
QR code advertising: a cross-country comparison of Turkish and German consumers

Ela Sibel Bayrak Meydanoğlu*

Department of Business Administration,
Faculty of Economics and Administrative Sciences,
Turkish-German University,
Şahinkaya Cad. No: 86 34820,
Beykoz, Istanbul, Turkey
Email: meydanoğlu@tau.edu.tr
*Corresponding author

Ahmet Mete Çilingirtürk

Department of Econometrics,
Faculty of Economics,
Marmara University,
Goztepe Campus, Kadikoy, Istanbul, Turkey
Email: acilingi@marmara.edu.tr

Stephan Böhm

Department of Media Management,
Faculty of Design Computer Science Media,
RheinMain University of Applied Sciences,
Unter den Eichen 5, 65195 Wiesbaden, Germany
Email: stephan.boehm@hs-rm.de

Müge Klein

Department of Business Administration,
Faculty of Economics and Administrative Sciences,
Turkish-German University,
Şahinkaya Cad. No: 86 34820,
Beykoz, Istanbul, Turkey
Email: klein@tau.edu.tr

Abstract: Among various mobile-based communication technologies, QR codes have recently gained a great popularity in mobile advertising. These codes are used by marketers for advertising in various ways such as in print media, in outdoor advertising, or even on the product packages so that consumers could get relevant information at instance. In the current literature perceived usefulness, behavioural intention, previous experience, knowledge and environmental constraints have been identified as the factors that lead consumers to scan QR code ads. The aim of this study was to investigate the factors and their extent in influencing the QR code ad scanning behaviour of

Turkish and German consumers. The results demonstrate that perceived usefulness and previous experience affect the scanning behaviour of both the groups, whereas knowledge about scanning and environmental constraints affects only the scanning behaviour of Turkish consumers. Contrary to our expectations, behavioural intention does not influence the behaviour of either Turkish or German consumers.

Keywords: advertising; IBM; integrated behavioural model; QR code; Turkish consumers; German consumers.

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Biographical notes: Ela Sibel Bayrak Meydanoğlu is a Professor since 2017 at Turkish-German University, Turkey. She received her Bachelor in Business Informatics in 1997 and Master in Finance and Accounting in 2000 from Marmara University, Turkey. She received her PhD degree from the University of Lüneburg, Germany in 2005 and was promoted to the associate professorship in the area of management information systems by the Turkish Higher Education Council in 2011. Her current fields of research cover e-business and digital marketing.

Ahmet Mete Çilingirtürk is a Full-Time Professor since 2011 at Marmara University, Turkey. He received his BA in Business Management from Bosphorus University in 1991 and his MA and PhD in statistics from Marmara University in 1993 and 1998 respectively. From 2006 to 2011, he was an Associate Professor at Econometrics Department in Marmara University. He was promoted to the associate professorship in the area of quantitative decision methods by the Turkish Higher Education Council. He has twice been a DAAD scholarship. His research interests are decision theory, applied statistics and data analysis.

Stephan Böhm is a Professor of Telecommunications and Mobile Media at the Department of Media Management at the RheinMain University of Applied Sciences. He is a co-founder of the University's Center for Advanced E-Business Studies (CAEBUS) at the Media Campus in Wiesbaden and of the Mobile Media Forum, an annual conference on mobile media technologies and applications. He teaches on media technology and media management topics in bachelor and master programs and is a visiting professor at the International College of the NIDA in Bangkok, Thailand.

Müge Klein received her Bachelor's and Master's degree in Business Informatics in 1996 from Vienna Technical University, Austria. She worked as a Research Assistant at the Institute of Applied Informatics of the Technical University of Karlsruhe, Germany and in 2002 she received her PhD degree from the same university. She began to work as an Assistant Professor at Turkish-German University, Turkey in 2014. She qualified for an Associate Professor in November 2015. Her current fields of research cover software engineering, software modelling, business process management, digital business, enterprise 2.0, social media, mobile marketing, QR codes and mobile tagging.

1 Introduction

At a global level, there is a tremendous increase in the usage of mobile devices. It is expected that the global penetration rate of mobile devices will be 59% in 2020 (GSMA, 2015). Due to rapid proliferation of mobile devices and technologies, a new advertising channel, called mobile advertising, has emerged in recent years (Vatanparast and Asil, 2007). Unlike traditional advertising, mobile advertising offers a personalised and interactive communication (Chowdhury et al., 2006) and facilitates consumers to access marketing messages anytime and anywhere (Ryu, 2013). Among various mobile-based communication technologies (e.g., SMS, MMS, banner ads), QR codes have recently occupied a larger space in mobile advertising (Narang et al., 2012). Jung et al. (2012) define QR codes as innovative marketing tools to support companies in advertising about products, services and their own brands. The expectation of many advertising experts is that QR codes will contribute in boosting the return on investments and increase consumers' interactions with the brand (Jung et al., 2012).

QR code is a type of 2D barcode that was developed by the Japanese company Denso Wave for tracking parts in vehicle manufacturing (Bayrak Meydanoğlu et al., 2015; Gura et al., 2011; Okazaki et al., 2012; Stadler, 2010). Very soon they crossed their initial intended use, and acquired an important place in various applications such as commercial tracking, entertainment, product marketing, and in-store product labelling (Shin et al., 2012). QR codes are scanned with the help of mobile devices having built-in cameras. The user needs mere a code reader software pre-installed on the device. After scanning, this application decodes the information embedded in the QR code. The code may contain contact information, short texts, URL of the company's website, etc. (Bayrak Meydanoğlu et al., 2015; Gura et al., 2011; Niklas and Bohm, 2011). By linking the code to brand websites, promotions, product information or any other mobile-enabled content, the advertisers can enhance consumer interactions with the brands (Ryu, 2013) in various ways. For example, QR codes can be used by advertisers to offer window shoppers a small discount which can lead to a buying decision and transform window shoppers into paying customers (Jung et al., 2012).

QR codes are used by marketers for advertising in various ways such as in print media (e.g., magazines, flyers, catalogues, newspapers), in outdoor advertising, on product packages to provide quickly more information about the product. QR codes facilitate consumers to engage in mobile pull advertising which "refers to communication that is sent by advertisers via mobile devices at the direct request of consumers." (Atkinson, 2013, p.388) Due to a small keyboard in smartphones, it can be a bit inconvenient for consumers to type in a website URL or search term (Atkinson, 2013). Therefore, the motivation of consumers to engage in mobile pull advertising was not high until recently (Dou and Li, 2008). Through the introduction of QR codes, accessing a website or any other information became so simplified that mobile pull advertising became very appealing (Okazaki and Barweise, 2011).

Increased popularity and usage of QR codes all around the world (Shin et al., 2012) as well as their mentioned contribution to mobile advertising increased marketers' interest in using QR codes for advertising campaigns (Jung et al., 2012). For an effective QR code advertising campaign, it is essential to know the factors that lead consumers to scan QR code ads. There are a few studies in the mobile advertising literature, wherein, generally the factors affecting the use of QR code advertising and partially their impacts on consumers' behavioural intentions were investigated (e.g., Atkinson, 2013; Jung et al.,

2012; Narang et al., 2012; Shin et al., 2012; Ryu, 2013). However, a cross-country comparison of consumers focusing on their performance about scanning QR code ads has not yet received significant attention in the research. In this context, this study aimed to contribute to the relevant literature by determining the factors that affect Turkish and German consumers in their usage of QR code ads. This study proposes a hypothetical model from a theoretical perspective that can be used to identify the factors that lead consumers to scan QR code ads. Thus, the findings of this study can have practical implications for the companies in Turkey and Germany for more effective use of the promotional tool “QR code”. Moreover, testing the viability of a hypothetical model in a cross-country context enables to reveal whether something working in a developed country (Germany) can also work in a developing country (Turkey) or not. In this way, marketers can focus on designing a platform that works across multiple countries and can develop marketing strategies in a multi-cultural context.

This study is organised as follows: In Section 2 the literature on the factors affecting the use of QR code advertising is briefed. In Section 3 the Integrated Behavioural Model is briefly introduced that forms the basis of the proposed research model and of the proposed hypotheses in this study. Section 4 describes the research method. Section 5 provides the results of empirical tests, followed by conclusion in Section 6. In Section 7 the managerial implications are discussed. Section 8 discusses the limitations of the study and proposes the future research areas.

2 Literature review

There is a long tradition of information systems (IS) research on the adoption and user acceptance of new information technologies. In 2003, Venkatesh et al. (2003) identified eight different theoretical models focusing on intention and/or usage as a key dependent variable: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned Behaviour (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilisation (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT). One of the most influencing and widely applied theoretical models for IS acceptance research is the TAM introduced by Davis (1986). The TAM was adapted from the TRA “to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified” (Davis et al., 1989, p.985). This model is based on perceived usefulness and perceived ease of use as the two primary determinants of acceptance. Since the early 2000s, several research studies on the acceptance of new mobile technologies and services (e.g., mobile Internet, mobile commerce) have been conducted based on the TAM and its extensions and revisions (e.g., Hong et al., 2006; López-Nicolás et al., 2008; Lu et al., 2003; Sanakulov and Karjaluoto, 2015; Wu and Wang, 2005). However, despite its impact on and importance in the field of acceptance research, the TAM has been a subject of critiques. Bagozzi (2007, p.244) stated that it is “unreasonable to expect that one model, and one so simple, would explain decisions and behaviour fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers.” Venkatesh et al. (2003) proposed a more comprehensive model of user acceptance by introducing a Unified Theory of Acceptance and Use of Technology

(UTAUT). The main factors that influence intention and usage are performance and effort expectancy, facilitating conditions, and social influence. UTAUT was later extended to the UTAUT2 and adapted to the consumer context by integrating the constructs hedonic motivation, price value, and habits (Venkatesh et al., 2012). Venkatesh et al. (2012) introduced UTAUT2 based on an example in the context of mobile Internet technology usage. Since then the UTAUT/2 and its adaptations provided the theoretical foundation for several user acceptance studies in the field of mobile services and applications (e.g., Ally et al., 2012; Morosan and DeFranco, 2016; Slade et al., 2014).

In the relevant literature on the topic, the factors affecting the use of QR code advertising and the correlation of these factors with the behavioural intention of consumers are discussed based on various theories such as Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Theory of Uses and Gratifications (U&G) (Katz et al., 1974), Technology Acceptance Model (TAM) (Davis, 1989), Elaboration Likelihood Model (ELM) (Petty and Cacioppa, 1981) or some models that were developed through extending one of the mentioned theories. Table 1 gives the details of such studies, and their theoretical bases.

Table 1 Literature on factors affecting the use of QR code advertising

<i>Author(s)</i>	<i>Title</i>	<i>Theoretical Base</i>
Jung et al. (2012)	Should I scan or Should I go?: Young Consumers' Motivations for Scanning QR Code Advertising	TAM, U&G, TRA
Narang et al. (2012)	Effect of QR Codes on Consumer Attitudes	ELM
Shin et al. (2012)	The psychology behind QR codes: User experience perspective	TBP&TAM
Atkinson (2013)	Smart shoppers? Using QR codes and 'green' smartphone apps to mobilise sustainable consumption in the retail environment	U&G
Ryu (2013)	Mobile Marketing Communications in the Retail Environment: A Comparison of QR Code Users and Non-Users	Utilitarian & Hedonic Shopping Motivations
Ertekin and Pelton (2014)	An Empirical Study of Consumer Motivations to Use QR Codes on Magazine Ads	TAM & TPB combined with consumer general deal proneness and perceived unwillingness to sacrifice security

Jung et al. (2012) introduced perceived information value, entertainment, perceived ease of use, personal innovativeness, social influence, and previous experience as a motivation to use QR codes displayed on an advertisement. The findings of the study suggested that consumers' intentions to use QR code advertising are extensively influenced by the perceived information value of QR code advertising followed by entertainment and the perceived ease of use. Furthermore, it was also determined that consumers with previous experience concerning QR code ads are more likely to use QR code advertising in the future. However, social influence and personal innovativeness were not found to be significant as a motivation of scanning QR codes on ads (Jung et al., 2012).

Narang et al. (2012) investigated in their study how QR codes and product involvement influence consumers' attitudes toward advertisement and brands and their purchase intentions. The first finding of their study was that the level of product involvement has a negative effect on consumer attitudes. It was also found out that mere the presence of a QR code in an advertisement, as a sole independent variable, has no favourable impact on the dependent variables than in the absence of a QR code. It was also determined that the impact of QR codes in an advertisement depends on the nature of product involvement of the consumer. Consumers are more likely to use QR codes when they look for more information for a high involvement product (Narang et al., 2012).

Shin et al. (2012) designed a research model to test the acceptance of QR codes in order to explain the development of individual behavioural intentions to use the codes. The model incorporates the following factors: perceived information quality, perceived ease of use, perceived system quality, perceived usefulness, customer attitude, consumer intention, behavioural intention, perceived interactivity, and subjective norm. Their results show that the perception of the quality of QR codes influences positively the perceived usefulness and the perceived ease of use. These two factors, in turn, positively influence consumers' attitude toward QR codes, their intentions to use codes and actual behaviour for QR codes. Interactivity and social influence were also found to be essential behavioural antecedents for the use of QR codes (Shin et al., 2012).

Atkinson (2013) examined the impact of trust (government, corporate, advertising), involvement (buycotting, boycotting) and market mavenism on the likelihood of interacting with a QR code. It was found that government trust, buycotting and market mavenism are positively related to consumers' willingness to scan QR codes, whereas corporate trust has a negative impact. Advertising trust and boycotting were found to be insignificant predictors (Atkinson, 2013).

Ryu (2013) compared shopping-related personal characteristics and behaviours of QR code users and non-users. The respondents were evaluated on the basis of following criteria: consumer innovativeness, market mavenism, shopping behaviours (utilitarian behaviours: achievement-seeking shopping behaviour, efficiency-seeking shopping behaviour and hedonic behaviours: adventure-seeking shopping behaviour, idea-seeking shopping behaviour, value-seeking shopping behaviour) and the extent of prior mobile shopping experiences. It was observed that QR code users show higher levels of consumer innovativeness and market mavenism and seek greater shopping achievement, adventure, ideas and value than non-users. Moreover, the consumers with prior mobile shopping experience showed a greater possibility to use QR codes than non-users. No significant difference was found in efficiency-seeking behaviour between users and non-users (Ryu, 2013).

Ertekin and Pelton (2014) conducted an empirical analysis regarding the motivations of retail consumers to use QR codes on magazine ads in the U.S. It was noted that perceived convenience, entertainment benefits, subjective norm and deal proneness were significant for predicting consumers' behavioural intention to use codes on magazine ads, whereas perceived unwillingness to sacrifice security was not (Ertekin and Pelton, 2014).

3 Research model and hypotheses

3.1 Integrated behavioural model

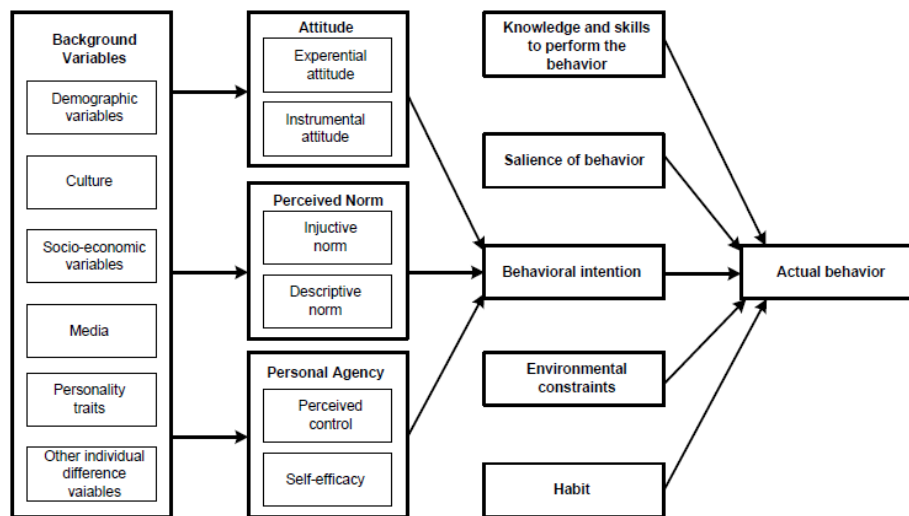
The proposed research model, which was constructed to illustrate the factors affecting the use of QR code advertising, was developed based on the Integrated Behavioural Model (IBM) and on the earlier studies mentioned in Section 2. IBM (see Figure 1) is the most recent formulation of the Theory of Reasoned Action (TRA) approach, which was developed by Fishbein in 1967. It assumes that the predictor of a behaviour is behavioural intention which is determined by attitude toward the behaviour and social normative perceptions regarding it (Montaño and Kasprzyk, 2008). The Theory of Planned Behaviour (TPB), proposed by Ajzen, was an expansion of TRA. It considers perceived control over behavioural performance as an additional construct next to the attitude and subjective norm (Yzer, 2012). Montaño and Kasprzyk collaborated with Fishbein to expand the TRA and the TPB and proposed an Integrated Behavioural Model (Rootman, 2010). Similar to the TRA/TPB, in the IBM, intention is the most important determinant of performing a behaviour. Intention is the trigger to carry out a recommended behaviour. Besides intention, there are four more other components that affect behaviour: knowledge and skills, salience of behaviour, environmental constraints and habit. Even if a strong behavioural intention exists, knowledge and skills are necessary to carry out the behaviour. It is also important that no or few environmental constraints exist that make behavioural performance very difficult or impossible to perform. A behaviour should be salient to the individual who carries it out. The experience concerned to performing of a behaviour may make the behaviour habitual. In this case, intention becomes less important in determining the actual behaviour of the individual. According to the IBM, a particular behaviour is most likely to occur if (1) a strong intention to perform the behaviour exists, (2) the individual going to perform the behaviour has the knowledge and skills to perform, (3) there are no serious environmental constraints preventing the performance, (4) the behaviour is salient, and (5) the person who performs the behaviour has experience. With reference to the IBM, behavioural intention is a function of three types of perceptions: attitude toward the behaviour, perceived norm and perceived agency (Montaño and Kasprzyk, 2008).

- Attitude toward a behaviour is defined as “*a person’s enduring, favourable or unfavourable evaluations, emotional feelings, and action tendencies toward some object or idea.*” (Kotler, 2000, p.96) Attitude includes experiential and instrumental attitudes. “*Experiential attitude or affect is the individual’s emotional response to the idea of performing a recommended behaviour.* (Montaño and Kasprzyk, 2008, p.78) Instrumental attitude means cognitive evaluation of the behaviour and “*is determined by beliefs about outcomes of behavioural performance.*” (Montaño and Kasprzyk, 2008, p.78)
- Perceived norm is a reflection of social pressure on an individual regarding performing a particular behaviour. It has two aspects: an injunctive and a descriptive norm. An injunctive norm shows the degree of the impact of important social networks on the performing of a behaviour by an individual. A descriptive norm is the degree of the impact of the members of those networks that perform the behaviour themselves (Yzer, 2012).

- Perceived control and self-efficacy are the two constructs of personal agency. Perceived control is defined as “an individual’s perceived amount of control over behavioural performance. Perceived control of an individual varies depending on his/her perception of the degree to which various environmental factors make it easy versus difficult to carry out the behaviour for him/her.” (Montaño and Kasprzyk, 2008, p.78) Self-efficacy implies the degree of an individual’s feeling regarding his/her capability of effectively performing a behaviour (Yzer, 2012). Self-efficacy is a perceived capability to successfully perform a behaviour and is not synonymous with competence which refers to actual skills. Certainly the skills one perceives himself to possess do not necessarily or always match the skills one actually possesses (Yzer, 2012).

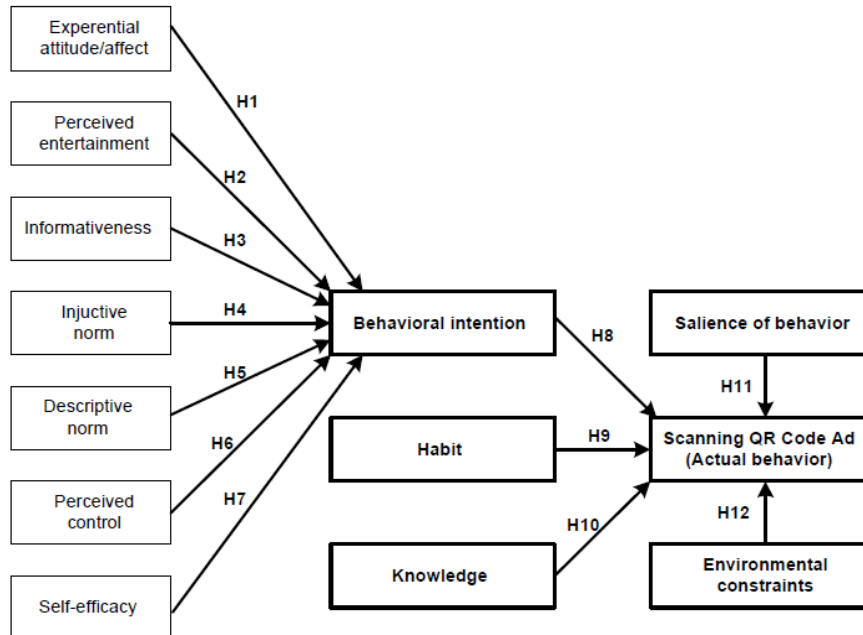
Other variables (e.g., gender, demographics, personality traits, culture, socioeconomic variables, media use) can also be associated with behaviours; however, the IBM proposes that their influence is indirect. Therefore, these variables are considered as external or background variables. The conceptualisation of these variables is important to illustrate the flexibility and adaptability of the IBM to different cultures and contexts as well as to investigate and understand how belief patterns may differ among various groups (Montaño and Kasprzyk, 2008; Yzer, 2012).

Figure 1 Integrated behavioural model (Montaño and Kasprzyk, 2008; Yzer, 2012)



3.2 Proposed research model and hypotheses

This study proposes and validates a research model as illustrated in Figure 2. It considers only the factors that directly affect the use of QR code ads, and excludes the background variables from the proposed research model. The following constructs are considered as the direct factors that can affect the use of QR code ads: knowledge, previous experience/habit, saliency of behaviour, environmental constraints, behavioural intention, and its antecedents.

Figure 2 Proposed research model

Experiential attitude or affect is an important factor that influences on consumers' behavioural intention for performing a recommended behaviour. Individuals that have a strong negative emotional response to a behaviour are unlikely to perform the behaviour. Unlike these individuals, individuals with a strong positive emotional reaction are more likely to perform a recommended behaviour (Montaño and Kasprzyk, 2008).

H1: Experiential attitude positively influences the intention to scan QR code ads.

As previous studies (e.g., Chowdhury et al., 2006; Jung et al., 2012; Tsang et al., 2004; Ünal et al., 2011) show, the instrumental attitude, which is defined as a function of the two types of perceptions: perceived entertainment and informativeness, influences the behavioural intention of consumers. The feeling of enjoyment associated with advertisements is an important factor for the overall attitudes of people toward ads (Shavitt et al., 1998). It is important for a message to be concise and entertaining. The messages perceived as concise and funny by consumers can capture their attention (Ünal et al., 2011). QR code ads that include an entertaining advertising message may be perceived more positive by consumers and may increase the intention of scanning QR codes. Therefore the following hypothesis is proposed:

H2: Perceived entertainment positively influences the intention to scan QR code ads.

Information seeking is also an important motivation for consumers to make the use of media or advertising. QR codes on ads serve as a mechanism to obtain information about the advertised product or service. This benefit of QR codes may prompt consumers to be much more willing to scan QR codes on ads (Jung et al., 2012). Thus, it seems reasonable to hypothesise:

H3: Informativeness positively influences the intention to scan QR code ads.

Because QR code advertising is still new to consumers, word of mouth through social networks (e.g., Facebook) may play a significant role in encouraging consumers to use QR code advertising. In other words, social networks have the potential to persuade consumers to scan QR codes (Jung et al., 2012). Thus:

H4: Injunctive norm has a significant influence on the intention to scan QR code ads.

In the context of this study, the term descriptive norm is used to refer to the social influence that may affect consumers' intention to adopt QR code advertising. Which means, it refers to consumers' perceptions regarding the adoption of QR code advertising considering the opinions of the reference group like friends, colleagues, or family members. Social influence is the degree of an individual's perception regarding the opinions of other important persons about using a system (Venkatesh et al., 2003). The social context may have an influence on the perception of a consumer that important references think the consumer should or should not perform a particular behaviour (Ajzen and Fishbein, 1980). Due to the desire of maintaining a social status or a favourable image within a reference group, behaviour of an individual is often influenced by friends, family, and colleagues (Jung et al., 2012). Descriptive norm is expected to influence the intention to adopt QR code advertising. Thus:

H5: Descriptive norm has a significant influence on the intention to scan QR code ads.

Mobile technologies have the capabilities to search, filter and access information and facilitate consumers to have higher control over the communication process (Narang et al., 2012). Previous studies show that consumers' perceived control of mobile advertising contributes essentially to the willingness of consumers to accept mobile advertising (Bauer et al., 2005; Carroll et al., 2005; Khan and Allil, 2010; Tsang et al., 2004). In this context the following hypothesis is postulated regarding consumer attitudes towards the adoption of mobile ads related to perceived control:

H6: Perceived control of QR code advertising positively influences the intention to scan QR code ads.

Self-efficacy explains consumers' perceived easiness or difficulty in using a technology. A consumer, while interacting with a QR code advertisement, requires to accomplish some technological tasks such as downloading a QR code reading software, and then scanning the QR code to obtain the end result. A consumer without self-efficacy might not feel confident about successfully accomplishing the task of using a QR code (Jung et al., 2012). Scanning QR codes and understanding their nature would be a difficult task for consumers without technological sophistication to understand the nature of these codes (Shin et al., 2012). Thus:

H7: Self-efficacy positively influences the intention to scan QR code ads.

Behavioural intention affects a consumer's performance regarding a special behaviour (Tsang et al., 2004). For this study, scanning a QR code on an ad is considered as a special behaviour for which the performance of consumers is evaluated. The hypothesis in this direction can be postulated as follows:

H8: Behavioural intention positively influences the actual behaviour of scanning QR code ads.

Users of a certain product are encouraged to use other similar products because of the experience gained by using that certain product (Rogers, 2003). Similarly, when consumers have experience in using a certain mobile technology-enabled service, they are more likely to adopt other mobile technology-enabled services (Ozdemir and Tott, 2009). Advertising attitudes are positively related with past behavioural experience (Donthu and Garcia, 1999). Based on these explanations the following hypothesis, regarding the scanning of QR codes as a new mobile technology, can be proposed:

H9: Individuals who have already used QR codes on ads are more likely to scan QR codes on ads than others.

Although QR codes are widely used there are still a significant number of people who do not have enough knowledge about QR codes. Therefore, it is advised to use a QR code including a step-by-step guide explaining what a QR code is and how it is scanned (Goldhar, 2011). Thus:

H10: Knowing how to scan QR codes positively influences the actual behaviour of scanning QR code ads.

In this study the term “salience of behaviour” is used to express the status of being aware of the relative advantages of QR code advertising. In the literature, perceived usefulness, perceived utility, and relative advantages are the analogous terms used (Khan and Allil, 2010). Relative advantage or perceived usefulness has a significant and positive influence on the adoption of new innovations (Holak and Lehman, 1990; Hsu et al., 2007; Luarn and Lin, 2005; Teo and Pok, 2003; Tornatzky and Klein, 1982) like QR codes. Consumers accept mobile marketing only if they perceive a benefit in receiving advertising messages on their mobile phones (Kavassalis et al., 2003). It won't be wrong to say that QR code advertising (a kind of mobile advertising) will be adopted by consumers only, if they could see a benefit in scanning a QR code ad, for instance, a special offer or discount, an online buying opportunity, ubiquitous access to a desired information. Thus, the following hypothesis can be proposed:

H11: Salience of behaviour positively influences the actual behaviour of scanning QR code ads.

Environmental constraints that make behavioural performance difficult or impossible to be performed have a negative influence on the actual behaviour of scanning QR code ads. For example, lack of standardisation, lack of mobile experience regarding QR codes, security problems and using codes at places with no Wi-Fi and connectivity (Kutsishin, 2012; Strout, 2013) negatively influence the actual behaviour of scanning QR code ads. Thus the last hypothesis of this study can be stated as:

H12: Environmental constraints have an influence on the actual behaviour of scanning QR code ads.

4 Research methodology

In order to test the hypothesised model, a drop-off survey was conducted both in Germany and Turkey. The data include 754 and 377 questionnaires respectively from Turkey and Germany. The German interviewees were undergraduate Media Management students from a German University and their families and friends. The Turkish interviewees were undergraduate students – who were studying Business Administration and Management Information Systems – from two Turkish universities and their families and friends. The questionnaire was first developed in English language and then translated into German and Turkish by native speakers. Table 2 provides an overview of the demographic characteristics of the German and Turkish samples. The sample selection was carried out by a non-random convenience sampling method, and therefore has limitation in its ability to be generalised.

Table 2 Demographic distribution of the respondents

<i>Characteristic</i>	<i>Turkey</i>		<i>Germany</i>	
	<i>Frequency</i>	<i>Valid %</i>	<i>Frequency</i>	<i>Valid %</i>
Male	315	42.0	192	51.3
Female	434	58.0	182	48.7
Married	212	28.1	73	19.5
Single	528	70.2	282	75.4
Highschool	207	27.6	249	69.1
Bachelor	482	64.2	71	20.0
Master, PhD	62	8.3	39	10.9
Free business	56	7.4	29	7.8
Public Emp.	78	10.3	19	5.1
Private Emp.	277	36.7	92	24.7
Student	277	36.7	226	60.8
Out of Work	66	8.8	6	1.6
<i>Age</i>				
18–20	163	21.6	101	27.0
21–25	268	35.6	135	36.1
26–30	127	16.9	70	18.7
31–35	97	12.9	19	5.1
>=36	98	13.0	49	13.1
<i>Income in €</i>				
<=500	303	40.9	172	48.7
501–1000	194	26.2	58	16.4
1001–1500	108	14.6	29	8.2
1501–2000	67	9.1	19	5.4
2001–2500	33	4.5	24	6.8
2501–3000	11	1.5	17	4.8
>3000	24	3.2	34	9.6

The questionnaire consists of seven demographic questions that describe the sample characteristics, two QR code scanning questions and 34 behaviour measurement items. The following items used in this study were selected and adopted from previous studies:

- Items concerning the experiential attitude were adopted from Shin et al. (2012), and Ünal et al. (2011).
- Items of the perceived entertainment were adopted from Liu et al. (2012), and Altuna and Konuk (2009).
- The item of the variable “scanning QR code ad” was adopted from Shin et al. (2012)
- One item of the informativeness was adopted from Liu et al. (2012), Ünal et al. (2011) and Altuna and Konuk (2009).
- Two items of the descriptive norm were adopted from Shin et al. (2012).
- Items concerning the behavioural intention were adopted from Shin et al. (2012). and Jung et al. (2012).
- Items of the self-efficacy were adopted from Jung et al. (2012).

The remaining items in the questionnaire were developed by the authors on the basis of literature survey about mobile and QR code advertising.

The items in the scale were expected to measure twelve factors and were measured on a five-point Likert scale. Except the demographic questions, and those about monthly income and age class, QR code scanning frequency questions were coded as the class mid-value, so statistical tests can be conducted on these variables.

5 Data analysis and research results

In Tables 3a and 3b the main research questions are addressed through frequency distributions and descriptive statistics. The median values of numerical values and the items were considered as their distributions was skewed. Furthermore, Pearson’s chi-square test of homogeneity was conducted to compare the frequency distributions and independent samples, and t-test was conducted to prove the equality of the means between the country samples. Levene’s test of homogeneity was used to examine the equal variances assumption and the dispersion of related variables. The data were analysed at 5% level of significance, so the test statistics are marked with one and two asterisk as the level of significance at 5% and 1%, respectively.

Statistical tests do not make assumptions about sample size. This means that type I error rate is not affected drastically by unequal group sizes. On the other hand, type II error rates are most likely affected by highly unequal sample sizes.

As shown in Table 3a and 3b, the samples from Turkey and Germany are not distributed homogenously according to marital status, educational level, employment, age class and income level distribution. It was assumed that the samples represent country specific demographic characteristics.

Table 4 shows the comparison of Turkish and German consumers regarding the scanning frequency of QR code ads. Independent samples t-test was conducted for this

purpose. The knowledge level of Turkish and German consumers regarding QR code scanning was examined with the chi-square test of equal proportions.

Table 3a Country-wise comparisons of demographic distributions and descriptives regarding gender, marital status, education and employment

<i>Characteristic</i>	χ^2	<i>Sig.</i>
Gender	9.68	0.021
Marital Status	21.08	0.001
Education	212.88	0.000
Employment	70.96	0.000

Table 3b Country-wise comparisons of demographic distributions and descriptives regarding age and income

<i>Characteristic</i>	<i>Levene F</i>	<i>Sig.</i>	<i>t</i>	<i>Sig.</i>
<i>Age</i>	1,41	0.236	2.07	0.039
GE: Md =23.9, X = 25.6, S = 6.73; TR: Md = 25.0, X = 26.5, S = 6.8				
<i>Income</i>	71.50	0.000	2.63	0.009
GE: Md=643.5, X = 1064,S = 1083;TR: Md=689 .6, X=89 4, S=784				

Table 4 QR code scanning frequency per week and knowledge level regarding scanning

<i>Use/week</i>	<i>Turkey</i>	<i>%</i>	<i>Germany</i>	<i>%</i>	<i>Statistics</i>
Never	397	52.9	255	68.6	Levene F
1-2	248	33.0	90	24.2	4.749
3-5	72	9.6	18	4.8	(0.030)
6-8	19	2.5	3	0.8	t-test
9-11	7	0.9	3	0.8	3.598
>=12	8	1.1	3	0.8	(0.000)
	X = 1.288 (0.0782), M=0.823		X = 0.833 (0.0991), M=0.515		
Know	505	67.0	304	80.6	$\chi^2=23.03$
Not know	249	33.0	73	19.4	(0.000)

Of the Turkish respondents, 52.9% have never scanned a QR code, and among the Turkish respondents, 33% did not know how to scan QR codes. The scanning frequency per week is 1.288, therefore the monthly average scanning frequency is approximately 5 times ($1.288 \times 4 = 5.152 \sim 5$). The knowledge level of German respondents related to scanning QR codes (80.6%) is higher than the knowledge level of Turkish respondents (67%). However, the percentage of QR code users in the German sample is lower than that in the Turkish sample. Among the German respondents, 68.6% had no earlier experience of a QR code scanning. The scanning frequency per week is 0.833; i.e., the monthly average scanning frequency is approximately 3.5 times ($0.833 \times 4 = 3.332 \sim 3.5$). The difference regarding the weekly average scanning frequency and the knowledge level between Turkish and German consumers is significant.

In Table 5 the items are summarised with their means, medians and standard deviations separately according to the country. Furthermore, independent sample *t*-test was conducted for the univariate item comparisons between the two countries.

Table 5 Item descriptives and cross-country comparison *t*-test

Item #	Items	Turkey			Germany			<i>t</i> -test
		Mean	Med.	Std Dev.	Mean	Med.	Std Dev.	
1	I have positive feelings towards scanning QR codes	3.82	4.00	.99	3.40	3.00	.99	6.67**
2	It would be a good idea to make use of QR codes	3.82	4.00	.94	3.52	4.00	.95	5.00**
3	I like the idea of using QR code advertising	3.62	4.00	1.03	3.12	3.00	1.06	7.56**
4	QR code advertising is entertaining	3.23	3.00	1.01	2.63	3.00	.92	9.69**
5	Contents in QR code ads are often annoying	2.73	3.00	.98	2.92	3.00	.88	-3.22**
6	QR code ads provide all the information I need	3.12	3.00	.98	2.92	3.00	.86	3.53**
7	QR code advertising is a good source of up-to-date product information	3.58	4.00	.93	3.17	3.00	1.00	6.93**
8	QR code advertising enables ubiquitous access to information	3.63	4.00	.98	3.13	3.00	1.00	8.04**
9	It is important to see my family members scanning QR code ads before I try to scan codes	2.86	3.00	1.21	1.90	2.00	1.06	13.60**
10	It is important to see my friends scanning QR code ads before I try to scan codes	2.93	3.00	1.19	1.94	2.00	1.06	14.14**
11	It is important to see my colleagues scanning QR code ads before I try to scan codes	2.91	3.00	1.20	1.99	2.00	1.07	13.05**
12	Recommendations of my family members concerning the scanning of QR code ads are important to me	3.17	3.00	1.15	2.37	2.00	1.11	11.11**
13	Recommendations of my friends concerning the scanning of QR code ads are important to me	3.29	4.00	1.12	2.46	2.00	1.16	11.59**
14	Recommendations of my colleagues concerning the scanning of QR code ads are important to me	3.21	3.00	1.15	2.38	2.00	1.12	11.56**
15	I want to scan QR code ads because my family members do so	2.91	3.00	1.18	1.96	2.00	1.00	14.07**
16	I want to scan QR code ads because my friends do so	2.99	3.00	1.19	2.03	2.00	1.05	13.77**
17	I want to scan QR code ads because my colleagues do so	2.95	3.00	1.18	2.04	2.00	1.02	13.40**

Table 5 Item descriptives and cross-country comparison *t*-test (continued)

Item #	Items	Turkey			Germany			<i>t</i> -test
		Mean	Med.	Std Dev.	Mean	Med.	Std Dev.	
18	The feeling of being in control of scanning a QR code ad is important for me	3.50	4.00	1.14	2.71	3.00	1.23	10.59**
19	Being able to download any desired QR code reader application on my mobile device lets me to feel of being in control of scanning a QR code ad	3.62	4.00	1.13	2.71	3.00	1.10	12.84**
20	It is easy for me to become skilful at using QR codes	3.67	4.00	1.07	3.49	4.00	1.12	2.62**
21	Learning to use a QR code would be easy for me.	3.92	4.00	.98	3.91	4.00	.99	0.07
22	I feel confident to scan QR codes on a range of different mobile devices	3.46	4.00	1.18	3.18	3.00	1.05	4.09**
23	I feel confident to scan QR codes on advertising to learn more about the product or brand	3.52	4.00	1.13	3.24	3.00	1.01	4.18**
24	I think I will use QR codes in the future	3.72	4.00	1.02	2.91	3.00	1.22	11.08**
25	I intend to continue using QR codes in the future	3.58	4.00	1.06	2.85	3.00	1.18	10.21**
26	I am used to scan QR codes	2.91	3.00	1.32	2.43	2.00	1.22	5.94**
27	I scan a QR code ad because code on ad can provide me a special offer or discount if I decide to buy	3.42	3.00	1.06	2.79	3.00	1.19	8.80**
28	I scan a QR code ad because I can gain access to an exclusive content via the code	3.48	4.00	1.04	2.81	3.00	1.18	9.29**
29	I scan a QR code ad because code on ad enables online buying	3.51	4.00	1.03	2.65	3.00	1.14	12.21**
30	Although I want, I can't scan QR code ads in places with no wifi or connectivity on my phone such as airplanes, subway stations, etc.	3.30	3.00	1.10	3.08	3.00	1.04	3.24**
31	My mobile experience concerning the QR code ads scanning have disappointed me due to taking me to non-mobile optimised sites	2.92	3.00	1.08	2.91	3.00	.97	0.11
32	My mobile experience concerning the QR code ads scanning have disappointed me due to taking me to sites without an appropriate connection to the original call-to-action	2.92	3.00	1.04	2.85	3.00	.89	1.19

Table 5 Item descriptives and cross-country comparison *t*-test (continued)

Item #	Items	Turkey			Germany			<i>t</i> -test
		Mean	Med.	Std Dev.	Mean	Med.	Std Dev.	
33	Lack of standardisation, i.e., lack of a built-in QR code scanner on any platform (Android, iOS or Windows), makes it difficult to follow a QR code ad	3.41	3.00	1.01	3.40	3.00	1.05	0.09
34	QR code ads hide security risks	3.09	3.00	1.05	3.32	3.00	.88	-3.90**

Note: * $p < 0.05$; ** $p < 0.01$.

With the exception of the item number 21, 31, 32 and 33, all the other items' means showed statistically significant differences.

In the study, the reliability test for the whole scale and for the explained dimensions was determined by Cronbach's α internal consistency coefficient. Based on the calculated Cronbach's α coefficients, the reliability intervals of the scale are defined as follows (Ünalán, 2014):

- If $0.00 < \alpha < 0.40$, then scale is not reliable
- If $0.40 < \alpha < 0.60$, then scale is slightly reliable
- If $0.60 < \alpha < 0.80$, then scale is considerably reliable
- If $0.80 < \alpha < 1.00$, then scale is highly reliable.

Table 6 summarises the test results. The scale as a whole has high internal consistency. The two items of the perceived entertainment are in opposite direction and are expected to have a negative correlation. These reverse phrased items are important for reducing the response bias. However, in reliability analysis these reverse scored items may lead to a negative Cronbach's α in extreme conditions.

Table 6 Scale and subscale reliability and related measures

Constructs		Items	Turkey			Germany		
			<i>W</i>	χ^2	<i>a</i>	<i>W</i>	χ^2 (Sig)	
Abbr.	Scale	34	0.9228		0.8858			
EA	Experiential attitude	3 (1–3)	0.8962	0.0089	75.14**	0.8205	0.0279	72.95**
PE	Perceived entertainment	2 (4–5)	-1.664	0.0601	63.61**	0.6175	0.0243	14.37**
Info	Informativeness	3 (6–8)	0.7767	0.0547	238.10**	0.7177	0.0127	25.68**
IN	Injunctive norm	6 (9–14)	0.9228	0.0196	252.29**	0.9022	0.0418	217.08**
DN	Descriptive norm	3 (15–17)	0.9188	0.0008	8.779*	0.9234	0.0010	5.3675
PC	Perceived control	2 (18–19)	0.8030	0.0031	13.95**	0.6815	0.0000	0.0184
SE	Self-efficacy	4 (20–23)	0.9042	0.0256	236.33**	0.7635	0.0722	176.27**
BI	Behavioural intention	2 (24–25)	0.9088	0.0045	38.41**	0.9291	0.0006	3.4085
SB	Saliency of behaviour	3 (27–29)	0.8446	0.0011	6.985*	0.8022	0.0037	9.51**
EC	Environmental constraints	5 (30–34)	0.6846	0.0335	175.48**	0.6388	0.0500	119.04**
HB	Habit	1 (26)						

To test the respondents' reliability, Kendall's coefficient of concordance "W" was used. This coefficient measures the respondents having same mindset, in other words, it indicates how many respondents are agree with each other regarding an item in the questionnaire. W coefficient takes value between 0 and 1, and a higher value corresponds to a higher conformity (Ünal, 2008). As Table 6 shows, German respondents do not have similar mindset regarding the answers of the questions, and do not perceive the questions in the same way as the Kendall's coefficient of concordance "W" is low for each scale except that for self-efficacy.

When differences among respondents are kept constant, Friedman's χ^2 test is used to find out if there is a statistically significant difference among the agreement levels of the respondents to the items. According to Friedman's χ^2 test, there should be a statistically significant difference among the responses concerning the agreement about the items. Otherwise, some questions would be measuring the same variable. The results of Friedman χ^2 show that the items in the study measure a different dimension or at least a slight different behaviour.

In the study, Structural Equation Modelling (SEM) was conducted to control whether the theoretically established relationships in the research model match with the empirical data material. Structural equation modelling is a comprehensive technique in statistics, which is applied to test the causal relationships between latent (unobserved) and observed variables (Reisinger and Turner, 1999). Latent variables are vital for structural equation modelling and they correspond to abstract terms such as motive, emotion and attitude, which researchers are most concerned with. These terms can only be observed indirectly by certain behaviours or variables scaled as indicators (Sumer, 2000). Such variables cannot be measured directly as they are unobservable. Thus, researchers should relate the latent variables with observed variables to define the latent variables numerically in an assumed structure (Byrne, 1998).

Observed items are indicators that influence latent variables, i.e. constructs, and the causal relations exist among these constructs. Structural equation modelling includes one or more regression equations that describe how exogenous (independent) variables and the endogenous (dependent) variables are related. Coefficients are usually denoted as path coefficients or regression weights (Reisinger and Turner, 1999). The structural model includes a measurement model for the latent endogenous variables as well as for the latent exogenous variables. The model formulises the causal relationship among these variables. The model may include mediation and moderation effects.

In this study, model parameters were estimated in R with package "lavaan" employing latent variable analysis "sem" algorithm that was developed from the ordinal level data (R Core Team). The parameters of the model were estimated with Maximum Likelihood method after the algorithm converged at 119th iteration for Turkish data and 127th iteration for German data. Table 7 shows the model statistics which are used to evaluate the fitness of the model and the empirical data as well as to measure the validity of the model. The baseline model (H₀) is compared with the empirical model (H_a).

Table 7 shows that chi-square statistic is statistically significant at 0.000 level. However, it is not sufficient to assess the goodness-of-fit between the model and data based only on the chi-square statistic, since chi-square test highly depends on the sample size (Baker et al., 2002). Therefore, other measures should be used in order to assess the goodness-of-fit. χ^2/df (degrees of freedom) is one of the measures that test the fit between model and data. When the χ^2/df value is lower than 5, it is accepted as a good fit (Kelloway, 1998). Research model shows that χ^2/df values are 5.66 and 3.44 for the

Turkish and the German data sets, respectively. These values indicate that there is a good fit between the model and the German data.

Table 7 Model Statistics and Goodness of Fit

		<i>Turkey</i>	<i>Germany</i>
	Used/Total n	727/754	352/377
H ₀	Minimum Function χ^2	3101.964	1883.020
	Df	548	548
	<i>p</i> -value	0.0000	0.0000
H _a	Minimum Function χ^2	18266.427	6902.135
	df	629	629
	<i>p</i> -value	0.0000	0.0000
Model Goodness of Fit χ^2		5.66*	3.44*
	CFI	0.855	0.787
	TLI	0.834	0.756
	Akaike (AIC)	62881.039	28878.189
	Bayesian (BIC)	63408.765	29322.329
	RMSEA	0.080**	0.087**
	SRMR	0.119	0.106

Some of the more commonly used measures of fit are Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Error (SRMR). RMSEA represents the square root of the average of the covariance residuals, which are the differences between the corresponding elements of the observed and predicted covariance matrix (Moss, 2009). SRMR is an absolute measure of fit and is defined as the standardised difference between the observed correlation and the predicted correlation. Because both SRMR and RMSEA are absolute measures of fit, a value of zero indicates a perfect fit (Kenny, 2015). Furthermore, the values close to zero indicate a good fit between the model and the data. Table 7 confirms that there is a good fit between the research model and the data considering these indices.

The comparative fit index (CFI), like the Tucker Lewis index (TLI), compares the model of interest with some alternative, such as the null or independence model (Moss, 2009). As shown in Table 7, when the values of these indices are closer to 1, it represents a good fit between the model and the data. Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) are regarded as an information theory measuring goodness of fit, which are applicable when maximum likelihood estimation is used. These indices are used to compare different models; and the models those generate the lowest values are optimal (Moss, 2009). AIC and BIC are used simultaneously while determining the appropriate model (Kuha, 2004). The proposed model functions better for the data collected from German respondents, because both AIC and BIC have smaller values for the data collected from German respondents.

The fit indices and absolute measures of the estimated models are acceptable for the data of both countries. In spite of the insignificant relations in the model for German data, the model and fit statistics were found to be statistically better than the model for Turkish data.

The latent exogenous variables in the model are estimated based on the indicator variables as follows:

$$EA \sim \sim ea1 + ea2 + ea3$$

$$PE \sim \sim pe1 + pe2$$

$$Info \sim \sim info1 + info2 + info3$$

$$IN \sim \sim in1 + in2 + in3 + in4 + in5 + in6$$

$$DN \sim \sim dn1 + dn2 + dn3$$

$$PC \sim \sim pc1 + pc2$$

$$SE \sim \sim se1 + se2 + se3 + se4$$

$$SB \sim \sim sb1 + sb2 + sb3$$

$$EC \sim \sim ec1 + ec2 + ec3 + ec4 + ec5$$

The latent endogenous variables are estimated as follows:

$$BI \sim \sim bi1 + bi2$$

which describe the empirical model together with the observed variables

$$BI \sim EA + PE + Info + IN + DN + PC + SE$$

$$dpw \sim BI + HB + know + SB + EC$$

where habit (HB) is a unique Likert scale ordinal variable, knowledge (know) is a binary variable and the dependent variable is the actual QR code scanning density per week (dpw), which is measured as numerical class midpoint of the density.

All latent variable estimation coefficients are significant ($p < 0.0001$). The second item under the subscale of perceived entertainment which refers to the annoying impact of the contents of QR code ads on code scanners is negatively related to the latent variable.

The estimated regression models related to Turkish respondents are as follows:

$$BI = -0.388x EA + 1.343x PE - 0.347x Info + 0.051x IN - 0.049x DN + 0.163x PC + 0.456x SE \quad Se: 0.249 \quad 0.482^{**} \quad 0.236 \quad 0.078 \quad 0.088 \quad 0.082^* \quad 0.085^{**}$$

Se: standard error

$$dpw = 0.177x BI + 0.438x HB + 0.623x Know + 0.306x SB - 1.151x EC \quad Se: 0.119 \quad 0.060^{**} \quad 0.170^{**} \quad 0.135^* \quad 0.251^{**}$$

Se: standard error

Behavioural intention is a function of perceived entertainment, perceived control and self-efficacy, which affect positively the behavioural intention of consumers. However, it was found that behavioural intention does not affect the actual behaviour, i.e., "scanning QR code ad". The scanning frequency is influenced by the constructs "salience of behaviour", "knowledge" and "habit" positively and by the construct "environmental constraints" negatively.

The estimated regression models related to German respondents are as follows:

$$BI = -0.769x EA + 4.639x PE - 2.674x Info + 0.583x IN - 0.841x DN + 0.091x PC + 0.225x SE \quad Se: 0.979 \quad 3.308 \quad 2.343 \quad 0.701 \quad 0.794 \quad 0.443 \quad 0.406$$

Se: standard error

$$dpw=0.189xBI+0.404xHB+0.151xKnow+0.393xSB+0.100xEC$$

Se: 0.140 0.079**
0.2500.211* 0.293

Se: standard error

Behavioural intention is not influenced by any of the constructs. However, the scanning frequency is a function of salience of behaviour and habit.

In Figure 3 and 4 the estimated structural equations are presented. There are 34 indicator variables explained by 10 latent variables in the model. Furthermore, there are a dependent measured variable, one ordinal and one dummy explanatory variable. The coefficients and error term measures are shown on the model figures. Two models are built for the cultural comparison of the behavioural intention model. Unlike German consumers, knowledge and environmental constraints have an impact on the QR code ad scanning behaviour of Turkish consumers.

Figure 3 SEM model and parameter estimates (for Turkish consumers)

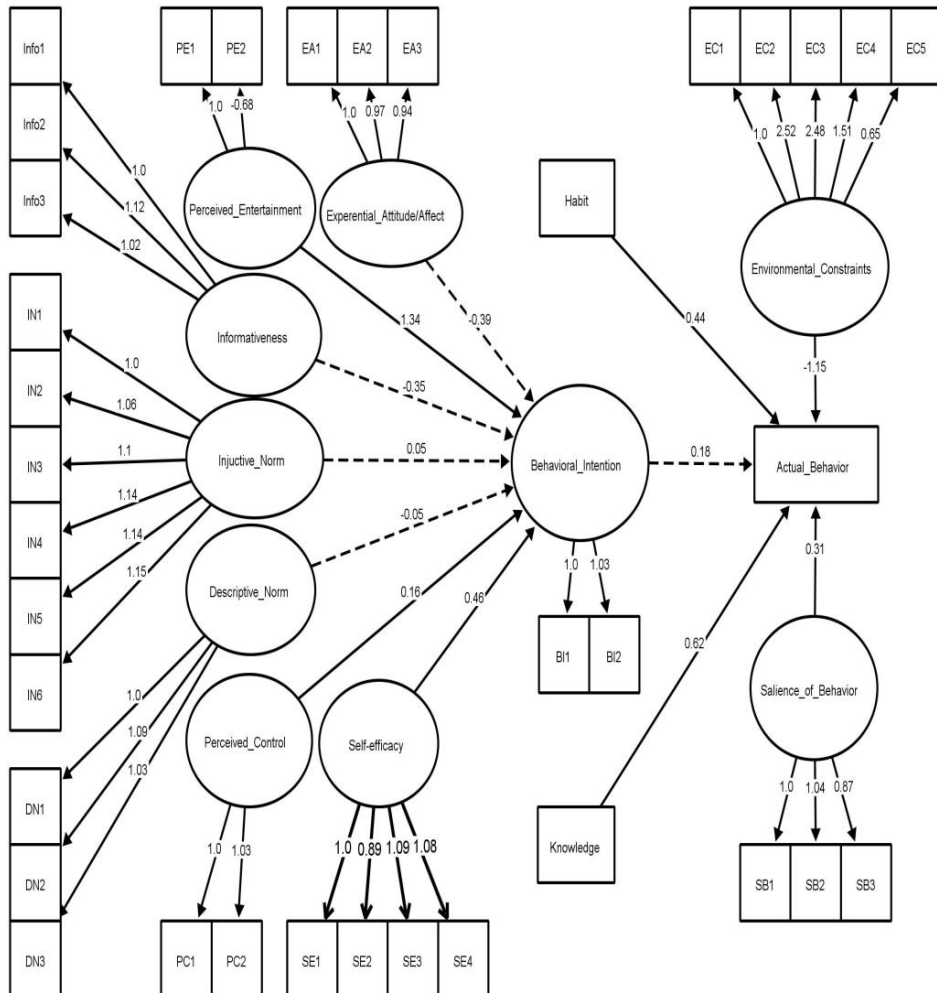
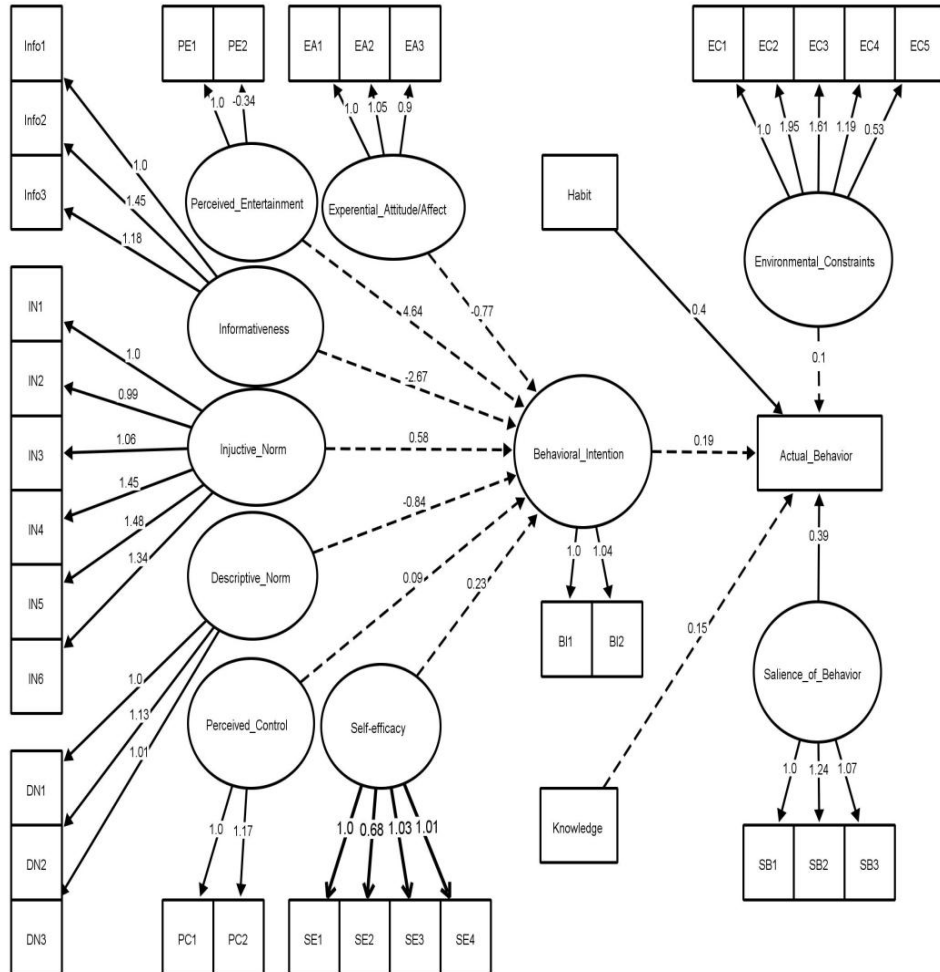


Figure 4 SEM model and parameter estimates (for German consumers)



6 Conclusion

The major objective of this study was to understand the cross-national differences in consumers' behaviours related to scanning QR code ads. Compared to Turkish consumers, German consumers are less likely to scan a QR code ad.

Past literature established that experiential attitude has an impact on behavioural intention of consumers (Montaño and Kasprzyk, 2008). However, the results of this study show that experiential attitude influences the behavioural intention of neither German nor Turkish consumers. The study of Ertekin and Pelton (2014) noted that the entertainment benefit of QR codes influences the behavioural intention to scan QR codes on ads. In this study, this could be observed only in the Turkish sample. In the existing literature self-efficacy and informativeness were found to influence behavioural intention (Jung et al.,

2012). In this study, for both groups, the informativeness did not emerge as a determinant of behavioural intention. Regarding self-efficacy, the results related to Turkish consumers are consistent with the study of Jung et al. (2012). Descriptive norm has no influence on the QR code scanning intention of Turkish and German consumers. This finding is consistent with the study of Jung, Somerstein, and Kwon (2012), where was found that descriptive norm failed to predict intentions to use QR codes on ads (see Table 8).

Table 8 Country-wise comparative results of the hypotheses regarding behavioural intention

<i>Hypothesis</i>	<i>Turkey</i>	<i>Germany</i>
H1	unsupported	unsupported
H2	supported	unsupported
H3	unsupported	unsupported
H4	unsupported	unsupported
H5	unsupported	unsupported
H6	supported	unsupported
H7	supported	unsupported

Previous studies have shown that social influence is a determinant in the adoption of new technologies (Brown and Venkatesh, 2005; Davis, 1989; Hsu and Lu, 2007). QR codes are likely to evolve as an interaction channel that enables users to connect with online communities through social networking services (Canadi et al., 2010). Shin et al., (2012) showed that this feature of QR codes has a strong impact on consumers' behaviour. Ertekin and Pelton (2014) also supported the influence of injunctive norm on behavioural intention. However, injunctive norm was not found to be determinant of behavioural intention for both groups. Perceived control emerged as a determinant of behavioural intention in the case of Turkey. This result is consistent with those of previous studies (Bauer et al., 2005; Carroll et al., 2005; Khan and Allil, 2010; Tsang et al., 2004). However, perceived control did not emerge as a determinant of behavioural intention for German consumers (see Table 8).

The findings of the study demonstrate some differences regarding environmental factors and knowledge between the Turkish and German samples. Environmental constraints do not have an impact on the QR code scanning behaviour of German consumers whereas they have a negative impact on the scanning behaviour of Turkish consumers. Furthermore, knowledge is also a factor that influences the scanning behaviour of Turkish consumers, but it is not important for German consumers (see Table 9).

Some significant similarities also exist between Turkish and German samples. For both groups, salience of behaviour and habit have an impact on the actual scanning behaviour. This result is consistent with previous studies about consumers' experience regarding QR code scanning behaviour (Jung et al., 2012). The impact of the constructs "salience of behaviour" and "habit" on the German consumers is greater than that on the Turkish consumers. In contrast to the expectations and the existing literature (Tsang et al., 2004; Ünal et al., 2011), behavioural intention influences neither Turkish nor German consumers (see Table 9).

Table 9 Country comparative results of the hypotheses regarding actual behaviour

<i>Hypothesis</i>	<i>Turkey</i>	<i>Germany</i>
H8	unsupported	unsupported
H9	supported	supported
H10	supported	unsupported
H11	supported	supported
H12	supported	unsupported

7 Managerial implications

The consumers in the considered countries show differences in their behaviour regarding the scanning of QR code ads. Global marketing managers need to be cautious while developing marketing campaigns. They could apply the preliminary information gleaned in this study to develop their marketing campaigns that include QR code advertising.

The results of this study show that most of the Turkish and German consumers have not scanned a QR code yet and have no experience in scanning QR codes. The lack of experience can explain consumers despite intending to scan QR codes do actually not scan them. Including some information in QR code ads about how to scan QR code can promote the actual scanning behaviour of consumers who are prompted to scan codes. On the other hand, Turkish and German consumers with QR code scanning experience are more likely to scan codes on ads than others. This finding could imply that QR code usage is not self-explanatory to customers and that its advantages arises only from actual usage. In order to overcome this barrier, the Marketers might need to stimulate the usage by integrating a clear call-to-action and informing the customers for what reason they should to scan the code instead of relying on curiosity and awareness created by embedding only the code.

According to the findings of the study, the number of German consumers who know QR codes is higher than for the Turkish consumers. There may be many reasons for this trend, such as the differences in the education level of consumers in a developed and a developing country, fewer usage occasions due to a lower level of country specific dissemination of QR codes in mobile marketing or sample specific characteristics. In order to increase the familiarity and the usage of QR codes among consumers, the Marketers need to actively promote this new technology and the ads themselves can include a step-by-step guide explaining what a QR code is and how it is scanned (Goldhar, 2011).

The study also illustrates that the Turkish and German consumers who see some benefit in scanning a QR code ad are more likely to scan it. The Marketers should integrate benefits of scanning QR codes (e.g., gaining a special offer, discount) in their ads. For example, marketers can integrate explanatory notes into billboard ads that describe how to get a discount through scanning QR codes.

The study shows that environmental constraints such as network coverage and data pricing have an influence on the actual QR code scanning behaviour of Turkish consumers. The technical shortcomings that lead to some problems in using QR codes and are more likely to occur in a developing country like Turkey, this can explain why environmental constraints are the main concern for the Turkish consumers rather than the German consumers.

Since QR code ads including entertaining advertising messages prompt the Turkish consumers to scan QR code ads, the Turkish marketers should design QR code ads with entertaining messages.

Neither for Turkish nor for German consumers, the informativeness feature of QR codes has any importance. There are several technologies and instruments to get information. This can be a reason of paying less attention to the informativeness of QR codes by the consumers. However, QR codes enable access to information at anytime and anywhere. For example, QR codes may help consumers to find product information while they simply “kill time”. Tesco had a great success in its QR code marketing campaign in South Korea. Tesco created virtual grocery stores at the subway platforms with a QR code billboard. This platform enabled busy consumers to shop for grocery items while waiting for the subway (Jung et al., 2012). Marketers can emphasise this feature of QR codes in their marketing campaigns.

The study shows that social influence does not have an important impact on the intention of Turkish and German consumers for scanning QR code ads. Social networks can affect consumers’ intentions to scan QR codes, if other members of the network use these codes. This study shows that the number of both Turkish and German consumers who scan QR codes is not high. Through the suggestions to increase the familiarity and usage of QR codes mentioned above, the usage of QR codes also by the members of social networks can increase. Thus through electronic word of mouth, the social networks can also affect potential users of QR code ads.

According to the findings of this study, Turkish consumers intend to scan QR codes when they feel that the control is in themselves. QR code technology is a technology that prevents consumers from being exposed to receive ads that are unwelcome and obtrusive. Consumers access information via QR codes if they really want it. Turkish Marketers should prompt consumers to scan QR code ads through incentives and should integrate explanatory notes on ads about how to scan QR codes. In this way, consumers can scan QR codes and see that they have control over the ads. Knowing this can increase the number of consumers that want to scan QR codes.

According to the findings of the study, self-efficacy has an influence on their behavioural intention to scan QR codes for Turkish consumers. Scanning QR codes requires consumers to proceed through a number of technological tasks to obtain the end result. Through the integration of a short explanation, into advertising campaigns that explains how to scan QR codes, Turkish marketers can arouse also the intentions of consumers without technical sophistication to scan QR codes.

8 Limitations and future research

Despite the interesting findings of this study, it is important to recognise its limitations and the need for additional research. Due to the inability of applying the questionnaire used in the study to all the consumers in Turkey and Germany, a non-random convenient sampling was used in the study. Therefore, the results are limited in its generalisability. In terms of future research, the study can offer at least two major research avenues. Firstly, the influence of background variables within IBM, especially “culture”, on the antecedents of the construct “behavioural intention” can be investigated closer in order to determine whether or to what extent they have an impact on the scanning behaviour of

consumers. Due to the shorter span of QR code advertising, QR code ad scanning behaviour of consumers may still be evolving, and longitudinal studies can be conducted to monitor this evolution.

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