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# CUSTOMERS' QR CODE USAGE BARRIERS IN A BRICK-AND-MORTAR STORE: A QUALITATIVE STUDY

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The purpose of this study is to explore the factors that hinder customers from utilizing QR codes when they visit brick-and-mortar (B&M) stores. The research was conducted at a Finnish fashion retailer, where three types of QR codes were displayed for customers to use. In order to identify the barriers that customers face, two different sets of data were collected and analyzed: open-ended survey data (n = 101) and interview data (n = 16). The findings showed two main categories of barriers, customer and company related, with seven sub-barriers. The customer-related barriers included lack of interest in QR codes, user-related usage issues, desire for a device-free B&M store, and dislike toward QR codes. The company-related barriers included unnoticeable QR codes in the B&M store, service personnel in the B&M store, and QR code-related technical problems.

## Keywords:

QR codes, omnichannel, channel, retail, customer perspective, commerce, QR code barriers, usage barrier, brick-and-mortar store, B&M, Finland



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## 1 Introduction

The customer journey is going through a digital transformation (Zimmermann, 2016), and due to the change from a multichannel to omnichannel environment, the digital and physical worlds are evolving into an single entity instead of being separate channels. Physical channels, such as brick-and-mortar (B&M) stores, include digital elements, such as electronic displays (Roggeveen et al., 2016) and quick response (QR) codes (Tiwari, 2016) to name a few. QR codes are becoming more and more common, as they allow for easy and quick access to value via a smartphone. Thus, QR codes are a way to guide customers to engage with the digital world as part of their shopping experience in a B&M store, but customers are not utilizing this opportunity (Lau et al., 2022).

Previous research on customers' QR code usage has focused on QR codes' visual appearance (Gao et al., 2015; Tsai & Peng, 2023); acceptance (Kim & Woo, 2016); use alongside with mobile trust and technology acceptance in omnichannel (Lawry & Choi, 2013); perceptions of codes on milk packages (Lau et al., 2022); impact on customer satisfaction and purchase intention (Hossain et al., 2018); customer experience (Shin et al., 2012); and print advertisements with codes (Trivedi et al., 2019). Even though QR codes have been investigated from multiple perspectives, there is a gap in our understanding of why customers do not use QR codes in B&M stores. This knowledge may help companies to understand the customers' perspective and make strategic decisions when implementing QR codes as a source of value in B&M stores to enable omnichannel shopping. Hence, this study focuses on identifying the barriers that prevent customers from using QR codes while shopping in B&M stores. The research was conducted at a Finnish fashion retailer, where three types of QR codes were displayed for customers to use. To gather information about the challenges that customers face when using QR codes, we collected and analyzed two sets of data: open-ended survey data ( $n = 101$ ) and interview data ( $n = 16$ ).

## **2 Literature Review**

A QR code is a two-dimensional matrix code which enables high-speed decoding via a smartphone's built-in camera. It was developed in 1994 by Denso Wave (a Toyota subsidiary) to track vehicle parts, and it has been implemented in marketing campaigns since 2011 (Tiwari, 2016). Ever since, QR codes have been a way for customers to navigate to the desired digital end point.

The visual appeal of QR codes has been noted as a usage barrier, as Gao et al. (2015) criticized that the tedious black-and-white code distracts from the quality of the advertisement. Thus, beautified (Tsai & Peng, 2023), invisible (Gao et al., 2015), stylized aesthetic (Xu et al., 2019), and colorful and decorated QR codes have been invented in an attempt to make the codes more attractive (Lin et al., 2013). In the luxury context, the visual appeal of QR codes was linked to customers' QR code scanning intentions (Lawry & Choi, 2013). Additionally, Singhal and Pavithr (2015) explained that the optimal size of a QR code for scanning should be calculated.

Sometimes, QR codes are not accepted by customers. Shin et al. (2012) studied QR code acceptance and found that while users might have a positive perception toward QR code features, this does not lead to QR code usage because confirmation of what will happen upon scanning the QR code is missing. The major technology acceptance drivers are perceived usefulness, enjoyment, and usability (Pucihar, 2020). Scanning intentions can prevent acceptance of QR codes and lead to their rejection. Lawry and Choi (2013) found that mobile trust was not related to QR code scanning intentions in the luxury retail context and called for experimental studies in real-life retail settings. Oppositely, Liébana-Cabanillas et al. (2015) found that attitude, innovation, and subjective norms were linked with intentions to use QR codes in the future in the context of mobile payment acceptance. Similarly, Kim and Woo (2016) found that customers have a positive intention toward using QR codes as an information tool. Additionally, QR codes have been criticized as unclear and cumbersome from customers' perspectives. Lau et al. (2022) found that in low-cost items (e.g., milk), the 'hassle cost' of scanning many QR codes to get a discount was too much effort. The study found that the perceived value of or trust toward QR codes did not lead to scanning and that the novelty of QR codes resulted in a lack of interest toward them.

Some studies have confirmed QR codes' feasibility. QR code promotions with product information in magazines were found to be motivating for customers (Ertekin & Pelton, 2014). Also, QR codes can be a bridge to move traditional push-based marketing (e.g., print) to a digitalized environment (Trivedi et al., 2019). This idea for using QR codes follows the omnichannel logic by Brynjolfsson et al. (2013), in which digital and physical spaces become one entity instead of channel clutter. Internal and external touchpoints in the customer journey can support each other (Mali et al., 2022; Paananen et al., 2022a; Holkkola, 2022a) with the aim of creating a seamless customer experience (Lemon & Verhoef, 2016). Digital transformation might increase the familiarity of QR codes. A study by Zhong and Moon (2022) found that the COVID-19 pandemic increased the use of contactless services, leading to familiarity with contactless technologies, such as QR codes, which are most likely to continue being used after the pandemic. Additionally, Rotsios et al. (2022) found that QR codes' contents can be entertaining and enriching for customers. The problem lies in QR code scanning barriers, which previous research has failed to address. As there are justified reasons for using QR codes, such as omnichannel operations, it is crucial to understand what prevents the use of QR codes in B&M stores.

### 3 Methodology

To map customers' real-life experiences of QR code usage barriers during a B&M store visit, we put QR codes on display at one of the case company's B&M stores and asked about customers' thoughts on them. The case company was a Finnish fashion retail company and clothing brand. Three different types of QR codes (see Appendix A) were on display from May 2022 to September 2022:

1. The first type of QR code was placed next to a clothing rack that contained the brand ambassador's (long term influencer) favorite items. The QR code led to the ambassador's Instagram post about the company's products.
2. The second type of QR code was placed next to jackets and trousers. The QR code led to the product page of the company's online store.
3. The third type of QR code was placed close to a sale outlet clothing rack, inside the fitting booth, at the checkout, and at the front door. In addition, the salesperson placed a promotional leaflet with the QR code on it in the shopping bag with the purchased items. The QR code led to the survey.

The survey data collection was carried out using both a pen-and-paper survey and an online survey that was implemented with the LimeSurvey service and could be accessed by either entering a web address or scanning a QR code. The survey questionnaires of both the surveys were identical and inquired the customers about their background information, B&M store visit frequency, use of the brand's other channels, customer experience, previous QR code use experience, and QR code usage during the B&M store visit. Those who answered that they had not used a QR code during the B&M store visit were asked why via an open question. After filling out the survey, customers could take part in prize drawing of a €50 gift card and, also, volunteer for an interview to receive an additional reward (a bag valued at €40) and tell their experience in more depth.

The interview data collection was carried out using semi-structured interviews with 16 selected volunteers (see Appendix B): three males and 13 females (referred to as Participants 1–16: P1–P16). The selection criteria were persons who had visited the B&M store between May 2022 and September 2022 while the QR codes were on display (see Appendix C). Data saturation was reached after 16 interviews, when new information was no longer obtained. One test interview was conducted. The interviews were conducted via Microsoft Teams in September 2022 with an average duration of 59 minutes. The participants were asked to describe their shopping experiences when visiting the B&M store, their IT skills, their QR code usage before and during the visit, and their general brand relationship with the company. The order of the interview questions was not strictly defined in advance, which enabled additional questions, following Myers and Newman's (2007) advice for semi-structured interviews. All the interviews were recorded and transcribed. The quotes were translated from Finnish to English.

Inductive coding was selected to process the data (Thomas, 2003). The survey data showed the themes, and the interviews explained them. First, the survey data's open answers to why customers did not use QR codes in the B&M store (i.e., usage barriers) were imported into Microsoft Excel starting with collecting the QR code usage related barriers. Second, after multiple rounds, two main categories were identified: company-related and customer-related QR code usage barriers. Third, after several rounds of examination, seven sub-categories emerged under these two main categories. After careful familiarization with the interview data, we took the seven identified sub-categories from the survey data's open answers and coded the

interview data with these barriers using the ATLAS.ti qualitative analysis software. Finally, seven-sub barriers with the deeper explanations were identified from the interview data.

#### 4 Findings

In total, 101 valid survey responses were obtained. The demographics (gender, age, and socioeconomical status) of respondents (referred to as R1–R101) are reported in Table 1. Most of them were women (74.3%). Many were 30–39 years old (28.7%). The average age was 39.9 years and the standard deviation 14.6 years. The respondents presented varying socioeconomic statuses, but the most of them were employed (72.3%). The respondents were able to pick multiple socioeconomic status choices. All the respondents were from Finland. Almost all answered yes to having previous experience with QR code usage (93.1%).

**Table 1: The survey respondents' demographics (n = 101)**

	n	%		n	%
<b>Gender</b>			<b>Socioeconomic status</b>		
Male	26	25.7	Student	23	22.8
Female	75	74.3	Employed	73	72.3
			Self-employed	5	5.0
<b>Age</b>			Unemployed or unable to work	3	3.0
15–29 years	26	25.7	Stay-at-home parent	1	1.0
30–39 years	29	28.7	Pensioner	7	6.9
40–49 years	20	19.8	<b>Has used QR codes before</b>		
50–59 years	11	10.9	Yes	94	93.1
60+ years	15	14.9	No	6	5.9
			No response	1	1.0

Despite their previous experiences with QR codes, only 11 (10.9%) of the respondents reported using QR codes during their B&M store visit. In contrast, 83 of the respondents (82.2%) did not use the QR codes during the store visit, and seven (6.9%) did not respond to the question. For all respondents who answered that they did not use QR codes while visiting the B&M store, we asked the open question: “Why did you not use QR codes when visiting the B&M store?” Of the 83 non-users, 78 (93.98%) answered this question. The non-users' open answers were

analyzed and divided into two main categories of usage barriers (company and customer related) with seven sub-barriers (see Table 2). These are presented in more detail in Table 2 and expanded upon using insights from the interviews.

Table 2: Themes and open answer counts from the survey

Theme	Count
<b>Customer-related QR code usage barriers</b>	<b>54</b>
Lack of interest in QR codes	32
User-related usage issues	12
Desire for a device-free B&M store	6
Dislike toward QR codes	4
<b>Company-related QR code usage barriers</b>	<b>36</b>
Unnoticeable QR codes in the B&M store	26
Service personnel in the B&M store	8
QR code-related technical problems	2

#### 4.1 Customer-Related QR Code Usage Barriers

**Lack of interest in QR codes.** The lack of interest in QR codes could be seen through the open answer data, appearing as a passive resistance to QR codes. This passive resistance emerged in the form of ignoring QR codes but not directly resenting them. This topic was explained by the survey respondents as, for instance, too tired to use them (R12, R63), no need (R28, R55, R58, R72, R87, R91, R98, R99), or I wasn't buying products right now (R7, R17). The interview data revealed that QR codes were uninteresting for some interviewees because the codes did not seem rewarding or clear enough to be scanned. For example, some interviewees were too confused to get excited about scanning the QR code.

“Well, maybe. I don't know what [value] these QR codes bring for me or why should I read them.”  
(P3)

“I don't know. Maybe those [QR codes] were nothing worth mentioning, so I just saw that there is one and maybe wondered what that was but haven't started to investigate or look into it any further.”  
(P5)



Some interviewees found the design of the QR codes and tags unappealing, describing them as “just black-and-white” (P9) or “just some paper with that QR code” (P6). Also, the QR codes were associated with products that were irrelevant to the interviewees.

“Maybe I wasn’t interested enough because they were not included with products I would buy anyways. So, then, I didn’t see it as relevant.” (P2)

**User-related usage issues.** The data revealed that customers entering the B&M store had varying technical skills and devices, leading to some being unable to utilize the QR codes even if they wanted to, as indicated by the responses “I did not have the application to scan the QR codes” (R43), “lack of Internet” (R25), “lack of skill” (R73), “low battery” (R67), “I did not have a mobile phone with me” (R75), and “unfamiliar” (R92). Problems with the user’s skills or their device’s functionality created barriers to QR code use. In the interviews, however, many interviewees described QR code usage as an “easy thing to do” (P2) and an “everyday thing” (P13) in a technical sense. Most of the interviewees described their general IT skills as advanced. Despite this, some interviewees faced issues when figuring out how to use the QR code scanner.

“I remember that it was like ‘all fingers and thumbs’ moment when you don’t use them every day, like, how does this work.” (P7)

The interviews also revealed that dysfunctional user devices created a barrier to QR code usage. For example, one interviewee’s phone did not have a QR scanner directly in the camera application. Additionally, the QR code scanner application’s flood of ads was distracting to another interviewee.

“These QR code scanners that I have, those have so many ads in them, that there is such a great danger of hitting an ad and then going to the wrong page.” (P9)

**Desire for a device-free B&M store.** The reluctance to adopt QR codes was further justified by the preference for a B&M store to be free of digital devices. One of the survey respondents indicated that “in a B&M store, I want to concentrate on looking and trying out physical products. In a B&M store, I don’t surf on the Internet” (R47). Another survey respondent reported that they just “prefer trying clothes on me instead of looking for inspiration from the Internet” (R70). This did not encourage the use of QR codes since phones were viewed as a distraction and

not part of a B&M shopping moment. These respondents wanted to experience, feel, and touch the products: “products in the B&M store were interesting and nicely on display” (R53). Thus, a barrier was created because some of the respondents did not want to experience products through the phone in the B&M store. This phenomenon of desire for a device-free B&M store was also reported in the interviews because “these products can be enjoyed without any digital aspects” (P12). Some interviewees even left their phone in the car to ensure their device-free shopping moment in the B&M store. They indicated that they would rather experience the store without digital encounters:

“When I saw those [QR codes], I thought, “Is this necessary, when I come here to the B&M store?”.... I don't want to dig out my phone. Often my phone might be left in the car, and it isn't always accompanying me. Then you don't assume that you need it there, and then you hope that you can reach the information in the store without using digital devices. There is a webstore etc. when you can use technology.” (P12)

**Dislike toward QR codes.** Disliking QR codes emerging as active resistance to QR codes, which means direct resentment towards QR codes in particular. In the open answers from the survey, certain respondents reported dislike and strong negative emotions rather than just a lack of interest, as exemplified by the responses “QR codes feel a little bit complicated and useless in general” (R14), “no additional value” (R32), and irrelevant for them right now (R44, R72). Some of the respondents indicated that they “haven't learned how to use them” (R57) or “not everyone is a “QR-code person”” (R77). This resistance toward QR codes created a barrier to their use and sometimes even to learning how to use them. Additionally, some interviewees felt that QR codes were unnatural because B&M store visits “do not require any phone” (P13) or they were not their “cup of tea” (P13) and, therefore, created a usage barrier. QR codes seemed to even represent an unwanted change or trend phenomenon.

“They represent the new era, but I don't care for them or need them” (P13)

“They are useless, or they are put up without purpose. They surely are useful for someone, but I feel that they seem out of place and bit “glued on.” It's like they are put up because its trendy or new even though obviously they are no longer a new thing. Regardless, I think they are not as needed there [in the B&M Store] as in other places.” (P4)

Some interviewees just wanted to “shop without scanning them” (P12) because the QR codes did not feel necessary or provide any additional value for them.

## 4.2 Company-Related QR Code Usage Barriers

**Unnoticeable QR codes in the B&M store.** Many survey respondents reported not noticing the QR codes during their B&M store visit (R8, R16, R18, R20, R27, R33, R34, R36, R39, R43, R48, R50, R51, R52, R55, R61, R64, R69, R70, R83, R84, R101). Almost all of the survey respondents had used QR codes before (see Table 1), and therefore, they understood what a QR code is and what it looks like, although some respondents reported noticing only the survey QR code (R16, R29, R31): “I thought all codes were the same; separating different codes could have helped” (R31). The interview data exposed issues with the QR codes, such as that they were too small (P2, P3, P4, P6, P9, P10, P16) or lacking color (P9) to be noticeable. Sometimes the QR codes were too well-camouflaged in the store. Additionally, the interviewees questioned themselves, wondering if perhaps they saw the QR codes, but their minds did not even register the codes, thus barring usage.

“Either those were so well-integrated into the product description, or the eye is already so used to seeing QR codes around that they are not noted in that sense” (P11)

“They blend in really well with the environment, maybe a little too well” (P6)

**Service personnel in the B&M store.** Some of the survey respondents described usually asking for customer service help when they needed information, such as, “I would rather ask a customer servicer” (R49) or that customer service personnel were “easy to approach” (R93). Customer service even outplayed the QR codes as a source of information: “I didn’t need it. Great service and salespersons who know their business!” (R81). Thus, the customer service seemed to be of too high of a level to encourage survey respondents to use the QR codes. One interviewee clarified the matter: “one can ask a salesperson, at least in a B&M store” (P1). This created a QR code usage barrier because customer service as an information channel came to their minds before using QR codes. Some interviewees also trusted the information and answers from the store’s salespeople more than trying to find information in other ways. This created a barrier to using the QR codes because customer service was the first choice to find answers:

“If I wanted more information about those products, I’d rather ask the salesperson when I’m in the store. And I trust that the salesperson can best tell me about it and answer questions.” (P12)

**QR code-related technical problems** emerged when positioning and visual design prevented their usage. It was noted in the survey, for example, that the QR codes did not work (R36, R65) when some of the survey respondents tried to scan the codes. One of the interviewees shed light on this technical problem by stating that the QR codes were placed too far away to be scanned with some devices, therefore creating a usage barrier:

“I noticed the QR code related to this study, which was honestly a bit far behind the counter, so I had to type in the visible URL that was below it to get there.” (P6)

Also, some participants experienced QR code dysfunction due to their small size (P2, P3, P4, P6, P9, P10, P16), which prevented them from being scanned.

## 5 Discussion

This study investigated customers' barriers to QR code usage in a B&M store in a real-life setting. The identified barriers are summarized in Figure 1.

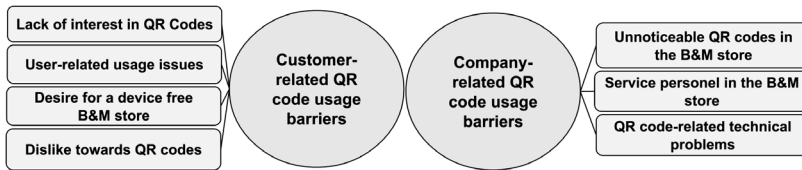


Figure 1: Summary of the findings

This study deepens the previous knowledge by identifying and describing QR code usage barriers relating to both customers and companies in the B&M store setting. The study responds to Lawry and Choi's (2013) call for experimental studies on real brands and QR codes. As in the study by Zhong and Moon (2022), participants in this study were familiar with QR codes but chose not to use them despite their previous experience.

This study suggests that QR code usage barriers in the B&M store setting can be customer related. Firstly, the finding of a lack of interest in QR codes is in line with Lau et al.'s (2022) finding of a 'hassle cost' when scanning QR codes and with Gao et al.'s (2015) criticism toward QR codes' appearance, which are perceived as

unappealing and requiring too much effort to use. Also, as in the study by Shin et al. (2012), a lack of confirmation regarding what would happen upon scanning the QR code was also shown in this study; the QR codes were not clear enough despite information in the QR code tags. Because they did not signal to the customer what would happen after a successful scan, customers were not motivated to take action and scan the tags. Perhaps a promise of more exciting content from a customer's point of view (e.g., sustainability information, product manufacturing information, or product color options) could make the QR codes more attractive and thus worth of the 'hassle cost'.

Secondly, sometimes the customers did not expect to encounter QR codes in a B&M store. User-related usage issues revealed customers who were unprepared to scan the QR codes because they lacked the required usage skills, suitable devices, or Internet connection. These are novel findings because QR code usage barriers in terms of devices and skills have been scarcely reported in prior research. QR codes should not complicate the buying of products in the B&M setting but rather add extra confirmation to the purchase intent. Thirdly, as a novel finding, this study found that customers' desire for a device-free B&M store visit, without the need to use their digital devices, is a notable usage barrier. Some customers had even left their devices in their cars and did not expect digital encounters before stepping into the B&M store. This finding shows aspects of technostress (e.g., Salo et al., 2019; Pirkkalainen, et al., 2019) because annoyance toward using a phone in the B&M store was noticed in the study. The stressor could be, for example, a shattered expectation of only a physical encounter during the B&M store visit. This is an interesting finding because the study by Holkkola et al. (2022b) found that certain customers tend to showroom, meaning they actively search for more information about products and better deals via their phone while physically experiencing products in a B&M store.

Lastly, the findings of customer-related QR code usage problems suggest active resistance. This dislike toward QR codes could be due to a failure to meet the technology acceptance drivers, such as providing enjoyment, usability, or usefulness (Pucihar, 2020) or perceived value or trust (Lau et al., 2022). The QR codes were not accepted; these actively resisting QR code dislikers did not even have an intention of using QR codes and showed resistance toward the technology.

In turn, this study suggests that a company can involuntarily cause QR code usage barriers in the B&M setting. First, the findings of unnoticeable QR codes in the B&M store showed novel findings concerning QR codes may be too small, blend into the background, or be difficult to tell apart from each other. In line with Lau et al.'s (2022) finding's inattention, some customers did not register or notice the QR codes. It is possible that they did not expect QR codes in the B&M store. The visibility of QR codes and their tags should be improved to make them more noticeable. Visibility could be improved with conspicuous design choices to make a pop-out effect and not to camouflage them. Also, improving QR codes' visual appearance (Gao et al., 2015; Lin et al., 2013; Tsai and Peng, 2023; Xu et al., 2018) should be considered. In cases where multiple different QR codes are used, they should be clearly separated from each other.

Second, this study showed that the service personnel in the B&M store outplayed the QR codes because customer service was available and was too good. Thus, QR codes may be useful if customer service is not available or if additional content (e.g., videos) is provided via the QR codes. Lastly, non-working QR codes were reported. Singhal and Pavithr (2015) previously noted that QR codes should be of an optimal size and scanning distance. Thus, a usage barrier was created by the QR codes' small size and big distance. We suggest planning where QR codes will be located and their size.

## **6 Limitations and Future Research**

This study considered the QR code usage barriers for customers in a real-life setting of a fashion retail store in Finland. This study provides an authentic in-depth understanding based on individual participants' experiences and thus is not to meant to be generalized. Notably, of participants, Finnish female B&M visitors were mostly represented in the findings. Future studies could research supporting factors of customers' QR code usage in a B&M store in different contexts. Retail markets should examine ways to ensure sustainable consumption following the barriers noted by Kemppainen et al. (2021). Last, QR code as an intermediary to a brand relationship could be investigated as stressed by Paananen et al. (2022b).

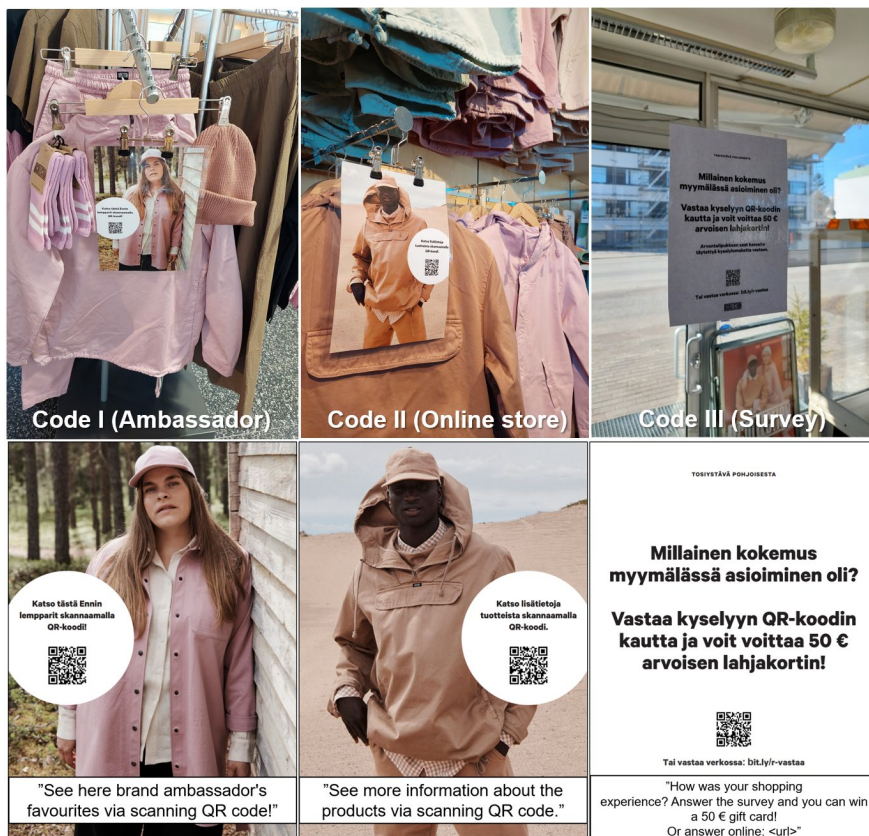
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## Appendix A: Examples of QR code tags

Figure 2: Promo material of R-Collection brand (<https://www.r-collection.fi/>)

**Appendix B: Details about the study's interview participants**

	<b>Gender</b>	<b>Age</b>	<b>Employment Status</b>	<b>Interview Duration (Min)</b>
P1	Female	37	Employed	43
P2	Female	30	Student, employed	53
P3	Female	23	Student	64
P4	Female	40	Employed	84
P5	Female	29	Employed	47
P6	Male	29	Student, employed	65
P7	Male	24	Student, employed	52
P8	Female	33	Employed	58
P9	Female	42	Employed	49
P10	Female	25	Student	40
P11	Male	38	Employed	69
P12	Female	33	Employed	70
P13	Female	59	Employed	69
P14	Female	24	Student	51
P15	Female	32	Employed	65
P16	Female	29	Employed	64

## Appendix C: Setting of the experiment in the brick-and-mortar store

