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The relative impact of QR codes on omnichannel customer experience and purchase intention

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Abstract

This study explores the relative impact of quick response (QR) codes in an omnichannel customer situation. A conjoint experiment was conducted where participants (n=53) assigned scores to stimuli cards according to experience and purchase intention in a shopping scenario. The main finding from the conjoint analysis showed that creating a positive experience does not necessarily require highly digitalized and personalized QR-code information and features. However, a balance is needed as it was discovered that the opposite was evident for purchase intention. Retailers and researchers must therefore be aware that there might be differences in what type of QR-code information and features create experiential value and what triggers purchase intention. These findings highlight the complexities of the customer experience (CX) and suggest that it is important to carefully consider the purpose for which QR codes are implemented.

Keywords: QR-codes; omnichannel; experiential value; purchase intention; conjoint study.

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1. Introduction

The initial adoption of quick response (QR) codes in retailing was quite slow [1–3]. Consequently, research on QR code predominantly focused on identifying factors influencing consumer usage. Most of this research originated prior to the pandemic and often approached QR-code research from a broad marketing or advertisement perspective [e.g., 2, 4, 5–9], used ambiguous marketing-retail environments [e.g., 10, 11–13], examined food traceability and grocery retailing [e.g., 3, 14, 15], or from a mobile payment context [e.g., 16]. To our knowledge, only two studies address in-store QR codes [e.g., 17, 18]; however, the context is either unspecified or related to home decor and fashion. Moreover, the more recent post-pandemic literature centers around QR codes in mobile payment solutions [e.g., 19, 20]. Digital touchpoints in the customer journey (like QR codes) are introduced to improve omnichannel experience [21]. Very few studies address QR codes solely as in-store digital touchpoints, the current revival of the QR codes, or QR codes in the context of high-involvement products such as consumer electronics. Up-to-date research is therefore required about QR codes and why consumers are motivated to interact with them or even possibly resist them. Thus, this study aims to fill this gap by investigating the impact of QR codes on the omnichannel customer experience and purchase intention. The following research questions guide this study: What QR-code information and features provide value and influence the omnichannel customer experience and purchase intention in consumer electronics settings?

2. Theoretical framework

QR codes are unique in their ability to deliver diverse digital content and features [13]. Like online platforms, QR codes can offer an endless variation of product information, ranging from customer reviews to product availability to prices and promotional offers [22]. QR codes can be used to employ a dynamic pricing strategy by promoting a limited-time scarcity message in which the retailer presents an offer or a price to the consumers that is available only for a short predefined period [23]. This strategy can positively influence consumer choice as scarcity messages induce arousal and lead to reactance [24]. Digital features such as wish lists and basket functions can be attached to QR codes. Wish lists can enable consumers to curate and consider potential items for purchase, supporting them during the evaluation stage [25]. Furthermore, buy-online-pick-up-instore (BOPS) functionality can be implemented. This can show customers the locations at which the items are available and give customers the option to purchase directly through the QR code and then pick it up in a physical store shortly after [26]. QR codes can also assist customers in evaluating the different products of interest by comparing product features and prices in store in an accessible and efficient way [12, 27, 28].

Sang Ryu and Murdock [13] find that QR codes can be linked to entertainment and informational content to raise consumers' enthusiasm. For example, fashion retailer Macy's uses QR codes to provide consumers with video clips, the latest fashion trends, and essential tips from style icons [13]. Research shows that dynamic messages (e.g., videos), as opposed to static ones (e.g., pictures), create stronger emotional connections, which reduces customers' price sensitivity and enhances consumption of hedonic options [29, 30]. Retailers should, therefore, focus on creating dynamic and interactive experiences as experimental aspects of technologies are argued to enhance the affective dimension and thus have a greater influence on buying behavior [21].

In addition to the need for a more digitalized and integrated shopping journey, consumers are now demanding personalization [28]. The key benefit of the QR code is its distinctive ability to adjust the information embedded in the code without changing the actual code symbol itself, and by that, customize the information to match customers' needs [13]. Thus, QR codes are effective at providing consumers with targeted product information at the right time and place [11]. Personalization efforts can also be attached to pricing, where retailers couple smartphone technology and loyalty card data to reach shoppers with personalized offers in real-time [31]. This can be particularly effective as Albăstroiu and Felea [17] find that consumers scan QR codes with the intention to buy products. Hoyer, Kroschke [32] argues that technologies in which deliver customized information can trigger the cognitive dimension of experiential value. Alexander and Kent [21] also find that personalized technologies enhance consumers' excitement, positively influencing customer experience.

3. Method

Conjoint analysis is a popular marketing research method for analyzing how consumers make trade-offs concerning their preferences and intention to buy "multi-attribute" products and services [33]. "It is based on the simple premise that consumers evaluate the value of an object (real or hypothetical) by combining the separate amounts of value provided by each attribute" [34, p. 34]. Accordingly, respondents are presented with stimulus cards comprising various combinations of product attributes and levels of those attributes that characterize the range of attribute options that they are to judge and rate according to their preference. Thus, conjoint analysis can statistically predict which importance they place on each attribute and the combination of product attributes consumers prefer [35]. Conjoint analysis contains a lot of flexibility; this makes it applicable in almost any area in which decisions are studied [34], including the study of how self-service technology (like QR codes) within retail add value [36]. We thus consider it appropriate to apply to study which QR-code attributes consumers value in their customer experience (CX). Therefore, this study aims to determine the contribution of each attribute and its levels related to experiential, cognitive, and affective value and purchase intention. Moreover, since respondents are presented with hypothetical descriptions, it may be possible to compare predicted behavior with actual behavior [37] and thus further understand consumer preferences regarding QR codes.

3.1. Participants

A total of 53 participants accepted an invitation through social networks and messaging apps to participate in the study. The age of the participants ranged from 1 ≤19, 18 between 20–29, 16 between 30–39, 6 between 40–49, 8 between 50–59, and 5 ≥60 years old. The sample comprised 17 men and 34 women. Nearly all (80.4%) participants had previous experience with QR codes.

3.2. Apparatus

The study was conducted using a verbal description of the scenario the respondents were to consider, along with both verbal and pictorial representations of hypothetical stimulus cards. This combination of information was applied as Holbrook and Moore [38] suggest: Respondents make evaluative judgements based on both verbal and visual cues. Moreover, pictorial material makes respondents' tasks more interesting, conveys information with little ambiguity, and reduces information overload as respondents are not required to read and then visualize large quantities of information [33, 37]. Thus, to ensure ecological validity, a smartphone interface depicting QR code attributes was designed in Adobe Photoshop™ 2022. The conjoint analysis was administered using Qualtrics™.

3.3. Procedure

After signing the consent form, the respondents were given a scenario of a specific shopping situation. They were asked to imagine that they were in a physical store of an electronic goods retailer searching for more information about a TV that they were considering. A QR code was attached to the digital price display. A picture of this was shown to create a more realistic representation of the scenario. By scanning the QR code, they would be directed to an online interface where they could access more detailed product information. An example of a stimulus card was shown, highlighting the attributes to be considered, along with questions. The respondents were presented with 20 stimulus cards showing different combinations of the attributes. One stimulus card was shown at a time, and these were randomly presented to minimize order effects [34]. For each card, the respondents were required to answer some questions. In addition, the participants were asked to answer questions related to demographics (age and gender) and their previous experience with QR codes.

3.4. Study design

The attributes chosen for this study were price, reviews, type of information, comparison of products, and call to action. These attributes are analogous to those identified by Fagerstrøm and Eriksson [36] in the context of retail

mobile applications. Thus, they are considered suitable as product information and evaluation sources and represent attributes that can be updated, aggregated, and personalized by digital technology [36]. These attributes are measured on levels that range from low to high digital information and product evaluation functions (see Table 1).

Table 1. Attributes and levels considered in the study.

Attribute	Levels
Price	1. Static price 2. Scarcity message 3. Personalized price
Review	1. Customer reviews 2. Personalized reviews
Type of product information	1. Verbal information 2. Video content 3. Product testing
Call to action	1. Add to wish list 2. Buy now and ship home 3. Store availability
Comparison of product	1. Similar products 2. Scan and compare

Price was operationalized at three levels: static price (e.g., regular price), scarcity message (e.g., time-limited offer), and personalized price (e.g., offer based on purchase history). Reviews were operationalized at two levels: customer reviews and personalized reviews (e.g., a feature currently used by digital retailers such as Amazon and is essentially a search function that enables consumers to search through customer reviews, frequently asked questions, and product information for a particular product to find answers related to their needs). Product information was operationalized at three levels: verbal product information, video content, and product testing (e.g., a feature used by the retailer in this study whereby consumers can test different product functions by scanning a QR code). The call to action feature was operationalized at three levels; add to wish list, buy now and ship home, and store availability (these levels are all part of various omnichannel strategies). The comparison feature was operationalized at two levels: similar products and scan and compare (e.g., a feature used by the retailer in this study whereby consumers can scan different QR codes on price displays to compare them side by side).

For data collection, a full-profile method was applied; this works well when five attributes are under consideration [39] and when participants see a complete set of full-profile situations [33]. However, if the current study were to array all possible combinations of the five attributes (3x2x3x3x2), it would result in 108 stimulus cards. Rather, it is recommended to implement the full-profile method by fractional factorial design. This is the experimental design in which the total number of situations is reduced to an orthogonal main-effects model with a manageable size of test combinations, whereby the independent contribution of all five attributes is balanced [37, 40]. Albeit complex, it involves fewer judgements to be made by the respondents [37]. Thus, using IBM™ SPSS™ statistics 27, a fractional factorial design resulted in 20 stimulus cards, including four holdout cards. Holdout cards were not used in the estimation of the part-worth; instead, part-worth were used to predict preference for the holdout cards to assess validity and reliability of the original part-worth estimates [34].

According to Green and Wind [40], preference and likelihood of purchase are often used as measures; however, any explicit judgmental criterion can be used. Thus, the dependent variables were defined as the degree to which the respondents derive, experiential, cognitive, and affective value from the attribute levels as well as purchase intention. One-item scales were adopted from Bustamante and Rubio [41] to measure experiential cognitive and affective value. The item for cognitive read: the retail environment offered by this QR-code inspires me. The item for affective read: the retail environment offered by this QR code makes me feel enthusiastic. A one-item purchase intention was also included: I intend to purchase the product based on the product information and evaluation functions provided. Green and Srinivasan [37] assert that a full-profile method can employ a seven-point scale. Thus, to keep consistent with the survey study, the dependent variables were measured on a seven-point Likert scale ranging from strongly agree to

strongly disagree. Rating scales are often considered less time-consuming as well as convenient for respondents while easy to analyze [42].

3.5. Data analysis

A discrete effect model with a score subcommand was applied to assess the relationship between the levels and to apply a rate preference measure. Due to the explorative nature of the study, the attributes were considered categorical, and the relationship to be part-worth form so that a separate estimate of each level was possible. These estimates in turn determine how influential each level is in the consumers' evaluations [40].

4. Results

The analyses of the data shows that correlations between observed and estimated preference were significant; cognitive value (r=0.93, p=<.001), affective value (r=0.88, p= <.001), and purchase intention (r=0.87, p=<.001). Table 2 shows the impact estimate for each attribute level on the dependent variables.

Table 2. The impact of attributes and levels on experiential value and purchase intention for all participants (n=53).

Attributes and levels	Experiential value				Purchase intention	
	Cognitive		Affective			
	Impact estimate	Std. error	Impact estimate	Std. error	Impact estimate	Std. error
Price						
1. Static price	0.108	0.042	0.127	0.061	0.054	0.052
2. Scarcity message	0.056	0.050	0.049	0.072	0.091	0.060
3. Personalized price	-0.164	0.050	-0.172	0.072	-0.145	0.060
Review						
1. Customer reviews	-0.162	0.032	-0.167	0.046	-0.124	0.039
2. Personalized reviews	0.162	0.032	0.167	0.046	0.124	0.039
Type of product information						
1. Verbal information	0.075	0.042	0.075	0.061	0.031	0.052
2. Video content	-0.040	0.050	-0.018	0.072	-0.077	0.060
3. Product testing	-0.035	0.050	-0.057	0.072	-0.046	0.060
Call to action						
1. Add to wish list	0.016	0.042	0.065	0.061	0.018	0.052
2. Buy now and ship home	-0.045	0.050	-0.040	0.072	-0.100	0.060
3. Store availability	0.029	0.050	-0.025	0.072	0.082	0.060
Comparison of product						
1. Similar products	0.012	0.032	0.017	0.046	-0.013	0.039
2. Scan and compare	-0.012	0.032	-0.017	0.046	0.013	0.039
Constant	3.578	0.037	3.632	0.053	3.245	0.045

For cognitive value, personalized reviews (0.162), static price (0.108), verbal information (0.075), store availability (0.029), and similar products (0.12) were most preferred among the respondents. For affective value, personalized reviews (0.167), static price (0.127), verbal information (0.075), add to wish list (0.65), and similar products (0.17) were most preferred. For purchase intention, personalized reviews (0.124), scarcity message (0.091), store availability (0.082), product testing (0.46), and scan and compare (0.013) were most preferred.

5. Discussion

The aim of this study was to investigate which QR-code information and features provide the most experiential value and influence purchase intentions in consumer choice settings. In doing so, relevant product information and

evaluation attributes and the relationship between them were tested using conjoint analysis. Accordingly, we assumed that there would be a higher preference for more digitalized and personalized attributes across the three dependent variables. The results indicate that less digitalized and personalized information and features triggered experiential value, and the opposite held for purchase intention.

Personalized reviews indication provided the strongest impact on experiential, cognitive, and affective value. This is interesting; it is not a feature specifically mentioned in the QR-code or shopper-facing technology research but was sought after among the respondents. Conceptually, it makes sense that this provides cognitive value. Not only do consumers expect timely and personalized information [43], but Bustamante and Rubio [41] find that cognitive value is created when triggers encourage content creation that is meaningful to the consumers. Irrelevant information may therefore produce inaccurate mental representations and hinder such creative processing. This may be particularly pressing when purchasing consumer electronics, where the risk of purchasing the wrong product may be high [44]. This is consistent with Hoyer and Kroschke [32] in that customized information provides better decision-making that matches consumer preferences.

Static price was the second strongest attribute level indicated to impact experiential, cognitive, and affective value. Consumers expect personalized and curated experiences [22, 28]. Mosquera and Pascual [45] also suggest special offers and promotions may enhance the experience. Yet a rational reason for why the respondents indicated a preference for a static price is that channel integration is a fundamental aspect of the omnichannel CX. Channel integration involves price consistency, which Zhang and Ren [46] emphasize is important for consumers to enjoy the same preferential in any channel and thus avoid confusion and develop consistent evaluations. This infers that dynamic and personalized pricing may hinder creative processing. Moreover, being faced with different prices in different channels, such as dynamic pricing strategies, can create feelings of frustration rather than positive feelings and attachment [36, 47, 48].

Verbal information was the third strongest attribute level indicated to impact experiential, cognitive, and affective value. A reason for this is that it enables customers to process the information more conveniently and efficiently, supporting the overall thought process and, by that, creating cognitive value. More advanced technologies may demand more from the consumers when they a merely seeking additional information and experiencing the product's core benefits. As such, these technologies (e.g., video content and product testing) might disrupt the thought process and negatively influence benefit convenience [49]. In terms of affective value, the results contradict previous research suggesting dynamic messages, instead of static ones, create stronger emotional connections. Video content and entertainment have been found to raise consumer enthusiasm [11, 13]. Yet, product testing, which may be more experimental, indicated a negative impact. However, Alexander and Kent [21] found that despite the enthusiasm that customers may show toward experimental technologies, they are minimally used. This may suggest that unfamiliarity with the more digitalized features and their benefits can suggest that customers' preferences can be influenced.

Across the call to action attribute, the store availability level was indicated to have the strongest positive impact on cognitive value. Thus, product availability is important during information search and evaluation. This is supported by Herhausen and Binder [50], who find that consumers prefer retailers that offer channel integration and deliver consistent information across different channels. Moreover, in line with Zhang and Ren [46], we suggest that consumers gain some level of control and empowerment by having access to product availability across all channels, which in turn can contribute to meaningful evaluations. Also, as QR codes make product availability information more accessible, store visitors can save the time and effort of asking sales advisors or searching for this information on their own. For affective value, add to wish list showed the strongest positive impact. Wish list functions have been identified in the literature as a way for customers to collate, curate, and consider potential items for purchase. Although Lynch and Barnes [25] emphasize that it may not lead to a purchase, consumers can benefit from this tool by saving their favorites and coming back later to consider different options.

Several findings can be discussed regarding purchase intention, particularly concerning the complexities of the omnichannel CX. For instance, the results indicate that the more digitalized and personalized the QR codes, the stronger the purchase intention. This is consistent with Fagerstrøm and Eriksson [36], who found mobile apps with digital information provided more value in grocery retailing than apps with standard information. However, this contrasts our findings for experiential value; what evoked cognitive and affective value is not the same as what induced purchase intention. Hoyer and Kroschke [32] emphasize that not all types of experiences are important to technological impact, suggesting that some attribute levels may be more suitable for evoking purchase intention than experiential

value. Yet, it presents a peculiar trade-off; does this suggest that purchase intention comes at the expense of experiential value? As mentioned, consumers preferred static price in terms of experiential value, but for purchase intention, they preferred scarcity message above static price. Does this imply consumers are willing to accept potential price unfairness and aversion in favor of a better price? If so, what impact does this have on the overall CX? The study respondents did not prefer personalized price, which suggests they are unwilling to accept just about anything, particularly intrusive technology that may threaten privacy. Since this was an explorative study, future research can build on and provide more in-depth answers to such questions. In addition, we study only two dimensions of experiential value. Future research can study other dimensions and use different measures to test the findings of this study further.

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