

# Eliciting Customer Preferences for Shopping Companion Apps: A Service Quality Approach

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**Abstract.** Shopping companion apps, which assist customers in product search and buying decisions, are an emerging phenomenon in the context of omnichannel retail. These retailer-provided apps link the digital with the physical servicescape of the store, allowing for new forms of online and at the same time physical service. So far, there is no dominant design for this type of information system. Both academia and practice lack empirical information about what customers expect from this kind of mobile app. Drawing from service quality literature as theoretical foundation, we conducted a qualitative content analysis of 1,448 customer reviews of three major shopping companion apps. The analysis yielded 23 aspects that customers expect from shopping companion apps, and that, in turn, can support establishing high mobile service quality. Our results contribute to the knowledge of m-service in retail and quality-driven app design.

**Keywords:** Mobile Service, Omnichannel, Service Quality, Customer Reviews.

## 1 Introduction

The mobile channel is an intimate and direct way for retailers to fulfill their customers' needs [1, 2] since customers nowadays use myriads of mobile devices in all situations of their daily lives including shopping [3, 4]. Customers search for products and services, and shop on the move without temporal or spatial constraints [5]. Customers are already using their smartphones in-store to get product information and compare prices [6]. Brick and Mortar (BaM) retailers respond to this changing customer behavior by introducing what we term *shopping companion apps* [1, 7].

A shopping companion app is conceptualized as retailer-provided software, executed on the customer's smartphone, which complements the personal and e-service of a BaM retailer by an additional mobile channel—manifesting as a digital support to the shopping process within and outside the store. Customers use these apps to access general shopping features such as product search, and immersive, location-based, and personalized functions such as in-store navigation and product recommendations [3, 8]. In contrast to third-party apps, shopping companion apps keep the customer in the retailers' self-contained environments [9] and allow them to create “seamless omni-

channel experience[s]” [10, p. 68] that match their overall strategies. Shopping companion apps offer several novel features of hybrid customer interaction [11] and value-added service [7], which are neither usefully realizable just in stationary retail nor in e-commerce [1, 12].

Being an emergent phenomenon, shopping companion apps have not yet received much academic investigation [1], and also instances in practice do not follow a dominant design [13] but rather vary in form and behavior. Developing and designing shopping companion apps that meet or even exceed the customers’ expectations is a challenging endeavor [14]. To establish a high-quality shopping companion app as a mobile interface for customer interaction with the retailer, designers must consider smartphone-specific constraints (e.g., display size, mobile Internet) and opportunities (e.g., sensor access, immersion) atop traditional user experience aspects [15, 16].

We draw from Service Quality (SQ) research to identify what makes up a *high-quality* shopping companion app. SQ is concerned with assessing the quality of interactions between a customer and a service provider [17, 18] and is defined as the degree of “discrepancy between customers’ expectations and perceptions” [19, p. 111] towards a received or experienced service [20]. SQ assessments have a long and rich history, ranging from person-to-person service (SERVQUAL) [17, 18], over e-service accessed via personal computers (E-S-QUAL) [21], to m-service accessed via mobile devices (M-S-QUAL) [22, 23]. Recent conceptualizations of Mobile App Service Quality (MASQ) now consider the peculiarities of mobile apps such as immersive human-computer interaction, location independence, and potentially far-reaching access to personal information and sensor data through the service provider [24-27]. However, while the literature acknowledges the importance of high-quality in-store service through the mobile channel as a future competitive edge for retailers [28], there is a lack of empirical information about what customers expect, and also—to the best of our knowledge—there is no domain-specific research for shopping companion apps.

Against this background, our research goal is *a set of customer preferences for shopping companion apps* with special consideration on MASQ. To reach this goal, we apply a twofold approach. First, we turn towards SQ literature as the theoretical foundation to understand MASQ. Second, we conduct a Qualitative Content Analysis (QCA) [29] of online customer reviews of three major shopping companion apps to retrieve the individual app users’ subjective perceptions of SQ. We follow suggestions from human-computer interaction research to analyze the interaction with mobile apps from a user’s point-of-view [16]. From the review corpus, we inductively derive 23 aspects customer prefer for shopping companion apps, which retailers can consider for quality-driven (shopping companion) app design.

The remainder of this paper is as follows: Section 2 introduces MASQ. Section 3 sketches the research approach. Section 4 gives the customer preferences for shopping companion apps, which are discussed in Section 5. We conclude in Section 6.

## 2 Theoretical Background

### 2.1 Service Quality

SQ is known to be an important determinant for the success of a company, impacting “business performance, lower costs, customer satisfaction, customer loyalty and profitability” [30, p. 913]. SQ assessments identify the perceived SQ of an individual, which is “a global judgment or attitude” [31, p. 16] comparing the customers’ expectations and actual perceptions of a service endeavour. Following the so-called disconfirmation paradigm, high SQ is achieved, when the difference between expectations and perceptions is marginal, or the perceptions exceed the expectations [17]. In contrast, customer satisfaction is “the result of specific service transactions” [32, p. 822]. Existing models of SQ distinguish different sub-dimensions, which further detail the overarching construct. Parasuraman et al. [31], for example, introduced reliability, responsiveness, assurances, and tangibles as dimensions for measuring the quality of interpersonal service. Various technological innovations have led academia to propose adjusted and extended SQ models for different types of information systems, domains, and kinds of service over time. In the context of mobile apps and m-service, adjusted models are subsumed under MASQ. Currently, research on MASQ is sparse [26, 27].

SQ research has created an own literature stream that spreads over the information systems, retail, e-commerce, human-computer-interaction, and marketing domains. To identify the dimensions that may explain high-quality shopping companion apps, we conducted a structured literature review [33] across outlets in these domains, without restricting the search basket to allow for an exhaustive coverage. The search took place on 2017-06-21 using SCOPUS, AISeL, Web of Science, and EBSCOHOST. Table 1 gives the generalized search query, which was adapted to the syntax of the respective search engine.

**Table 1.** General Literature Review Search Query

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```
("app" OR "mobile" OR "electronic" OR "m-" OR "e-") AND  
("service quality") AND ("*commerce" OR "*shopping") AND  
("criteri*" OR "dimension" OR "measure*")
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After performing a one-way forward- and backward search, a sample of 34 papers remained, which yields insights on the determinants and dimensions of Electronic Service Quality (ESQ), Mobile Service Quality (MSQ), and MASQ in the B2C area.

### 2.2 Research Model of Mobile App Service Quality

Figure 1 shows the multidimensional, hierarchical research model of MASQ, adapted from [22]. Synthesized from the identified literature sample, the model comprises the dimensions of SQ, which apply to the case of shopping companion apps.



**Figure 1.** Multidimensional Hierarchical Research Model of MASQ, adapted from [22]

The shaded dimensions are either added to or reframed from the initial model by [22], based on the literature synthesis and initial results of the QCA. The example of the reliability dimension can illustrate this adaptation. Initially, this dimension focuses on the reliability of delivery and fulfillment processes [34, 35], which are out-of-scope for shopping companion apps that are used primarily in-store. Reliability in the online customer reviews is often related to technical malfunctions and service dropouts. Hence, this dimension is subsequently denoted as technical reliability. In line with previous hierarchical models [36, 37], the MASQ is comprised of three secondary dimensions, which themselves are comprised by primary dimensions.

The research model in Figure 1 is used as the theoretical lens to analyze and structure the qualitative data in the subsequent QCA. Following the QCA terminology [29], the primary dimensions make up the *content categories*. To allow for a fine-grained analysis, these content categories are further detailed into 22 *characteristics*. Table 2 provides the content categories and characteristics related to MASQ, which have been derived from the literature review.

### 3 Research Approach

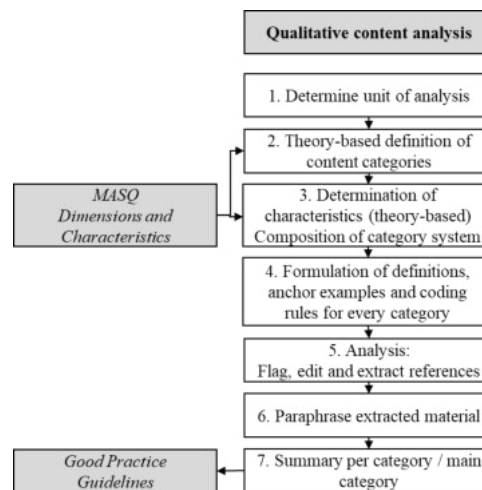
We analyzed customer reviews of three major, shopping companion apps by Walmart (US), Tesco (UK), and Marks & Spencer (M&S) (UK) to elicit customers' preferences for shopping companion apps. Although the selected retailers trade internationally, the apps under consideration are tailored to their respective home countries of operation. We sampled these apps because they are on the market for more than three years, they address a significant proportion of people in their countries of operation, and a vast number of online reviews make these three apps the subject of discussion. Further, these retailers have a long history in BaM operations. Additionally, we focused on grocery retail as industry because these retailers offer a broad spectrum of product categories, and thus, are potentially relevant for the majority of the population, compared to specialist shops that only address a certain focus group. Electronic customer reviews as a form of electronic word-of-mouth are a valuable source for indicating the quality of apps including the users' personal opinions, bug reports, and desired features [38]. We employ the QCA [29] as research design and make use of the methods presented in [39] and [40] to extract and prepare the review sample. The QCA approach is frequently applied to extract information from user-generated content such as reviews [41, 42].

**Table 2.** Content Categories and Characteristics related to Mobile App Service Quality

<b>Dimension</b>	<b>Description</b>	<b>Support</b>
<b>Interaction quality</b>	“Reflects all the quality characteristics of a customer’s interaction with the [...] service provider.” [22, p.942]	[22, 36, 37]
Responsiveness	The retailer’s ability to promptly and politely solve a customer’s issues related with the mobile app. <b>RES1:</b> Customer service availability <b>RES2:</b> Problem solving ability <b>RES3:</b> Politeness and kindness of personnel <b>RES4:</b> Guidance and instructions for app usage	[21, 35, 43–45]
Information	“The provision of accurate and precise information” by the retailer. <b>INF1:</b> Information adequacy <b>INF2:</b> Information usefulness <b>INF3:</b> Information correctness	[22, p.943] [22, 34, 35, 46–48]
Security and Privacy	“The protection of system and network resources from any external or internal attack and the protection of users’ personal data.” [22, p.943] <b>SEC1:</b> Information security <b>SEC2:</b> Data protection <b>SEC3:</b> Data collection	[21, 22, 35, 44, 45, 48]
<b>Environment quality</b>	Reflects “the context in which [mobile apps] are delivered, [and] quality characteristics of the equipment” that affect the delivery of the mobile apps. [22, p.942]	[22, 36, 37]
Design	The aesthetics, features, and layout of the user interface. <b>DES1:</b> Visual aesthetics and clarity of layout <b>DES2:</b> Quality of multimedia content <b>DES3:</b> Ease of use and ease of navigation <b>DES4:</b> Search function and filters	[21, 22, 34, 35, 45, 46, 48]
Performance	The performance of the mobile app and its resource requirements. <b>PERF1:</b> Processing speed <b>PERF2:</b> Device storage usage and mobile network usage <b>PERF3:</b> Network connection quality	[21–23, 34, 46, 49]
<b>Outcome quality</b>	Reflects the technical quality of and the customer’s satisfaction with the service delivery. [22, 36, 37]	[22, 36, 37]
Technical reliability	The accurate and consistent operation of the mobile app. <b>REL1:</b> Mobile app reliability <b>REL2:</b> Availability of provided services <b>REL3:</b> Continuous operation after updating	[22, 23, 45, 46, 48, 50]
Valence	The customer’s ex-post impression of the service delivery. <b>VAL1:</b> Overall satisfaction with the provided service <b>VAL2:</b> Satisfaction with the scope of provided services	[22, 43, 46, 47, 51, 52]

Following Pagano and Maalej [39], we first extracted review data from Apple’s App Store and Google’s Play Store using a paid version of the online service *heedzy.com* on 2017-07-03. The raw data contains information on the app name, date, title, and content of the review, the nickname of the customer who created the review, the rating that is provided, and the app version. 10,099 reviews have been extracted in total. This number comprises 6,048 reviews for the Walmart app (1,084 iOS / 4,964 Android), 3,389 reviews for the M&S app (818 iOS / 2,571 Android), and 662 reviews for the Tesco app, where a technical restriction only allowed us to extract reviews from the Apple App Store. Since mobile apps are frequently updated, we only consider reviews written within the last six months, which leaves 8,237 reviews. The review sample was manually pruned by non-informational reviews such as “*Great app!*” and “*Useless!*”.

Customer reviews in foreign languages and reviews concerning the retailer’s general assortment, delivery quality, and price politics were excluded, which leaves a final sample of 1,448 reviews (795 Walmart, 433 M&S, 220 Tesco) for further investigation.



**Figure 2.** Research Approach, adapted from [29, 33]

Figure 2 shows the QCA process based on its content structuring approach, which supports the deductive assignment of reviews to content categories [29]. The review corpus containing the users’ expectations and suggestions was grouped and analyzed for each content category. Anchor examples are used as references to illustrate the elicitation of customer preferences. Since online customer reviews usually contain more than one aspect [39], reviews were sub-classified regarding the characteristics, which results in 1,307 codings. We used *QCAnap.org* to aid the coding process [29].

## 4 Results

### 4.1 Relevance of MASQ Dimensions

We assigned the customers' statements to the content categories and characteristics, which allows weighting the relevance of the MASQ dimensions. Table 3 provides the distribution of customer review codings. The amount of codings per characteristic varies between five and 298. In effect, customers emphasize some of the dimensions and characteristics with higher importance than others. For example, *ease of use and ease of navigation* (DES3) as a part of the *design* dimension seems to be more important than attentive customer service (RES3) as a part of the *responsiveness* dimension. Regardless of the provided functionality, customers expect fast response times (PERF1) and reliable service (REL1) and use the review function of the app stores as an outlet to complain when issues arise.

**Table 3.** Frequency of Characteristics Mentioned in the Online Customer Reviews

Content Category	$\Sigma$	Mentions per Characteristic			
Responsiveness	93	RES1: 27	RES2: 52	RES3: 5	RES4: 9
Information	103	INF1: 29	INF2: 28	INF3: 46	
Security and Privacy	67	SEC1: 35	SEC2: 16	SEC3: 16	
Design	452	DES1: 38	DES2: 20	DES3: 298	DES4: 96
Performance	140	PERF1: 119	PERF2: 10	PERF3: 11	
Technical Reliability	394	REL1: 312	REL2: 19	REL3: 63	
Valence	59	VAL1: 45	VAL2: 13		

### 4.2 Customer Preferences Regarding Shopping Companion Apps

The three shopping companion apps under review provide a similar range of functions: Access to the particular online shop, click & collect, store finder, in-store inventory checking, aisle locator, promotions, loyalty programs, and product scanning. In the following, we focus on the non-functional aspects of app and service delivery. From the review corpus, we found rich hints what customers expect from shopping companion apps and identified 23 aspects that retailers could pick up to improve their m-service offerings. Table 4 lists the aspects, which we have structured by the primary dimensions of the MASQ model (Figure 1).

Customers voiced some preferences that are specific to the context of shopping companion apps. For example, because shopping companion apps enhance the physical servicescape of the store with digital service, customer service should be able to support both the retailer's m-service and issues that arise in-store. Nevertheless, trained customer service—of course—is also relevant to any other m-service. We highlighted the aspects that include such peculiarities regarding shopping companion apps in boldface. However, to provide a complete picture of the customers' preferences, we also include more general aspects in Table 4, which may fit other types m-service too.

**Table 4.** Customer Preferences for Shopping Companion Apps

# Aspect	Description
<b>Responsiveness</b>	
01 <b>Trained customer service</b>	Customer service should be able to assist the customers knowledgeably and politely with any inquiries related to the retailer’s mobile services, app functionality, and in-store issues.
02 <b>In-app guidance</b>	The app should include an onboarding process to introduce the retailer’s range of provided m-service offerings and should provide a help section with usage instructions.
03 <b>Omnichannel customer service</b>	Customer service should be available through all channels the retailer offers and provide personalized service to customers independently of the selected channel.
04 In-app customer service	The app should provide direct access to customer service (e.g., by text, voice or video chat) and display easy to find contact information.
05 Responsive customer service	Customer service should respond timely to customer requests, even during times of high request volumes.
<b>Information</b>	
06 <b>Real-time information</b>	Any information shown in the app (e.g., prices, stock information) should be up-to-date, correct, complete, and consistent to information provided by the retailer through other channels.
07 Adequate and clear information	Any information shown in the app should be provided to the customer in a relevant, clear, and intelligible manner.
08 Update descriptions	Customers should receive detailed update and release notes.
<b>Security and Privacy</b>	
09 Request permissions	The customer’s personal and payment data should be collected, stored, and processed only after permission for the particular purpose is granted.
10 Restrict permissions	Permissions should only be requested when they are required and appropriate for the app’s provided set of functions.
<b>Design</b>	
11 <b>Limit advertisements</b>	Although customers expect to receive offers through shopping companion apps, advertisements should be used with moderation and not distract users from fulfilling their current objective.
12 <b>Accurate product search</b>	The app should include a product search engine that returns adequate results, which may also take the customer’s current in-store context into account.
13 <b>Convenient product filters</b>	The app should provide filters to ease digital and physical information and product search processes.
14 High-quality multimedia content	Multimedia content such as product images and videos should be in high-quality and fit to the screen resolution.
15 Clear design and intuitive layout	The app should have a clean and simple design that fosters its Intuitive use.



#	Aspect	Description
16	Short navigation paths	All functions of the app should be easily accessible and not deeply nested.
<b>Performance</b>		
17	Technical responsiveness	The app should start up quickly and react fast to the customer's interactions.
18	Reasonable resource utilization	The app should have a small footprint regarding app and update sizes, local storage occupancy, and (mobile) network traffic.
19	Reduced background activity	The app should keep background activities to a minimum to limit battery drain.
<b>Technical Reliability</b>		
20	Reliable operations	The app should provide its service reliably without crashes or service outages.
21	Sustainable updates	Updates should be non-breaking and sustain existing functions.
<b>Valence</b>		
22	Scope of features and services	A single app should incorporate all m-service offerings that the retailer provides.
23	Continuous improvement	The retailer should use a continuous improvement process to react to ever-changing customer expectations.

Customer reviews frequently contain experiences on service encounters with the service provider. Customer service representatives constitute a direct personal contact within the otherwise human-to-machine context of shopping companion apps. Customers expect service personnel that will respond in a timely fashion when they require assistance, is reachable through the channel of their choice, and can quickly, professional, and politely resolve their issues. We found that customers, among other things, complain about a lack of contact channels and unavailable representatives (“*No one to call no one to email*”), and the quality of employee training (“*The employees are clueless on how to even help you*”). However, they also mention positive service experiences (“*Had problem just called and they had it fixed in 2 mins thanks*”).

Especially for shopping companion apps whose information is changing at a fast pace (offers, stock information), users expect correct, current, and complete data that is relevant to their situation (“*Used every day to keep updated with offers and developments*”). Incorrect or useless information discourages users (“*If someone is using the app and looking for the store nearest to them, why would you have a distribution center come up as the closest store and then direct people there?*”) and can result in lost sales.

Regarding the app itself, customers expect guidance on the use of the app (“*Can't find instructions on how to use, and there are features that are not all that intuitive*”) and want to be informed of changes introduced by app updates (“*When YOU update your app, you need to specify what changed - features, bug fixes, etc. BS like WE MADE IT BETTER is not an update description*”).

Similarly, the retailer has to be transparent on the collection and processing of personal data so that customers gain trust and grant the requested permissions (“*Major*

*privacy concern I just used the app to make a purchase. Without my knowledge or permission, it stored my credit card information.”*). In effect, permissions and data should only be requested when they are required for the proper provision of the app’s service and features (“*Unwarranted permissions - why does it need access to WiFi info, media files and photos, contacts - no, really M&S, and no explanation*”).

Design and usability are the most frequently reviewed aspects in our sample (see Table 3). While app designers receive numerous hints of varying relevance from the reviews, we suggest executing a structured usability assessment [53]. Users particularly name aspects such as a clean and simple design (“*Good size text and clear with suitably neutral colours which are pleasing to the eye*”), intuitive navigation (“*The app is far quicker & easier to use than the website*”), high-quality multimedia content (“*doesn’t get 5 stars because of the ui and graphics. Low resolution or not optimized for retina screens*”), a reliable search engine, and filtering functions (“*Why doesn’t this app allow me to sort my results? Like price high - low?*”).

Customers expect well-performing apps (“*Opening app takes a long time*”), which make reasonable use of cellular data (“*Too data intensive. [...] it is taking FOREVER to load [...]*”), on-device storage (“*With storage space at a premium on my phone, I am seriously reconsidering the necessity of having this app*”), and background processing activities (“*It is active in the background to such a degree that it is a constant drain on my battery*”). Although the preferences regarding technical reliability seem obvious and should be taken for granted, customers reported a significant amount of technical issues for the apps under consideration. App developers need to make sure that the range of offered m-services and features is functioning correctly without bugs (“*NullPointerException when trying to add anything to the basket*”) and continues to work after updating (“*Still can’t use scanner...every since November 2016 update*”).

The valence dimensions subsume the subjective feelings and perceptions customers have after using the retailer’s m-service. We suggest to regularly assess the customers’ feelings towards the app, e.g., by using an in-app survey mechanism to identify the individual pain points. Lastly, the apps under review apply two different strategies. Either, all customer-facing m-service offerings of the retailer are bundled in a single app, or there are multiple apps that all fulfill a single purpose. A frequently named ex post evaluation was not to spread features across multiple apps but to follow the first strategy (“*You have so many apps doing different things! [...] Link them for easy use*”).

## **5 Discussion**

Informed by extant SQ knowledge and real-world customer reviews of three major shopping companion apps, we provide a set of 23 aspects customer expect from shopping companion apps, structured by a multidimensional hierarchical model on MASQ. Nevertheless, fulfilling these aspects is not a *sufficient* condition for high MASQ *per se*, although they are based on the individual customers’ written expectations and perceptions. As with most design decisions, there is no one-size-fits all approach since customers may have different or even contradicting expectations of the same service. Nevertheless, the derived preferences provide a good picture of what

the majority of customers desire with regards to shopping companion apps. While these aspects can aid app developers and support quality-driven app design, their implementation might be difficult. Inherent with using customer reviews as data source, we draw from customers' wishful thinking that may conflict with the retailers' economic and business capabilities.

Since the earliest conceptions of SQ, most models are based on the disconfirmation paradigm [18], which states that quality is the result of the comparison between perceived and expected performance [17]. However, a small difference in performance as the indicator for high SQ is subject to critique by some scholars [e.g., 54]. Following the conceptualization, high SQ is achieved as long as the customer's expectations are met or exceeded, even though these expectations might be meager. In our understanding, the SQ is high when the expectations of a large majority of customers are exceeded. Suppose we have a large sample, outliers having particularly low respective particularly high expectations rule themselves out. Consequently, we used a large sample of 1,448 customer reviews to capture a representative set of customer expectations. On a further note, we confirm Knotte et al's [40] observation that users' perceptions and evaluations strongly depend on their current situations and previous experiences with other apps, which are taken as a reference point for comparisons.

The elicited customer preferences constitute a snapshot in time that reflects current customers' perceptions and foci. Over time, these foci may change as new technologies and services evolve. For this reason and the subjective nature of SQ, we did not state explicit design guidelines that retailers have to implement to achieve high MASQ.

As with any research, our work comes with some limitations. First, our results may be prone to selection bias because the same set of researchers performed the derivation of content categories and characteristics related to MASQ as well as the subsequent coding of the online customer reviews.

Second, we did not take into account the specific Graphical User Interface (GUI) components and structures defined by the different mobile operating systems. These design conditions may influence both the customers' service expectation prior to the app usage, and their perception when interacting with the shopping companion apps on a smartphone. However, the scope of and interface to the provided functionality of the samples apps only slightly differed between Apple iOS and Google Android.

Third, the sampled apps all focus on grocery retail, which may constrain the generalizability of the derived customer preferences for shopping companion apps that focus on other retail industries such as apparel or sporting goods to some extent.

Fourth, there are inherent limitations when dealing with online customer reviews in general and reviews of mobile apps in particular. As customers can post online reviews anonymously [39], no customer information is available on the analyzed set of reviews. Consequently, we cannot make a detailed statement whether our sample is representative. Further, within the corpus of seemingly authentic online customer reviews published by real customers, there can be spam and misleading reviews [55]. Due to the anonymity of reviewers, we cannot rule out *manipulation* by developers and app providers to praise their product. We have no means to identify fake reviews. However, these reviews usually tend to praise or condemn the app under review without going into detail. Since we are only interested in information on the service delivery,

we can quickly discard non-informational reviews such as “Useless rubbish!”—being a fake review or not.

Moreover, the majority of customers only posts a single review, but a small number of customer rates a mobile app several times (up to nine times in our sample). By using the app over a longer period, users become familiar and might identify further aspects worth reviewing. Therefore, we kept those reviews in the corpus. Admittedly, the number of reviews per customers has to be treated carefully because a single customer also can write reviews using multiple nicknames, which biases results in small samples.

Customers tend to report remarkably satisfying or dissatisfying aspects involving exaggerations and generalizations when reviewing products and services [55]. Although we use single anchor examples for clarification, our preferences abstract from single reviews and always summarize the judgments of many customers, in line with [29], so that single exaggerations do not bias our analysis.

We collected the most current 10,099 online customer reviews of the three shopping companion apps across a time span of six months. During this period, the apps have received multiple updates. For simplification, we did not include version numbers in the QCA. Thus, comparisons across app versions are not possible, and changes in the perceived MASQ cannot be traced back to new app releases.

Lastly, the manual coding process follows a strict procedure [29]. However, it may be biased by personal opinions and subjective evaluations. A fully automated process for the QCA, ranging from the extraction of online customer reviews from the app stores to summarizing the results per category using advanced text mining tools or cluster analyses could help to alleviate this issue. Nevertheless, a manual process seems appropriate in the context of subjective online customer reviews that may contain ironic and ambiguous statements, which are hard to identify for automated tools [39, 55].

## **6 Conclusion and Outlook**

M-commerce is a significant growth area for retailers, and mobile shopping companion apps are an emerging phenomenon that has not found much attention in academia so far. To remedy this situation and set the field, this paper first introduced a working definition for shopping companion apps. We built upon kernel theory from SQ and introduced a multidimensional, hierarchical research model of MASQ that comprises the content categories and characteristics relevant to service delivered through mobile apps. From analyzing close to 1,500 real-world customer reviews of three major shopping companion apps, we identified 23 aspects customer expect from this kind of app. Our results can aid service and app designers towards providing mobile service and shopping companion apps that exhibit high MASQ.

We investigated shopping companion apps from a customer’s point-of-view. In future work, we will assess the overall service system that spans between retailers and customers and between groups of customers. Special consideration will be put on the interactions between the involved parties and on the co-creation of shopping experiences that are facilitated by m-services and apps. Finally, we follow the dual mission of design science to advance theory while developing and evaluating

innovative IT artifacts for practice. The customer preferences elicited in this work will inform our overarching design science research project on m-service in BaM retail.

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