads to a high perceived severity of service failure.

$H_{2b}$ . Perceived severity of service failure negatively influences E-S-QUAL.

*Effects of E-S-QUAL on customer attitude towards the retailer and willingness to continue shopping*

Existing literature shows that E-S-QUAL has a positive impact on several behavioral and attitudinal outcomes. E-S-QUAL has a direct influence on customer satisfaction (Alnawas and Al Khateeb, 2022; Trabold *et al.*, 2006), purchase intention (Trabold *et al.*, 2006; Gounaris *et al.*, 2010), repurchase intention (Blut, 2016; Blut *et al.*, 2015), site revisit (Gounaris *et al.*, 2010), loyalty (Tsao *et al.*, 2016), trust (Rita *et al.*, 2019; Tsao *et al.*, 2016) and word-of-mouth (Blut, 2016; Gounaris *et al.*, 2010). Moreover, E-S-QUAL influences consumer attitudes towards the website (Wolfenbarger and Gilly, 2003; Yoo and Donthu, 2001) and specifically whether one is well-disposed or not towards the online shop (Chen *et al.*, 2002). Thus, E-S-QUAL impacts both customer willingness to continue shopping and customer attitude towards the retailer.

$H_{3a}$ . Low E-S-QUAL negatively influences customer willingness to continue shopping.

$H_{3b}$ . Low E-S-QUAL negatively influences customer attitude towards the retailer.

The theory of reasoned action, according to Fishbein and Ajzen (1975), suggests that attitudes determine consumer behavior. Thus, behavior is a reaction based on predisposed attitudes that lead to several behavioral shopping outcomes, including purchase intention (Goldsmith *et al.*, 2000). Consequently, we assess customer attitude towards the retailer as a mediating variable of the effect from E-S-QUAL on customer willingness to continue shopping.

$H_{3c}$ . The effect of low E-S-QUAL on customer willingness to continue shopping is mediated through customer attitude towards the retailer.

*The role of different PIQ criteria*

Our research approach deals with PIQ with a particular focus on its different dimensions and criteria. We argue that (1) every PIQ criteria influences the effect of PIQ on perceived severity of service failure and that (2) there are differences in the effect sizes between the PIQ criteria. In the following, we derive the theoretical underpinnings for every PIQ criteria (see Table 5).

The PIQ dimension product depiction including the criteria (1) Images and (2) Video relies on assumptions of image processing (Lutz and Lutz, 1978). Images or other visualization have an image value (Maclnnis and Jaworski, 1989). These visual stimuli induce image processing – a procedure where mental visualization of content is undertaken (Lutz and Lutz, 1978). This mental imagery approach improves attitude towards the advertisement as images positively influence consumer attitudes (Cheng and Zhang, 2023; Huang and Ha, 2021). Through these image processes, visualizations are more effective than words alone (Cao *et al.*, 2021). Further, the importance of visualization increases in online versus store-based retailing, since the products are intangible on the web (Basu and Sondhi, 2021). Consequently, we consider that low PIQ through a lack of visual product depiction negatively impacts consumer perceptions.

One major threat for online commerce is the lack of direct contact between the retailer and buyer (Kumar and Kashyap, 2018), which makes it difficult to establish a basis of trust (Bitner *et al.*, 2000; Monsuwé *et al.*, 2004) and leads some consumers to assess online shopping as risky (Johnson and Ramirez, 2020) and untrustworthy (Irshad *et al.*, 2020). According to the uncertainty reduction theory (Berger and Calabrese, 1975), consumers who feel uncertainty try to gather information to remedy these shortcomings otherwise they cease their actions. We suppose that for online shopper’s product information ((3) title length, (4) title readability) and product details ((5) detail readability) are particularly important for reducing uncertainty. When detailed, high quality information is provided, uncertainty is reduced and trust towards the retailer increases (Rita *et al.*, 2019; Tsao *et al.*, 2016). Finally, related, we can conclude that low PIQ lacking adequate or including inappropriate or inaccurate product information negatively influences perceptions and leads to service failure.

PIQ dimensions	PIQ criteria	Theory
Product depiction	(1) Images	Image processing (Lutz and Lutz, 1978)
	(2) Video	Image processing (Lutz and Lutz, 1978)
Product information	(3) Title length	Uncertainty reduction theory (Berger and Calabrese, 1975)
	(4) Title readability	Uncertainty reduction theory (Berger and Calabrese, 1975)
Product details	(5) Detail readability	Uncertainty reduction theory (Berger and Calabrese, 1975)
Product attributes	(6) Attribute consistency	Consistency theory (Zajonc, 1960)
	(7) Attribute relevancy	Consistency theory (Zajonc, 1960)
Product details	(8) Detail relevancy	Consistency theory (Zajonc, 1960)

**Table 5.**  
Dimensions of PIQ

**Source(s):** Table by author

Online shopping has many advantages compared to physical stores (Szász *et al.*, 2022). Besides the greater product variety and availability (Weber and Maier, 2020), greater information about the product and its prices are provided than might be offered at a physical shelf-edge. This allows greater comparability with similar products or indeed retailers, as well as providing greater convenience given there is no need for the consumer to travel (Li *et al.*, 2022). In many respects then, online retailers might realize a degree of competitive advantage (Szász *et al.*, 2022), though there is fierce competition so it is incumbent on retailers to offer a high level of quality on their websites (Weber and Maier, 2020).

Based on the consistency theory (Zajonc, 1960) individuals have a fundamental need for cognitive consistency. If a state of inconsistency occurs, negative attitudinal and behavioral consequences arise (Festinger, 1962). When we link consistency theory with the ease of product comparability in online retailing, we deduce that product attributes ((6) attribute consistency, (7) attribute relevancy) and product details ((8) detail relevancy) have to be consistent and comparable within a retailer's website and across other retailers' websites. In the event of inconsistency, negative consequences are likely to result. We thus infer that low PIQ in terms of inconsistent product attributes and details within and across retailers' websites causes a negative impact.

*H<sub>4</sub>*. The different PIQ criteria influence the effect of low PIQ on perceived severity of service failure.

#### *The moderating impact of product category*

The moderating variable of product category is divided into high and low involvement products. Involvement generally describes a motivational state based on an individual's values and needs (Zaichkowsky, 1986). Product involvement is the perceived importance of a product based on someone's interests and needs (Bian and Moutinho, 2011) and is connected with several attitudinal properties of a decision making process (Mou *et al.*, 2020). The degree of involvement influences consumers' cognition of product information (Zhu *et al.*, 2019), so the level of product involvement determines the extent of cognitive and behavioral effort when making a purchase decision (Chakravarti and Janiszewski, 2003). When product involvement is high, consumers are likely to spend more effort in the information search/decision (Rokonuzzaman *et al.*, 2020). Further, consumers relate high involvement products with individual and experimental benefits, while low involvement products are only a constraint on their functionalities (Solomon *et al.*, 1985). We therefore conclude that there is a difference between the product categories depending on whether they are high or low involvement. Furthermore, we contend that high involvement products are more sensitive in terms of the occurrence of low PIQ and that in this case a higher level of PIQ is needed.

*H<sub>5</sub>*. The characteristics of the product category influence the effect of PIQ on perceived severity of service failure

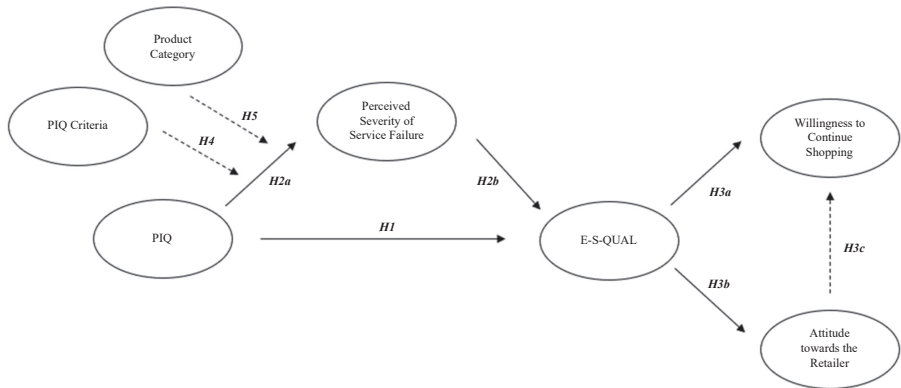
#### *Research model*

All five hypotheses result into the research model (Figure 1). First, at its center are the effects of PIQ on customer willingness to continue shopping and customer attitude towards the retailer. A second element focuses on the mediating effect of perceived severity of service failure. Finally, two influencing constructs explain the moderating impacts on the main effect of PIQ. In the following, we empirically test this research.

## **Methodology**

### *Experimental design*

To test the conceptual model, we conducted a scenario-based experiment. Therefore, we utilized the most prevalent PIQ criteria of a leading online DIY retailer. Based on the user face of this retailer's website we developed 32 scenarios, wherein 16 settings serve as treatment and the rest



**Figure 1.**  
Research model

**Source(s):** Figure by author

as control groups. The scenario allocation was made on the basis of a random sampling technique and the experimental design is outlined as  $8 \times 2 \times 2$  between subject’s design (see Table 6). The treatments represent different dimensions of PIQ criteria (8) on a low- or high-quality level (2). Furthermore, we divide the respondents in two product categories, namely high or low involvement product (2). As a high involvement product, a power drill is used and as a low involvement product, we assume a hammer. For further information on the scenario descriptions see Appendix 1 and 2. After receiving the scenario the respondents were invited to answer several questions on their attitudinal and behavioral response on this specific situation.

*Sample*

The underlying population of the sample represents all individuals who shop DIY products online and corresponds to the target customer group of the leading DIY retailer. Hence, we drew a quota sample taking into account gender and age as quota controls (see Table 7).

			Product type			
			High involvement		Low involvement	
8 × 2 × 2 between subject design			PIQ level		High	Low
			High	Low		
PIQ dimensions and criteria	DEPIC-TION	(1) Images	Setting 1	Setting 9	Setting 17	Setting 25
		(2) Video	Setting 2	Setting 10	Setting 18	Setting 26
	INFOR-MATION	(3) Title length	Setting 3	Setting 11	Setting 19	Setting 27
		(4) Title readability	Setting 4	Setting 12	Setting 20	Setting 28
	DE-TAIL	(5) Detail readability	Setting 5	Setting 13	Setting 21	Setting 29
	ATTRI-BUTES	(6) Attribute consistency	Setting 6	Setting 14	Setting 22	Setting 30
		(7) Attribute relevancy	Setting 7	Setting 15	Setting 23	Setting 31
	DE-TAIL	(8) Details relevancy	Setting 8	Setting 16	Setting 24	Setting 32

**Table 6.**  
Empirical research design

**Source(s):** Table by author

The sample selection procedure was undertaken together with an international panel provider between December 2021 and January 2022. The final sample consists of 3,544 male and female UK consumers, between 18 and 89 years, living most of them in a smaller town (54.5%) and living in households of two (43.2%) till three (18.7%) people. On average they earn 20,001 till 50,000 (53.3%) per year and work as employees (50.2%). The sample is distributed approximately equally among the 32 scenarios. There are 101 till 119 participants randomized allocated across the settings.

*Measures*

We applied introduced scales from the literature to measure the constructs included in the research model. Different variables, manipulation checks and attention checks were also considered in the data collection procedure. The focus relies on the model constructs. The perceived severity of service failure (Maxham and Netemeyer, 2002) is used to quantify the perception of the different levels of PIQ. Given the online shopping context, the e-service quality (Parasuraman et al., 2005) scale is surveyed. Customer attitude towards the retailer (Spears and Singh, 2004) and customer willingness to continue shopping (Wakefield and Baker, 1998) are measured to indicate the consequences of the different level of PIQ. Furthermore, various shopping outcomes such as willingness to stay (Wakefield and Baker, 1998), intention to spend

Demographic	Frequency	Percentage	Demographic	Frequency	Percentage
Gender			Job		
Female	1,897	53.5%	Employed	1,779	50.2%
Male	1,640	46.3%	Self-employed	282	8.0%
Diverse	7	0.2%	Out of work/looking for work	81	2.3%
			Out of work/not looking for work	31	0.9%
Age			Student	20	0.6%
18–24	34	1.0%	Homemaker	201	5.7%
25–34	299	8.4%	Military	3	0.1%
35–44	587	16.6%	Retired	939	26.5%
45–54	783	22.1%	Unable to work	179	5.1%
55–64	936	26.4%	Other	29	0.8%
65–74	704	19.9%			
75+	201	5.7%			
Origin			Income (per year)		
UK	3,544	100%	Below 10,000	309	8.7%
			10,001–20,000	689	19.4%
Main residence			20,001–30,000	766	21.6%
City	853	24.1%	30,001–40,000	673	19.0%
Smaller town/suburb	1,933	54.5%	40,001–50,000	451	12.7%
Rural area	758	21.4%	50,001–60,000	262	7.4%
			60,001–70,000	145	4.1%
Education			Above 70,000	249	7.0%
No formal qualification	134	3.8%			
School qualification	1,229	34.7%	Household Size		
Trade qualification	362	10.2%	One Person	596	16.8%
Certificate below Bachelor's level	517	14.6%	Two Persons	1,532	43.2%
Bachelor's degree	794	22.4%	Three Persons	663	18.7%
Higher qualification	475	13.4%	Four Persons	499	14.1%
NCEA	33	0.9%	Five and more Persons	253	7.1%

Source(s): Table by author

**Table 7.** Demographic distribution of the sample

less (Baker *et al.*, 2002), negative word-of-mouth (Baker *et al.*, 2002) and patronage intention (Wakefield and Baker, 1998) are queried. In addition, we implemented the control variables sex, age, education and previous shopping experience. All measures provide a sufficient internal consistency (Cronbach's  $\alpha > 0.70$ ) (see Table 8).

## Results

### *Manipulation check*

The manipulation of the scenarios worked as intended. For this purpose, manipulation check questions for each PIQ dimension, in view of the level of PIQ (high/low) and the product category (high/low involvement) were added in the questionnaire. Independent *t*-tests reveal that the participants in high PIQ settings perceive the quality level as high and, in comparison, the respondents who received the low level perceived it as such. There are highly significant mean differences between the range of  $M_{\text{High\_PIQ}} = 4.43$  and  $M_{\text{Low\_PIQ}} = 2.06$  on a *p*-value smaller than 0.001. All respondents were asked whether they received a scenario about a high (drill) or low (hammer) involved product category. Moreover, they had to state which PIQ criteria was the content of the scenario they were shown (product images, product video, title length, title readability, detail readability, attribute consistency, attribute relevancy, detail relevancy). These manipulation check questions were also answered correctly by everyone. Thus, our manipulations worked as intended.

### *Effects of low PIQ on E-S-QUAL*

To assess H1, H2a and H2b we applied a mediation analysis using PROCESS model 4 (Hayes, 2022). The results reveal that there is no direct effect of PIQ on E-S-QUAL ( $B = -0.031$ ,  $p = 0.162$ ). Thus, we cannot support H1. However, PIQ affects the mediator perceived severity of service failure significantly,  $B = 0.893$ ,  $p < 0.001$ , which is in support of H2a. In turn, the perceived severity of service failure impacts the dependent variable E-S-QUAL ( $B = -0.415$ ,  $p < 0.001$ ). These results support H2b. To conclude, we found that the relationship between PIQ and E-S-QUAL is fully mediated by the variable perceived severity of service failure (Indirect effect  $-0.371$ , 95%-CI  $[-0.409, -0.334]$ ).

### *Effects of E-S-QUAL on customer attitude towards the retailer and willingness to continue shopping*

To examine the following hypotheses H3a–c we conduct a mediation analysis using PROCESS model 4 (Hayes, 2022). First, we identify the effect of E-S-QUAL on customer willingness to continue shopping ( $B = 0.141$ ,  $p < 0.001$ ), which supports H3a. The findings also suggest that E-S-QUAL has an effect on customer attitude towards the retailer ( $B = 0.754$ ,  $p < 0.001$ ) and thus, we can support H3b. Finally, the results provide support for H3c. Hence, the effect of low E-S-QUAL on customer willingness to continue shopping is partially mediated through customer attitude towards the retailer (Indirect effect  $0.499$ , 95%-CI  $[0.471, 0.526]$ ).

### *The role of different PIQ criteria*

A moderation analysis using PROCESS model 1 (Hayes, 2022) was conducted to determine whether the interaction between PIQ and the type of PIQ significantly predicts the perceived severity of service failure. The overall model is significant,  $F(3, 3,540) = 296.43$ ,  $p < 0.001$ , predicting 20.08% of the variance. Moderation analysis shows that type of PIQ moderated the effect between PIQ and perceived severity of service failure significantly ( $\Delta R^2 = 20.11\%$ ,  $F(3, 3,540) = 5.07$ ,  $p < 0.05$ , 95% CI  $[-0.054, -0.004]$ ). Thus, we can support H4.

We further examined the moderating effects for each of the eight types of PIQ. The type of PIQ (1) Image, (4) Title Readability and (6) Attribute Consistency have strong negative moderating effects (see Table 9).

Scale	Type of scale	Description	Cronbach's $\alpha$
(1) Perceived Severity of Service Failure (Maxham and Netemeyer, 2002)	5-point scale 'not a problem' to 'a major problem' 5-point scale 'no inconvenience' to 'a major inconvenience' 5-point scale 'not an aggravation' to 'a major aggravation'	What I experienced on this website is . . .	0.946 (3 Items)
(2) E-Service Quality (Parasuraman et al., 2005)	5-point scale: 'strongly disagree' to 'strongly agree'	<i>Efficiency</i> EFF1 This site makes it easy to find what I need EFF2 It makes it easy to get anywhere on the site EFF3 It enables me to complete a transaction quickly EFF4 Information at this site is well organized EFF5 It loads its pages fast EFF6 This site is simple to use EFF7 This site enables me to get on to it quickly EFF8 This site is well organized <i>Fulfillment</i> FUL1 It delivers orders when promised FUL2 This site makes items available for delivery within a suitable time frame FUL3 It quickly delivers what I order FUL4 It sends out the items ordered FUL5 It has in stock the items the company claims to have FUL6 It is truthful about its offerings FUL7 It makes accurate promises about delivery of products <i>System availability</i> SYS1 This site is always available for business SYS2 This site launches and runs right away SYS3 This site does not crash SYS4 Pages at this site do not freeze after I enter my order information <i>Privacy</i> PRI1 It protects information about my Web-shopping behavior PRI2 It does not share my personal information with other sites PRI3 This site protects information about my credit card	0.962 (22 Items)
(3) Attitude towards the Retailer (Spears and Singh, 2004)	7-point scale 'strongly disagree' to 'strongly agree'	ATT1 I like this retailer ATT2 I feel positive towards this retailer ATT3 Shopping at this retailer is desirable	0.943 (3 Items)

(continued)

**Table 8.**  
Measurement scales

Scale	Type of scale	Description	Cronbach's $\alpha$
(4) Willingness to continue shopping (Wakefield and Baker, 1998)	5-point scale 'strongly disagree' to 'strongly agree'	CONT1 I like to remain in this online store as long as possible CONT2 I enjoy spending time in this online store CONT3 Browsing in this online store is fun	0.925 (3 Items)
(5) Online shopping experience	5-point scale 'very inexperienced' to 'very experienced'	How experienced would you say you are with shopping – DIY products online?	–

**Table 8.** Source(s): Table by author

Moreover, we provide results regarding the differences between the eight PIQ dimensions and their severity. We conducted a variance analysis to outline whether there are differences between the different types of PIQ. The findings suggest that there are statistical differences between the types of PIQ  $F(7) = 9.41, p < 0.001$ . The perceived severity of service failure is the highest for the types of PIQ (1) Image ( $M_{PIQ_1} = 2.53$ ), (6) Attribute Consistency ( $M_{PIQ_6} = 2.36$ ), (3) Title Readability ( $M_{PIQ_3} = 2.34$ ) and (8) Detail Relevancy ( $M_{PIQ_8} = 2.32$ ).

*The moderating impact of product category*

To test H5 a moderating analysis with PROCESS model 1 (Hayes, 2022) is undertaken. The overall model is significant,  $F(3, 3,540) = 334.70, p < 0.001$ , predicting 22.10% of the variance. The moderation suggests that the product category moderates the effect between PIQ and perceived severity of service failure significantly,  $\Delta R^2 = 22.56\%$ ,  $F(3, 3,540) = 25.48, p < 0.001, 95\% CI [-0.407, -0.179]$ . Consequently, we can support H5.

Additionally, we compared the two product categories by means of an independent *t*-test. The test supports a significant mean difference between the two product categories ( $M_{Drill} = 1.87, M_{Hammer} = 1.63, t(3,422.13) = 7.43, p < 0.001$ ). The perceived severity of service failure is generally higher for the high involvement product type (see Figure 2).

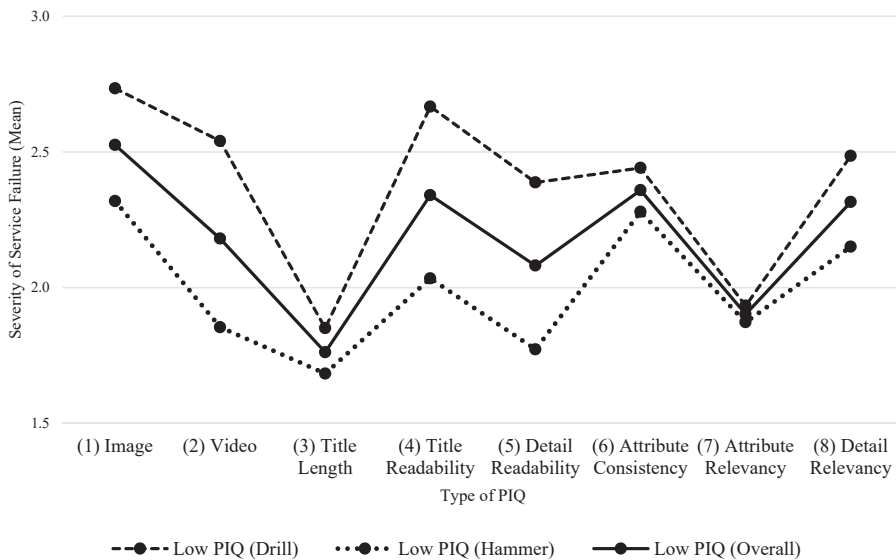
In the high involvement setting, the perceived severity of service failure is the highest for the types of PIQ (1) Image ( $M_{PIQ_1} = 2.74$ ), (3) Title Readability ( $M_{PIQ_3} = 2.67$ ) and (2) Video ( $M_{PIQ_2} = 2.34$ ). Whereas in the scenarios with the low involvement product category, the perceived severity of service failure is the highest for the type of PIQ (1) Image ( $M_{PIQ_1} = 2.32$ ), (6) Attribute Consistency ( $M_{PIQ_6} = 2.28$ ) and (8) Detail Relevancy ( $M_{PIQ_8} = 2.15$ ). For the whole rankings see Table 10.

	Moderating effects Coefficient		95% - CI
PIQ CRITERIA	(1) Images	-0.459*	[-0.629, -0.289]
	(2) Video	0.050	[-0.124, 0.224]
	(3) Title Length	0.524	[0.353, -0.695]
	(4) Title Readability	-0.253*	[-0.426, -0.080]
	(5) Detail Readability	0.151	[-0.023, 0.326]
	(6) Attribute Consistency	-0.307*	[-0.485, -0.128]
	(7) Attribute Relevancy	0.162	[-0.013, 0.337]
	(8) Details Relevancy	0.130	[-0.047, 0.307]

**Table 9.** Moderating effects per type of PIQ

Source(s): Table by author





**Figure 2.** Comparison of low PIQ per product category

Source(s): Figure by author

Overall PIQ criteria	Mean	Drill (high involvement)		Hammer (low involvement)	
		PIQ criteria	Mean	PIQ criteria	Mean
(1) Image	2.53	(1) Image	2.74	(1) Image	2.32
(6) Attribute consistency	2.36	(4) Title readability	2.67	(6) Attribute consistency	2.28
(4) Title readability	2.34	(2) Video	2.54	(8) Detail relevancy	2.15
(8) Detail relevancy	2.32	(8) Detail relevancy	2.49	(4) Title readability	2.03
(2) Video	2.18	(6) Attribute consistency	2.44	(7) Attribute relevancy	1.87
(5) Detail readability	2.08	(5) Detail readability	2.39	(2) Video	1.85
(7) Attribute relevancy	1.90	(7) Attribute relevancy	1.93	(5) Detail readability	1.77
(3) Title length	1.76	(3) Title length	1.85	(3) Title length	1.68

Source(s): Table by author

**Table 10.** Ranking of the PIQ criteria regarding their severity

## Discussion

### Theoretical implications

*Expanding website design literature.* Online retailing lacks the opportunity to directly present products in a physical, haptic setting (Gilkeson and Reynolds, 2003; Koehn, 2003). Thus, online shoppers base their buying decisions mainly on the website, its design and the general information provided (Daroch et al., 2021). Previous researchers therefore emphasize the importance of accurate information on retailers' websites (Parasuraman et al., 2005; Holloway and Beatty, 2003; Forbes et al., 2005). It has been demonstrated that website design, including a high information quality, positively influences online shoppers behavior (Carlson and O'Cass, 2010). However, while the existing literature has only dealt with information quality in general, this research significantly deepens our understanding to focus on the specific case of online product information in DIY retailing.

*Introducing product information quality (PIQ).* We introduce the construct of PIQ and link this to online service failure (Holloway and Beatty, 2003; Tan et al., 2016) and e-service quality literature (Alnawas and Al Khateeb, 2022). PIQ is an indicator for the occurrence of online

service failure and is thus closely related to e-service quality. Moreover, we define different PIQ levels, addressing information completeness, relevancy and accuracy. Based on the disconfirmation theory (Woodruff *et al.*, 1983), we identify low PIQ as a service failure, while high PIQ is assigned to positively influence consumer's online behavior.

*Connecting PIQ with E-S-QUAL and consumer shopping outcomes.* We build on previous research efforts and apply the E-S-QUAL measure as a mediating variable between low PIQ and customer willingness to continue shopping and customer attitude towards the retailer. Prior studies contend that service failures correspond with the dimensions of e-service quality (Sousa and Voss, 2009). The current study supports that the occurrence of low PIQ negatively influences E-S-QUAL which, in turn, impacts customer willingness to continue shopping and customer attitude towards the retailer in online shopping contexts. This is the first time that this causal chain has been statistically supported.

*Supporting the impact of customer attitudes towards the retailer on customer willingness to continue shopping.* This research also supports Fishbein's and Ajzen's (1975) theory of reasoned action (Fishbein and Ajzen, 1975) that suggests that attitudes determine consumers' behavior, so behavioral shopping outcomes are based on predisposed attitudes (Gresham and Shimp, 1985). In this research, the mediating effect of attitude towards the retailer between E-S-QUAL and customer willingness to continue shopping is statistically supported.

*Emphasizing the differences between various PIQ criteria.* In order to provide a deeper understanding of PIQ, this paper identifies eight criteria, their different perceptions and impacts. Based on the assumptions of image processing (Lutz and Lutz, 1978), uncertainty reduction theory (Berger and Calabrese, 1975) and consistency theory (Zajonc, 1960), we provide statistical evidence that every PIQ criteria is perceived as service failure. The three most important criteria, which also operate as significant moderators on the effect of PIQ on perceived severity of service failure, are (1) Image, (4) Title Readability and (6) Attribute Consistency. This means that an appropriate depiction of product images, a comprehensible product title and comparable product attributes are indispensable for online retailer websites. In high involved purchase procedures also, the criteria (2) Video is important, while in low involved ones the (8) Detail Relevancy plays a major role for customers decision making process.

*Assessing the differences between high and low involvement products.* Finally, we assess the moderating effect of product category by distinguishing high and low involvement products. Existing literature describes product involvement as the perceived importance of a product based on someone's interests and needs (Bian and Moutinho, 2011). The degree of product involvement determines the extent of cognitive and behavioral efforts in decision making processes (Chakravarti and Janiszewski, 2003). High involvement products are associated with greater effort in information search/decision and with individual benefits (Bian and Moutinho, 2011), while low involvement products rely on their operability (Solomon *et al.*, 1985). This study assesses the statistical difference between high and low involvement products in relation to PIQ and service failure. As we hypothesized, PIQ is more important in terms of high involvement products since the perceived severity of service failure is higher in this context.

#### *Managerial implications*

*Low PIQ is associated with service failures.* Product information on websites plays a major role in the consumer buying process. Specifically, PIQ is a major indicator for e-service quality on retailers' websites. We find that low PIQ is perceived as an online service failure, so PIQ deserves the same management focus as other service failures that achieve greater prominence in the retail marketing research literature. Where PIQ is insufficient or misleading, subsequent, prevention and recovery measures should be applied as a priority to

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avoid or reduce negative effects on consumer shopping behavior. Therefore, practitioners should pay greater attention to approvals for text and visual copy before posting on a web site. Retail managers should track the number of web site errors and inconsistencies to ensure that their information is trending in the right direction.

*Not every PIQ criteria deserves the same attention.* Our empirical results imply there are PIQ criteria that require more attention than others, which should, in turn, inform management practice. The PIQ criteria that are most critical to perceptions of service quality are (1) Image, (4) Title Readability and (6) Attribute Consistency, while (3) Title Length causes the smallest impact. Therefore, critical PIQ criteria warrant greater focus from online retail managers and their PIQ level needs to be higher. So, online shoppers prefer an appropriate depiction of product images, a comprehensible product title and comparable product attributes on online retailers' websites.

*High involvement products need a higher PIQ.* Our data also imply greater attention should be directed by retailers to higher PIQ in the online merchandising of high involvement products, compared to low involvement goods. This is because in situations with high involvement products, a higher severity of service failure appears. Of course, high involvement products are associated with greater effort in information search and therefore consumers demand accurate and sufficiently detailed product information to inform their buying decision. In the case of low PIQ, there is insufficient qualitative information provided which leads to negative consequences. In contrast, low involvement products typically offer only basic functionality and hence, not that much information is needed for the buying process. It might therefore be said that the management of PIQ on retailer's website need not be standardized across all criteria nor across all product categories. Ultimately, differentiated managerial approaches are required.

#### *Limitations and future research agenda*

As with every empirical research, this study has limitations. The paper deals with the eight most important PIQ criteria of an international leading DIY retailer and its target customers. In turn, the results only represent a specific case and should be replicated. Future research should survey more PIQ criteria of other DIY retailers. More significantly, this research setting should be expanded across other retail sectors, like apparel and electronics to identify sectoral differences in the importance of PIQ criteria. Additional variables could also be integrated into this research context, including moderating variables such as type of brand (strong vs. weak) or product importance (normal vs. very important). Future research might further adopt and test recovery measures for low PIQ experiences and should apply AI (e.g. chatbots) to detect further PIQ criteria.

#### **Conclusion**

To conclude, this paper investigates how to appropriately present products on websites. Thus, this study enhances both the literature on website design and the literature on online service failures. Moreover, this research emphasizes the importance of information quality criteria for online shoppers. The findings reveal that low PIQ is perceived as service failure and further influences customers overall service quality evaluations. In addition, customer attitudes towards the retailer and willingness to continue shopping at this retailer's website decrease. The results also support that there are differences between PIQ criteria and their severity. Therefore, it is especially important to provide a sufficient depiction of the product, an easily readable title and comparable product attributes on retail websites. We also found that PIQ is of greater importance for high involved product categories. Based on these insights, retailers should pay greater attention to product information on their websites. Since errors can still happen, retailers need to think about how they can minimize the negative consequences, e.g. through recovery measures.

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## Appendices

### Appendix 1. Scenario Description: Setting 1

#### (1) Start of your shopping journey on your mobile phone:

Please imagine that you are going to buy DIY products over the web using your smart phone. You do not want to spend too much and look for something that you like.

#### (2) The product search on websites:

After a good search of different retailers' websites, you end up on a gallery webpage of XY where you see different products that come close to what you were looking for.

#### (3) The choice of the product:

You click on one of the suggested products that give you more detail. On that page you can have a good look at the product. *You have chosen a drill.*



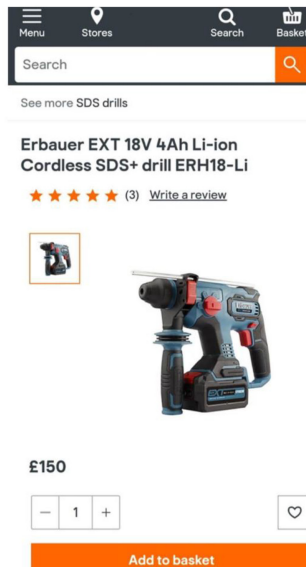
(4) **Important aspects for choosing a product online**

When shopping online and choosing a product, it is important for you that the presentation of the product includes an *appropriate number of images* and *perhaps videos*. You also want the product information especially the *product title* to be of *sufficient length* and *easily readable*. Furthermore, the *product details* should be *clear* and *useful for the selection* of the product. Finally, specific *product attributes* should be *easily comparable* with other product variants and across other retailer's website.

Please take these aspects into account when you next see the detailed examination of the chosen product.

(5) **Detailed examination of the chosen product:**

To be sure, you want to closely inspect all the product information to make a good decision. Therefore, you are now taking a closer look at the *image* of the product. The image depicts the product only from *one perspective*, so it *cannot be seen from all sides* and you can *hardly evaluate* whether you find the product suitable.





(6) **Your purchase decision:**

Please answer the following questions assuming that:

- you can afford this DIY product
- you like it

**Source(s):** Appendix by author

**Appendix 2. Scenario Description: Setting 9**

(1) **Start of your shopping journey on your mobile phone:**

Please imagine that you are going to buy DIY products over the web using your smart phone. You do not want to spend too much and look for something that you like.

(2) **The product search on websites:**

After a good search of different retailers' websites, you end up on a gallery webpage of XY where you see different products that come close to what you were looking for.

(3) **The choice of the product:**

You click on one of the suggested products that give you more detail. On that page you can have a good look at the product. *You have chosen a drill.*



(4) **Important aspects for choosing a product online**

When shopping online and choosing a product, it is important for you that the presentation of the product includes an *appropriate number of images* and *perhaps videos*. You also want the product information especially the *product title* to be of *sufficient length* and *easily readable*. Furthermore, the *product details* should be *clear* and *useful for the selection* of the product. Finally, specific *product attributes* should be *easily comparable* with other product variants and across other retailer's website.

Please take these aspects into account when you next see the detailed examination of the chosen product.

(5) **Detailed examination of the chosen product:**

To be sure, you want to closely inspect all the product information to make a good decision. Therefore, you are now taking a closer look at the *images* of the product. The images depict the product from *different perspectives*, so it *can be seen from all sides* and you can *easily evaluate* whether you find the product suitable.



(6) **Your purchase decision:**

Please answer the following questions assuming that:

- you can afford this DIY product
- you like it

**Source(s):** Appendix by author

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