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How Do You Scan?

The Emergence and Development of the QR-Code Scanning Practice in China,
Sweden and the USA

Philip Bauer

Supervisor: Johan Hagberg
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University of Gothenburg, School of Business, Economics and Law
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Abstract: The commercial diffusion of QR-Codes has increased in recent years. These two-dimensional barcode are used for a wide spectrum of applications. Even though the QR-Codes are visible in our everyday life, the use of QR-Codes differ widely between countries. Precisely, the use of QR-Codes is more popular in Asian compared to Europe and the USA. Therefore, the aim of the study is to illustrate consumers' and producers' role in the emergence and development of the QR-Code scanning practice in China, Sweden and the USA. In order to address this issue, the study takes a consumer practice theory perspective and conducts an intense-multiple case study. Three Practitioners and three business professionals from each country were interviewed to gain an deep understanding of the QR-Code scanning practice and the institutional context in each country. Based on thematic analysis and a cross-country comparison, the article shows that a recursive relationship between consumers and producers exist, which affects the trajectory of QR-Codes in each country. Further, specific circumstances facilitated the development of the practice into the everyday life of practitioners in China. Based on these findings, the article concludes that the different usage of QR-Codes is an outcome of consumer-producer relation, rather than the affect of the behavioral intention of the consumers.

Keywords: QR-Codes, Consumer Practice Theory, Cross-Country, China, Sweden, USA

Introduction

Quick Response Codes, better known as QR-Codes, are two-dimensional barcodes consisting of different pixel modules, arranged in a square pattern (Shin, Jung, & Chang, 2012). These optical tags act as a visual representations of the information encoded in it (Böhm & Niklas, 2012). The encoded information can range from a simple URL or contact details to more complex operations. Once scanned with an imaging device, for commercial usage mostly a smartphone, the reader application software decodes the QR-Code and quickly directs to the

specific content embedded in the matrix (Cata, Patel, & Sakaguchi, 2013).

Even though QR-Codes were initially created to optimize the logistic of Toyota in 1994, QR-Codes are now used in a much broader context (Cata et al., 2013). The spectrum of application is diverse and varied, including logistical tracking, mobile payment and transport ticketing to product labeling and marketing communication (Massis, 2011; Shin et al., 2012). Within these use cases, the potential of QR-Codes lies in its pivotal role as a bridge between the real physical world and the digital world (Cata et al., 2013; Narang, Jain, & Roy, 2012). It enables

consumers to instantly switch from one medium to another.

The commercial diffusion is driven, on the consumer side, by the rapid penetration of mobile devices (Heggestuen, 2013), increasing the potential user base of QR-Codes accordingly. On the side of the companies, technical advantages and possibilities of QR-Codes drives the usage. Compared to other optical tags, QR-Codes offer a greater storage capacity and a higher decoding ease (Bamoriya, 2014a; Böhm & Niklas, 2012). Further, the usage of QR-Codes is free of royalty (Sago, 2011), making the commercial adoption by companies particularly attractive.

Even though visibility of QR-Codes increased in many countries in recent years (Okazaki, Navarro, & Campo, 2013), the usage of s on the part of the consumers differs from country to country. Precisely, it is less popular in the Western parts of the world than in Asian countries (Böhm & Niklas, 2012; Cata et al., 2013). Empirical data shows that the percentage of smartphone users who previously scanned a QR-Code differs between Europe, the USA and Asia. With less than 20%, about 35%, and over 70% of smartphone users, respectively (eMarketer, 2013; Jong-Hyuok, Somerstein, & Eun Seon, 2012; Liao & Lee, 2010; Mohamud, 2012). This disparity is of particular interest in light of the facts that QR-Codes are equally well-known by consumers in the East and the West (Watson, McCarthy, & Rowley, 2013) and that smartphones, by far the most common tool to decode QR-Codes, have reached very similar penetration rates of around 50% in all major markets worldwide (MediaCT, 2013). Hence, other factors must account for the different usage level.

Previous studies within marketing research have addressed the acceptance of QR-Codes from various angles. Within the existing body of literature four different factors were identified that might affect the usage level of QR codes. Firstly, the QR-Code content itself has an impact on the usage. Qualitative modeling approaches, imply that consumers' intention to use QR-Codes is

predicted by the perceived quality of information presented as well as the perceived entertainment through the encoded content (Ertekin & Pelton, 2014; Jong-Hyuok et al., 2012; Shin et al., 2012). These findings draw attention to the QR-Code content as a driver of acceptance. In a similar manner, Okazaki, Li, and Hirose (2012) argue that QR-Codes succeed if the encoded content satisfies the users' psychological needs.

Secondly, the usage by business professionals affects the consumer adoption. From a strategic perspective, Cata et al. (2013) go beyond the encoded information and argue that the success of QR-Codes as a marketing tool relies on their strategic integration into the overall marketing campaign. The authors see the primary success factor of QR-Codes in their ability to interact with the consumers. This point of view is in line with Shin et al. (2012), who highlight the importance of interactivity in the QR-Code context. The authors inferred that QR-Codes are seen by consumers as social venue rather than a commercial channel.

As a third point, previous research accounts for technical aspects. In order to decode the QR-Code it is necessary to possess a smartphone with a suitable reader application. According to a survey among UK college students the main reason for the non-use of QR-Codes was the lack of technology (Watson et al., 2013). Further, Sago (2011) reports that the unawareness of the technical capability of the phone is a usage barrier among US students.

Furthermore and fourthly, practical aspects impact the usage. It is critical to keep in mind the practical task that consumers have to complete in order to decode the QR-Code. More precisely, downloading the QR-Code reader application, starting this application, placing the camera over the barcode, waiting for the information to be decoded and accessing the online content on the mobile device. Empirical findings suggest that the confidence in ones ability to accomplish this task positively influences the behavioral intention towards scanning a QR-Code (Ertekin & Pelton, 2014; Jong-Hyuok et al., 2012; Shin et al., 2012). Thus, the easier consumers perceive the process of scanning a QR-Code, the higher the likelihood

to ultimately scan the barcode. This relation draws attention to the usability of the reader application.

Even though the literature account for a varies aspects that affect the acceptance of QR-Codes, such factors can only partly explain the different usage levels of QR-Codes. The usage of QR-Codes does not depend on these aspects alone and in isolation. Instead it is the combination and interplay of these aspects in conjunction with additional elements that affects the usage. This is, to a considerable degree, due to the fact that many elements and actors come into effect when scanning a QR-Code. As explained above, the interaction with a QR-Code requires the consumer to complete a number of concrete technical steps. This practice involves, on one side, a series of technical elements like the mobile device and the QR-Code reader application, on the other side, it demands from the consumer specific competences in order to not only complete the technical tasks but also to process the encoded information. Beside the involvement of the technical elements and the consumer, also a variety of different producers are involved. As the literature review shows, these producers equally affect the acceptance of QR-Codes. For instance, marketers and business professionals are responsible for the QR-Code content or the strategic implementation, while developers affect the usability of the QR-Code reader application.

In a similar manner and in the realm of retailing, Cochoy (2012) argues that the success or failure of QR-Codes in the context of grocery shopping may rely “on their [QR-Codes] ability (or opportunity) to find or not to find their place in the more general arrangement of the other devices of which they are but one ‘part’” (p. 227). In this, the author sees the network of relations, constituted of and by the QR-Codes and other technologies, as a key factor for the success of the data matrix. In a similar case, Shove and Pantzar (2005) presented that images, artifacts and competence, that compose Nordic Walking, are integrated differently in the UK and Finland.

The authors argue “what really matters is the way in which constituent elements fit together” (Shove & Pantzar, 2005, p. 61), highlighting the importance of the local context and actors involved.

Therefore, the use of QR-Codes might depend less on its intrinsic properties, consumers’ intentions, attitudes and choices, but rather on the relation between all what is involved in scanning a QR-Code. Consequently, a more dynamic approach is required in order to explain the different usage levels between different countries. Such a dynamic social-material perspective, that emphasizes the interconnectedness of elements, lies at the heart of the practice theory (Bueger, 2013; Reckwitz, 2002). Practice theory allows, on one side, to illustrate the elements that constitutes the practice of scanning a QR-Code. On the other side, it shows the dynamic integration of these elements, a process in which both consumers and producers are involved.

The introductory discussion shows that the interconnectedness of a diverse range of elements, human and non-human alike, has an impact on the use of QR-Codes. Therefore, from a consumer practice theory perspective, the overall research question asks how the practice of scanning QR-Codes emerged and developed in China, Sweden and the USA. The aim of the study is to illustrate consumers’ and producers’ role in the emergence and development of the QR-Code scanning practice in the three selected countries. Further, by answering the research question the study will contribute to the research field with relevant and important insights.

Theoretical Framework

In order to address the research question, this article adopts a perspective rooted in the ‘theory of practice’. Practice theory emerged from philosophy and social science in the 1970s and focused “on the conditions surrounding the practical carrying out” (Halkier, Katz-Gerro, & Martens, 2011, p. 3). The account is closely tied

to authors like Bourdieu, Foucault, de Certeau and Giddens, who sought to overcome the structure-agency problem. Structure and agency refer to two opposing determinations of action and social order that exist in sociology (Reckwitz, 2002). Structure refers to a set of collective norms and values that define human action, thereby social order is established by action based on existing norms. Agency, on the other hand, sees the humans as autonomous individuals, thus, the social is viewed as a sum of single interest and action. Practice theory bridges these two accounts and sees social order established through social practice. Specifically, humans carry out practices which are shaped by structure, and at the same time, the structure is reproduced through the human activity (Shove, Pantzar, & Watson, 2012). Thereby practice theory proposes that a recursive relation between social structure and human activity establishes the social order. It takes the ontological position that social reality is constituted by the practices. This has an important empirical consequence, it implies that the point of analysis is the practice itself.

The early conceptualizations of practice were fully social theories “in the sense that material artifacts, infrastructures and products feature barely at all” (Shove & Pantzar, 2005, p. 44). However, the more recent formulation of practice theory by Reckwitz (2002) and Schatzki (1996) shows a turn towards materialization within the field of social practice theory. These authors, distinguished between practice as ‘entities’ and as ‘performances’. The first notion, defines practices as “temporally unfolding and spatially dispersed nexus of doings and sayings” (Schatzki, 1996, p. 89). Likewise, Reckwitz (2002) describes practice as a set of interconnected heterogeneous elements. Consequently, ‘practice as entities’ describes that practices are shaped or configured by a variety of different elements. Moreover, it is the interconnectedness of these elements that configures how practices are carried out and makes the practices recognizable, intelligible and describable as one entity (Shove et al., 2012;

Southerton, Olsen, Warde, & Cheng, 2012). Even though it is widely agreed on that practices constitute of interwoven elements, there is no single typology of the elements (McMeekin & Southerton, 2012). In fact, the categorization of elements differs between several authors (Gram - Hanssen, 2010). Whereas Schatzki (2002) sees practical understanding, rules and teleo-affective structures as key elements in the understanding of practice, Reckwitz (2002) distinguishes between “body, mind, things, knowledge, discourse, structure/ process and the agent” (p. 245).

The second notion, ‘practice as a performance’ refers to the carrying out, the ‘doing’ of the practice. It is the performance that “actualizes and sustains practices in the sense of nexuses” (Schatzki, 1996, p. 90). In so far, it is the performance, which not only establishes the practices, but also reproduces and sustains it over time or adapts and innovates the practice. Therefore, it is in the doing of a practice that the different elements, that constitute a practice, are linked together.

This, in addition, highlights the recursive relation between practice-as-entity and practice-as-performance. The different elements configure how a practice is conducted, but it is through the performance that practice-as-entity is shaped and reproduced.

Building on this understanding of practice theory, Shove, Pantzar and colleagues (Shove & Pantzar, 2005; Shove et al., 2012; Warde, 2005) developed a conceptualization of practice theories that is explicitly articulated in the context of consumer studies. In particular, the work of Shove and Pantzar (2005) and Shove et al. (2012) has posed a specific emphasis on the dynamics of changes, transformation and diffusion of social practices in the realm of everyday life and mundane practices. Thus, as the aim of the study is to show the emergence and development of the QR-Code scanning practice, the framework is highly appropriate for this study. Additionally, the framework is appropriate for empirical investigation and has

been applied in a several studies (Magaudda, 2011; Southerton et al., 2012).

Shove et al. (2012) propose that the three elements *materials*, *meaning* and *competence* constitute practices. Each of these three elements can be seen as a category including a variety of aspects. However, in regards of the elements there is no clear distinction from one another (Røpke, 2009). The *material* component represents “things, technologies, tangible physical entities, and the stuff of which objects are made” (Shove et al., 2012, p. 14). The component of *meaning* includes symbolic meanings, ideas of why the activity is good or problematic for aspirations, beliefs and understandings (Røpke, 2009; Shove et al., 2012). Consequently, meaning is about making sense of the activity. Even though the practice is carried out by individuals meaning can be generic, thereby, shared by many, just like “the idea that doing something is healthy” (Røpke, 2009, p. 2492). The final element *competence* comprises know-how, practical understanding, technique and skills (Shove et al., 2012). Competences can be learned through experience. In addition, competences can exist as explicitly formulated knowledge or in the form of tacit knowledge (Røpke, 2009).

Beside the theoretical conceptualization, the application in empirical studies raises concerns about where one practice starts and another one ends. Addressing the issue of delimitation, Røpke (2009) proposes to delimit practices, on one side, from a phenomenological perspective, hence, the practice must be meaningful to people. On the other, the delimitation must be based on the study’s research purpose. Beside the delimitation, scholars struggle to differentiate context from practices. Some refer to super-practice of a broader heading (Røpke, 2009; Warde, 2005), or see the relation as a “larger net of practice-arrangement bundles” (Schatzki, 2005, p. 473). In order to differentiate practices from context, Schatzki (2005) refers to ‘site’ as “an arena or set of phenomena that surrounds or immerses something” (p. 468). Acknowledging

these challenges, the study adopts the definition of ‘site’ as a context surrounding the practice, whereas ‘practices’ are seen as bodily-mental activities that consist of material, meaning and competence.

The conceptual framework of consumer practice theory offers some critical dimensions for the analysis of emergence and development of practices. From an empirical perspective, Shove et al. (2012) propose that changes happen within a practice through the recursive relation between practice-as-entities and practice-as-performance. More precisely, “the contours of any one practice – where is it reproduced, how consistently, for how long, and on what scale – depend on changing populations of more and less faithful carriers or practitioners” (Shove et al., 2012, p. 63). Thereby, building up on Reckwitz (2002) and his concept of people as carriers of practice, the authors argue that the contemporary practice is shaped by the way previous participants accumulated material, meaning and competence. Thus, by following the development of practitioners, an understanding of the current organization of practice can be gained.

From a theoretical standpoint, the emergence of practices requires agents to integrate the elements of meaning, material and competence. In explaining this process, Røpke (2009) points to concepts from the economics of technological innovation. In this sense the concept of strategic niche management seems to be relevant (Kemp, Schot, & Hoogma, 1998). Niches are an important space in which innovation can be developed. Due to the protection from the mainstream market, the innovation can build up a network of supporters and users. Further, the niche offers the room for the innovation in which it can adopt itself to the ultimate use case in which it will eventually be put (Geels & Kemp, 2007).

In regards of the development of the practice, Southerton et al. (2012) refers to the diversification of a practice. This refers to the reproduction of the practice in a modified form, thereby multiple types of related practices exist.

The co-existence of practices can lead to a decline or a spread of a specific practice.

Methodology

From the consumer practice theory perspective, this study asks *how* the practice of scanning QR-Codes emerged and developed in China, Sweden and the USA. In the simplest terms, this means to study what practitioners do when scanning a QR-Code and how they understand this doing. Further, this development is influenced by producers, therefore, it is important to capture the institutional context. Hence, a qualitative research approach was chosen, as it is the most adequate method to gain a holistic understanding of complex issues (Eriksson & Kovalainen, 2008).

Research Approach

In order to be able to gain a deeper understanding of the dynamics of a specific setting in a contemporary context (Yin, 2013), a comparative intense-multiple case study approach was chosen. The intensive research design aims to understand the case from the perspective of an insider by providing a thick, holistic and contextualized description (Eriksson & Kovalainen, 2008). Hence, applying an intense case study enables to understand how the practice of scanning a QR-Code works in the specific context of China, Sweden and the USA. Further, multiple cases enable to “compare and contrast cases or to explore the phenomenon in a number” (Farquhar, 2012, p. 42). Therefore, the combination with a multiple-case design is a highly suitable approach considering the research question’s call for a comparison between China, Sweden and the USA. Within the scope of this study, the multiple-case design allows the comparison of the different countries and enables to understand in more depth how the interrelations of different elements and aspects affect the emergence and development of the practice.

Case Selection

For this study, the countries China, Sweden and the USA were chosen as the case countries and were selected through purposeful sampling, a criterion-based selection method. This sampling method permits to construct the sample according to a predefined profile (Barringer & Greening, 1998). The selection was based on four criteria. Firstly, the selected countries had to be similar with regard to the general public awareness of QR-Codes. This criterion is important as it can be argued that the awareness of QR-Codes and their benefits positively affects the intention to scan (Bamoriya, 2014a, 2014b). The second criterion, similarity in terms of the penetration rate of smartphones, was chosen, as smartphones are the most common device to scan a QR-Code and therefore are a necessary tool for the practice. Thirdly, all selected countries should be characterized by a similar short history of commercial usage of QR-Codes. This point is important in terms of the comparability of the trajectory of the QR-Code scanning practice. However, most importantly, the countries had to differ from each other in terms of the usage rate of QR-Codes. This criterion resulted in the selection of China, Sweden and the USA, representing high, low and medium levels of usage of QR-Codes, respectively. A summary of the major characteristics of the countries in the study can be found in Table 1.

Table 1: Characteristics of Selected Countries

	China	Sweden	USA
Awareness of QR-Codes	92%	77%	91%
Smartphone Penetration	47%	63%	56%
Use of QR-Codes	70%	<20%	25% - 39%

(AIP-Global, 2012; Büttner, Ahmet, & Cramer, 2011; eMarketer, 2013; MediaCT, 2013; Mohamud, 2012; Visualead, 2014)

Methodology Selection & Procedures

A two-phase study was conducted using semi-structured interviews in order to get insights about how the QR-Code scanning practice emerged and developed in the selected countries.

In the first phase in-depth interviews were conducted with business professionals as well as industry experts. Interviews were particularly appropriate as they allow to “enquire openly about situational meanings or motives of action” (Hopf, 2004, p. 203), both relevant to understand the development of the practice. The interviews were conducted in a semi-structured manner and thereby organized around a set of predetermined open-ended questions (Eriksson & Kovalainen, 2008) to make sure all relevant topics are covered. Further, a funnel approach was adopted to structure the questions (Flick, 2014).

In regards of the business professionals, product managers as well as advertisers were interviewed. The focus of the interviews lay on the specific situations in which the professionals either decided to incorporate or not to use QR-Codes in a marketing campaign and on their motivations to do so. Participants were selected to account for a maximum variation of motives and explanations (Flick, 2007). Thereby, participants were selected from different industry backgrounds, as the existing literature on QR-Codes, that proves that the effectiveness of QR-Code campaigns varies with the perceived product risk (Narang et al., 2012; Neumann, Bartsch, & Meyer, 2014). Suitable companies and persons were identified through internet search and contacted via e-mail without prior contacts to neither the companies nor participants. Thus, one advertiser and one marketer from each country were selected (see Table 2).

Table 2: Overview Business Professionals

Job Position	Company Type
China	
Managing Partner	Advertising Agency
Senior Brand Manager	Automobile Industry
Sweden	
Brand Analyst	Digital Marketing Agency
Product Manager	Consumer goods
USA	
CEO and President	Advertising Agency
Key Account Manager	Audio electronics

In addition to the business professionals, industry experts were included in the sample as they are

“able to provide more information and a deeper insight into what is going on around them” (Marshall, 1996, p. 92) due to their position and role. Participants were selected according to the five ‘ideal’ characteristics of key informants: role in the community, knowledge, willingness, communicability, impartiality (Marshall, 1996). The interview focused on information about the specific practice of scanning a QR-Code in the specific country, how it changed over time and on the institutional context. Industry experts were identified similar to the business professionals. However, it should be mentioned that industry experts seemed to be more willing to participate. This might be due to the fact that the topic is more relevant to this group of people. In this manner, one key informant from QR-Code service providers was selected for each country (see Table 3).

Table 3: Overview Industry Experts

Job Position	Company type
China	
VP Marketing	O-to-O Solution Provider
Sweden	
Managing Director	QR-Code System Provider
USA	
CEO and Founder	Mobile Solution Provider

All interviews with business professionals and industry experts took place mid-March 2015 and were conducted via phone. The interviews with business professionals lasted between 15 – 40 minutes, while the interviews with industry experts lasted 30 – 70 minutes.

In the second phase, a series of episodic interviews were conducted with three practitioners from each country in order to gain an understanding of the construction and change of the practice from a consumer perspective. Episodic interviewing is a narrative interview technique that elicits descriptions of particular situations in the interviewee’s daily life (Flick, 2009). This approach is appropriate as the presented study asked for the understanding of the experience of practitioners. As suggested by Flick (2009) the interviewees were asked to present a narrative regarding their first QR-Code

scanning experience at the beginning of the interview. This was followed by questions focused on specific aspects of the practice related to materials, meaning and competence. This procedure was repeated for the most recent QR-Code scanning practice. Thereby, allowing to analyze the changes between the two performances of the practice.

The main criterion for the selection of participants was the previous experience with QR-Codes, thereby addressing the appropriateness for the study (Hamilton & Bowers, 2006). Further, participants had to be citizens of one of the three case countries, since the selected environment can affect the practice (Røpke, 2009). A detailed account of the participants can be found in Table 4. Participants were recruited through the referral of existing contacts in China, Sweden and the USA. Following the initial contact an appointment was scheduled. All interviews took place in the first two weeks of May 2015 and lasted between 20 – 30 minutes.

Table 4: Overview Participants Consumers

Pseudonym	Occupation	Age
China		
Kim	HR Recruiter	27
Queenie	Student	24
Maggie	Accounting Specialist	25
Sweden		
Maria	Student	27
Christopher	Student	28
Rosita	Student	24
USA		
Jane	Student	20
Sophie	Student	23
Peter	Dentist	28

Challenges During Data Collection

An important issue to address during the course of research is the change of method. The initial plan was to conduct online focus groups with consumers in each country. However, after having conducted a focus group with Chinese citizens, the method was seen as insufficient for two reasons. First, only 2 out of 5 participants attended the focus group session, therefore, the retrieved material was not deep enough to

analyze the practice. Secondly, the interaction between participants was minimal and participants took a long time to respond to questions. This might be due to the language barrier or the logographic writing system used in China. Thereby, interviews were seen as more suitable.

Data Analysis

For the data analysis of consumer interviews a twofold process was utilized: a thematic analysis followed by a narrative presentation of the results. Thematic analysis has been widely used as an analytical method in interpretive studies. The approach is used “for identifying, analyzing and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 79). In particular, an inductive approach towards thematic analysis was chosen, thereby no prior assumptions, theories or hypotheses of the existence of categories were assumed (Mayring & Fenzl, 2014). The content analysis of the transcribed interviews was conducted with a six-step model, as suggested by Braun and Clarke (2006). The steps are: data familiarization, generation of initial codes, searching for themes, defining and naming themes, reporting findings. In an additional step, related categories were grouped and linked to the conceptualization of practice by Shove, Pantzar, and Watson (2012). Each interview was analyzed according to this procedure, and thereby a representation of the QR-Code scanning practice for each respondent was developed. In the final assessment, each representation was re-checked with its transcribed interview in order to increase the credibility and confirmability of the research findings.

In the second step a narrative structure was chosen to report the practice for each country based on the representation (Eriksson & Kovalainen, 2008). Thereby, all the elements involved in the practice and the links between them are described. The practice for each country was described highlighting the similarities and differences between the participants.

In addition to the consumers' interviews, interviews from business professionals were analyzed as well. The procedure was similar to the consumers' interviews, however, the data was integrated into the existing narrative of each country in order to support the results or point out contradictive findings.

Research Quality

Due to the qualitative nature of the research, the research quality is assessed based on the concept of trustworthiness (Eriksson & Kovalainen, 2008). The concept of trustworthiness consists of the four aspects credibility, transferability, dependability and confirmability.

Credibility refers to the "adequate representation of the constructions of the social world under study" (Bradley, 1993, p. 436). It concerns the fit between the interviewees' view and the researchers' representation of it. Hence, in order to increase the credibility of the description, detailed quotes from the empirical findings will be provided in the section Analysis & Results.

Transferability refers to the degree of similarity between the findings of the conducted study and previous research. Hence, the aim is to establish a form of connection to previous findings. In order to address this issue, the results will be compared to previous findings in the discussion.

Dependability concerns the information provided that shows that the research process has been logical, traceable and documented, which is achieved through a process of auditing. The research process has been accompanied by several seminars in which the research progress has been presented and a detailed account of data gathering has been disclosed.

Confirmability relates to all activities that establish that the data and interpretations of the findings are not figments of the inquirer's imagination. Hence, in order to link the findings to the interpretation, quotes are integrated throughout the representation of the findings.

Analysis & Results

QR-Code Scanning Practice in China

Initial Practice

The empirical findings show that the mass popularity of QR-Codes in China is clearly linked to the social network WeChat. WeChat is a mobile text and voice messaging application developed by Tencent and released in the beginning of 2011 (Tencent, 2015). Even though QR-Codes have been used before for marketing purposes, the major breakthrough of the practice was due to the integration of a QR-Code reader into the WeChat application.

"The major thing that made QR Codes popular in China is the use in social networks. [...] China has used it [QR-Codes] for marketing even before, but the mass popularity I think, has began in 2011 when WeChat, the social messenger of Tencent, has started using QR Codes for social networks" (Industry expert China, Vice President Marketing)¹.

Subsequently, it is not surprising that when interviewees were asked about the *material aspects* of the QR-Code scanning practice, all mentioned to have used WeChat when they scanned a QR-Code for the first time between 2011 and 2012.

"I was trying to add someone on my WeChat" (Kim, female, 27).

"I was on the street the first time I used it. I added a friend on WeChat when I met him in the street. He had to go quick, so we used WeChat to stay in touch" (Maggie, female, 25).

"A teammate wanted to add me on WeChat, I asked him to show me his QR-Code" (Queenie, female, 24).

QR-Codes are used in this situation to add new friends to the WeChat contact list. Each WeChat profile includes a unique QR-Code, thus, one person displays their personal QR-Code, while the counterpart scans the QR-Code by using the

¹ The industry expert for China is the Vice President Marketing of a technology company offering products that facilitate the offline-to-online journey of consumers. The expert has been with the company since 2013.

integrated QR-Code reader. Thereby this practice can be characterized by the interaction between two individuals. It can be argued that activities that produce such an asymmetric outcome are not one single practice, but rather two practices that meet in a common situation. On the contrary, the asymmetric outcomes of this practice are mutually conditioned – one cannot scan without the other displaying the QR-Code. Following the argumentation of Røpke (2009), it is favorable in such a situation to “conceptualize such activities as one practice” (p. 2492), even though the conceptualization of practice by Shove and partners does not explicitly include the interplay. Therefore, in order to highlight the importance of the interplay, the person displaying the WeChat QR-Code, called counterpart in the following, as well as the QR-Code itself are specifically included as part of the material aspect. The WeChat application with its QR-Code reader is included as well.

With regard to the *competences* needed to scan, the respondents reported no particular needs. They referred to it as “simple” and “easy”. However, it was evident from the findings that specific education took place.

“So I heard of it from one of my friends and he sort of convinced me to use it [...] He showed it to me and said you can just add me using the QR-Code” (Kim, female, 27).

In this case situative learning (Fox, 2000) took place, a learning process that is tied to an ongoing practice and accomplished through social interaction between practitioner and counterpart. This relation shows how the material aspect is linked with the competences: the counterpart educates the newbie practitioners on how to scan a QR-Code, during the performance of the practice. In another case, the practitioner reported that the know-how was gained through explicitly formulated instructions by the application itself, which was confirmed by the industry expert.

“It was shown in the app [WeChat], they introduced the new function, showed where the reader is and where to find everything” (Maggie, female, 25).

“So if you go to the discovery section of WeChat or another application you will find a link, saying scan a QR Code” (Industry expert China, Vice President Marketing).

In this situation the specific design of the application had an impact on the competences, highlighting another interconnection between competences and material. However, the competences can also be mastered outside the actual practice; one interviewee mentioned that her son educated here in terms of the scanning competences.

The findings concerning the *meaning* of the QR-Code scanning practice illustrate that the practitioners were fascinated by the novelty of the function and the technical possibilities. This notion is also confirmed from business professionals.

“It was a new function, it was also fun to do [...] It was convenient” (Maggie, female, 25).

“Exciting, I mean it is a new thing, it was good” (Queenie, female, 24).

“I think it is convenient and interesting, it is different from typing” (Kim, female, 27).

“Five years ago less advertisers used QR-Codes, so people find the novelty more interesting, try it out and see what is happening after scanning” (Managing partner, advertising agency).

Further the quotations point out that practice was seen as “convenience”. This meaning emerged from specific Chinese aspects. According to the industry expert as well as the practitioners interviewed, the convenience of the practice is based, on one side, on the large population in China, making it more efficient to add new WeChat contacts using the QR-Code instead of searching by user name. On the other hand, the Chinese language, which does not have an alphabet but uses a logographic system for its written language instead, makes it more difficult to type on the keyboard.

“So, normally people combine a lot of numbers and different letters, so sometimes it is quite difficult to search” (Maggie, female, 25).

“On the smartphone, typing in Chinese is much more difficult than typing in Latin language because there are 5000 characters” (Industry expert China, Vice President Marketing).

The empirical findings depict a clear picture of the interwoven elements of meaning, material and competence.

Most Recent Practice

However, the practice changed over the years. The industry experts explain that based on the success of WeChat social networks and e-commerce applications integrated a QR-Code reader into their application between 2011 and 2013. Hence, nowadays consumers find QR-Code readers in several applications that they “are using anyhow” (Industry expert, Vice president marketing). This shift is also reflected in the interviewees’ statements, now using a diverse range of applications.

“I used Alipay, another app that is very popular in China, to transfer money to my friends. When we go out and have dinner, we do that sometimes” (Maggie, female, 25).

“I used my telephone and the Taobao app. I scanned the QR-Code to go to that shop and to buy something I like and pay there” (Queenie, female, 24).

“Mostly WeChat, sometimes Weibo as well” (Kim, female, 27).

These empirical findings show that the consumers use different apps for different occasions. Hence, the integration of QR-Code readers into different applications had the effect of the reproduction of the practice in a different form. Thereby, the diversification leads to the spread of the practice. Weibo is used in a similar way as WeChat, to add friends to your contact list, Alipay for the management of financial transactions and Taobao for online shopping. However, rather than the practitioners’ motivation or the aim that decides on the use, the findings illustrate that the *meaning* of the practice is connected to the material aspects. In the case of Alipay the consumer explains that it helps to “safe time, we could transfer money without

going to the bank” (Maggie, female, 25). Thereby, the meaning of convenience, which was in the beginning purely moderated by specific Chinese aspects (logographic language, population size), is now redefined in the specific context the practice is performed. However, the logographic system still plays a role, one consumer explains to have scanned the Taobao QR-Code, as “it is very useful to me, you don’t have to type in the store name” (Queenie, female, 24). Further, the fascination for the technic caused by the novelty of the material aspects has given away as the practice becomes familiar. Consumers now describe QR-Codes as “common” and “popular”.

“First time it was like wow, that is a new thing, and now it is common” (Queenie, female, 24).

“I think now it is really popular in China” (Kim, female, 27).

This change is driven by the omnipresence of QR-Codes in China. A consumer explains “every commercial advertisement will show a QR-code, even the TV show would have a QR-code while it is on”. Additionally the industry expert assures that “QR codes are everywhere” in China and that “the general view is that they are part of daily life”. Thus, the material aspect, particular the increased usage of QR-Codes, influences the way consumers see QR-Codes nowadays in China. This dynamic relationship is logic as the more people take up a practice, the less strange it becomes (Shove & Pantzar, 2005).

Regardless of the use of specific applications in specific situations, WeChat seems to be still the predominant application to scan a QR-Code. The interviewed consumers refer to WeChat as “very popular” and, thus, “mainly use WeChat”. The empirical findings also show that consumers feel more “familiar” with the practice. One consumer explains that this lies in familiarity with the application, highlighting the interrelation between learned *competences* of the initial practice to the material aspects of the new practice. The effect of educated consumers on the current practice was also pointed out by the industry expert.

“Today I would say that every Chinese user knows how to scan a QR-Code [...] It is also much more useful in marketing because you have user educated about it and they know everything they need to know in order to utilize this technology” (Industry expert China, Vice President Marketing).

The empirical findings show how materials, meaning and competences first integrated and constituted the practice of scanning a QR-Code and how gradual changes within the elements took place that eventually constituted a new practice.

QR-Code Scanning Practice in Sweden

Initial Practice

In comparison with China, the practice in Sweden is not linked to a single application. On the contrary, the practice emerged in the broad commercial space and is related to the advertising efforts of companies. When the interviewees were asked about their first QR-Code scanning experience, which took place between 2012 and 2013, they mentioned that they scanned advertising related QR-Codes.

“The first time I scanned a QR-Code was at an amusement park. They had a QR-Code on the wall and said ‘scan this QR-Code to download our app’” (Maria, female, 27).

“I remember I was in a store, I was looking at something that had a sustainability label on it [...] it was coffee [...]. You could scan the coffee and you could get more information about farmers and about how the coffee was grown” (Christopher, male, 28).

“I found it in a newspaper, it was a link, you could scan the code and participate in a competition and you were asked some questions to describe yourself. And that is why I used the QR Code to go to the link and answer the questions” (Rosita, female, 24).

In addition, QR-Code readers were not pre-installed on the phones or integrated in a widely used application. According to the industry

expert², efforts have been made to preload reader applications on mobile devices in 2008. However, these efforts failed due to the lack of believe in the technology on the side of mobile operators. Not surprisingly, all interviewees mentioned to have downloaded a specific reader application in order to be able to scan a QR-Code. As a consequence, the *material aspects* are characterized by a diverse range of QR-Code reader applications as well as the QR-Code itself. With respect to the *competences* the industry expert reports that no market player took the opportunity to systematically educate potential practitioners. In fact the industry expert, as the managing director of a leading QR-Code system provider, expected mobile operators to educate consumers. This is also reflected in the consumer perspective. The practitioners distinguished between skills needed to perform the task and a general understanding of QR-Codes. Regarding the skills, all interviewed consumers mentioned that they learned how to scan while accomplishing the task. One interviewee elaborated in detail on how he figured out how to scan, indicating that the competences needed to scan might migrate from co-existing practices. This might explain why all respondents referred to the procedure as “not so difficult” and “straightforward”.

“I guess we have a sense of scanning since you go to the cashier every time you buy grocery. They have their own scanner, its not like a QR code but it's a barcode I guess. So the idea of scanning something is strongly rooted in the back of your head. [...] So I mean the process of picking up the commodity and scanning it, once I had the app, was not hard either. It felt like common sense. I didn't feel any particular struggles” (Christopher, male, 28).

While learning-by-doing took place for the skills of scanning, a general understanding of QR-Codes was gained spatially and temporally separated from the first act of scanning through a diverse range of sources of information. These

² The industry expert for Sweden is a Managing Director of the leading mobile engagement provider in Northern Europe. The expert has been with the company since 2007.

sources of information are treated as material aspects of the practice.

“A guy who is very technical and knows stuff like that, was talking about everything, like the ease of use of the QR Code and that you could connect to stuff and so on. I think that was like the first conversation that I ever had about QR Code” (Maria, female, 27).

“I am a bit interested in technology so this is something that I have read about in some newspaper or some magazine. And then I guess, it is hard to recall, but I guess I heard people talk about it. You know when a new technology emerges people tend to mention it, ‘have you seen this technology, have you tried it?’” (Christopher, male, 28)

“My mum has used it before so I have heard from her a little bit [...] So when I tried it myself I have heard it before but never used it” (Rosita, female, 24).

These quotes exemplify first of all, that conversations about QR-Codes took place due to the novelty of the material aspects. Secondly, it demonstrates that social interaction among consumers lead to the dissemination of the understanding of QR-Codes, rather than institutionalized education by organizations. Furthermore, these conversations also imply that the topic itself was associated with a sense of popularity.

In line with this *meaning*, one consumer describes QR-Codes as the “new thing that every body was going to do” (Maria, female, 27). Moreover, the advertiser interviewed confirms that QR-Codes “became like a hype” (Brand Analyst, Digital Marketing Agency). Thereby, new material aspects, a general understanding of QR-Codes and the popularity associated with QR-Codes are linked and enforced through the conversation. Further, the general understanding about QR-Codes and the novelty of the material aspects arouse the curiosity towards the technology of the practice, practitioners were hooked by the technic.

“Curiosity! Mainly because it was a new technology which I haven’t tried. I am a bit curious, I mean just technologically. But also it was a commodity that I was actually interested in knowing more about. So

it certainly dependent on the commodity. I wouldn’t have scanned a bottle of shampoo or something, that wouldn’t interest me” (Christopher, male, 28).

“I think I actually saw it as an opportunity to scan the code, like a code for the first time, to see if it works. And then I wanted the app [QR-Code linked to the App-Store] as well, to see what it was. But I think I saw the opportunity to try the scanner” (Maria, female, 27).

“I was curious to use it. [...] I recognized it [previous QR-Codes] but it was not interesting for me, but when I saw it in the newspaper, ‘ohh this is for me I think i can use it maybe’ and then I tried” (Rosita, female, 24).

Further, the quotes clarify that the curiosity of the practitioners was triggered in a specific moment when the interviewees were exposed to the QR-Code. This shows the interrelation between the material aspect and the curiosity. However the meaning related to QR-Codes in commercials changed over the time. Two interviewees mentioned that they have changed their opinion about QR-Codes related to advertising based on their scanning experience.

“I feel like they are a bit redundant. I think it is often very hard to scan and it is just as easy to type it in. I mean everyone is a fast typer now a days so I don’t really see the need of them” (Maria, female, 27).

“I gathered that most of the QR-Codes are just like redirections to the website and then it is just easier to just type it in. It needs to be simpler, it needs to be quick and actually beneficial and not just a gimmick” (Christopher, male, 28).

The interviews with practitioners point to a circuit of interdependent relation between the material aspects, the understanding of QR-Codes and the deflection of the practice in the advertising space. Based on the scanning practice and the reevaluation of the QR-Code content, the meaning of scanning changed gradually and eventually QR-Codes were considered as “redundant” and “unnecessary”. Thereby, previous experience shaped the meaning of QR-Codes in the context of advertisement, and explains the deflection of the two practitioners. This is confirmed by the industry expert, who

believes that “QR-Codes even today are suffering from the label they got years ago”.

Most Recent Practice

In regard to more recent scanning experiences, all three consumers reported to have scanned a QR-Code in very different occasions.

“I think I scanned to get my phone connected to my smartTV, to browse on YouTube through my phone on TV, on my big screen” (Maria, female, 27).

“Two weeks ago I went to a seminar, like a business seminar, and that seminar was free to register, but you got a ticket via e-mail. They sent me a QR-Code which I needed to show” (Christopher, male, 28).

“In the library at the university we have a QR-Code to book our study room [...] They are outside the room on the door. The QR-Code is on the paper and I took my smartphone and just held it to the QR-Code and came to the link where I could book the room” (Rosita, female, 24).

The findings show that the practice is now integrated into a diverse range of established products and practices. This raises the classical problem of defining the boundaries of the practice. From the conceptualization of practice, this development can either be seen as new material aspect of the existing practice or the practice itself can be seen as a sub-practice related to a broader context (Mylan, 2014; Røpke, 2009, p. 142). Even though this is an interesting theoretical aspect, it is not really relevant for the research purpose. Here, the main point is the diversification of the practice. The practice is reproduced in a different form due to the integration of the practice into other products and activities. Thereby, multiple types of practices exist around scanning a QR-Code.

This process also affects the *material aspects*, as each practice has “its own required paraphernalia” (Warde, 2005, p. 142). Hence, the material aspect related to the practice of scanning got more diversified and tailored to the usage. Further, in the cases described by the interviewees the demand for QR-Codes is generated indirectly through the participation in

an event, the technical system of the TV and the booking of a group study room.

This has consequences for the *meaning* of scanning a QR-Code. Consumers describe the QR-Codes in relation to the use case. More precisely, they see QR-Codes as an “easy way” and “good way of doing”. Thereby, the consumer evaluates the QR-Code in context of its use.

“I felt it was very, very efficient. And I felt that it was a good way. You do not even have to talk with the people who scan the code” (Christopher, male, 28).

“I think that was quite easy, I had to go up to the TV of course and scan the code but that worked ok. It didn’t take long and it worked fine” (Maria, female, 27).

“That’s a very clever way, you don’t have to use your computer, all you need is the iPhone to book the study room, very smooth” (Rosita, female, 24).

In regards of skills needed to scan, all interviewees mentioned to be more familiar with the practice of scanning, due to their previous experience. However, as the QR-Code is used in different situations, a new understanding is established. In this context, all three consumers interviewed mentioned that the materials informed them about the use, illustrating the link between material and meaning. Beside the materials, one consumer mentioned that the understanding of the QR-Code migrated from co-existing practices.

“They [in the e-mail] said this is your ticket and I figured this is something I need to show to the person who is working there because of my previous experience. And I guess the reference to entering the airplane was very strong” (Christopher, male, 28).

The empirical data revealed that the consumers’ practices were initially linked to advertising, and then changed through the integration of QR-Codes into established practices and products. The brand analyst interviewed supports these findings. While initially used in advertisement to “bring people from offline to online, [...] now it is been used very well for tourism or even entertainment fields” (Brand Analyst, Digital Marketing Agency).

In explaining why these elements came together it is important to look at the institutional context. The industry expert, the Managing Director of a leading QR-Code system provider in Northern Europe, took initial efforts to promote the practice in Northern Europe. However, the early years were characterized by resistance towards the technology.

“So in 2008 I went out, started in Denmark, trying to tell people we are [QR-Codes] going to be big. I realized that I was the only one in northern Europe that believed in that fact, at least in 2008” (Industry expert Sweden, Managing Director).

In particular, mobile operators, advertising agencies and brands are involved as market actor. The mobile operators showed a lack of believe in the technology and as a consequence did neither support the dissemination of the technology nor the education of the consumers. In the case of advertising agencies the technology was rejected for aesthetic reasons.

“I went to all of the agencies, for me QR-Codes are an additional tool in their toolbox for their clients to create an instant entrance for offline-to-online. [...] They didn't like it. From an agency, a graphical design perspective, they believe it ruins the design of the poster” (Industry expert Sweden, Managing Partner).

Further, according to the industry expert the agencies didn't understand it as an additional marketing tool. In fact, agencies now see it as “pretty much old marketing tactic” (Brand Analyst, Digital Marketing Agency). On the side of the brands, the opinion prevailed that it is “extremely expensive” (industry expert Sweden, Managing Partner) to incorporate a good user journey. Consequently, “there has been a focus on design but only very little focus on the user journey and the consumer experience” (Industry Expert Sweden, Managing Director), even though the industry expert was aware of the importance of the user experience.

QR-Code Scanning Practice in the USA

Initial Practice

Similar to Sweden, the QR-Code scanning practice in the USA emerged in the broader commercial space. The consumers interviewed reported that their first QR-Code scanning experience took place between 2007 and 2012. Two interviewees reported that the practice was tied to promotional efforts of a company, whereas one consumer mentioned to have scanned a QR-Code related to publishing.

“I think that it was on the back of a product, I cannot remember what product it was, but it was basically a link to the product's official website. [...] I feel like it was kind of late when I did it, the codes were already out there in 2012” (Jane, female, 20).

“So I guess the first time ever I scanned a QR-Code was probably 2010. At that time I was in high school. And in the school newspaper there was an advertisement and they used it just to link their website to their ad” (Sophie, female, 23).

“The first time I used a QR-Code was while reading an article in the Wired magazine specifically about these codes and the use and so on. This was probably about 8 years ago, at that time QR-Codes began showing up in print and stores” (Peter, male, 28).

In regards to the *materials*, all respondents mentioned that QR-Code readers were not pre-installed on their phones, thereby specific applications had to be downloaded. As a consequence, the material aspects are characterized by different QR-Code reader applications as well as the QR-Code itself that was found on print material and on a product. All interviewees reported that the variety of available QR-Code readers in the app store was great and the application was free of charge. One participant even mentioned that a payment would have been an obstacle.

“The apps that could scan them [QR-Codes] were free. I don't think I would have done it if I had to pay 99 cent or something for it” (Sophie, female, 23).

Concerning the *competences* the practitioners distinguished between practical skills to carry out the procedure of scanning and a general understanding of QR-Codes. Regarding the first, all interviewed consumers mentioned that they perceived the procedure as “easy” and learned how to scan while accomplishing the task.

“I just opened the app and it said place camera just on top of the QR-Code. And that’s what I did and it scanned it in one second” (Sophie, female, 23).

“When I clicked on it [the application] there was already the camera view and there was a little square, a frame where I could match the QR-Code so I just went on. [...] It was quick, simple. I liked how you would just fit the code inside the frame without clicking anything” (Jane, female, 20).

“It wasn’t that hard. There was not much to see actually, it showed the camera frame and I kind of put the camera of the phone over the code and scanned it” (Peter, male, 28).

The citations illustrate that the perceived ease-of-use of the application had an impact on the learning process, thereby, material aspects and the skill needed for the procedure are linked. In one case, this relationship is specifically strong, as explicitly formulated instructions on how to scan were given by the application itself. Additionally, a general understanding of QR-Codes was gained from a diverse range of sources. One participant mentioned to have read an article about QR-Codes, whereas two others mentioned to have learned about it from friends.

“I heard about it from my friends but never tried it. And then I just saw one [QR-Code] so I gave it a try and downloaded the app” (Jane, female, 20).

“And the first time I didn’t really know what it was and a friend was like ‘this is called QR-Code’ and I was like ‘OK, what’s that?’. And then I downloaded one of the free apps from the app store” (Sophie, female, 23).

“[...] Reading an article in the Wired magazine specifically about these codes and the use and so on” (Peter, male, 28).

All three cases show that knowledge about QR-Codes played an important role in the practice. Once the potential practitioners were educated

on QR-Codes, their interest and curiosity in the practice arose. One participant elaborated in detail on the importance of knowledge regarding the use of new technologies, illustrating how understanding affects the sense making process of the practice.

“Just like any kind of new thing that comes out, you’re kind of ignorant of it until someone really tells you what it is. [...] When I first saw it [a QR-Code] I just didn’t really have an opinion. I just thought it was a weird thing to put on an advertisement. Then my friend told me what it is and I got kind of curious and wanted to try it [...] If I see one now I am like ‘Okay, cool I can scan that with my phone’” (Sophie, female, 23).

Thereby, competences are clearly linked to the *meaning* of the practice. Beside the knowledge that created curiosity and interest in the practice, the novelty of the technology as well as the omnipresence of the QR-Codes reinforced this feeling.

“I was curious, because people were talking about it. I saw QR-Codes starting to appear in advertisement and on products. So I wanted to try it” (Jane, female, 20).

“I am in general interested in new technologies, I think you should try out new things from time to time and see how it works. So in the article they were talking a lot about it and they said it was a new thing that comes from Japan. That kind of got me excited about it. I just got curious” (Peter, male, 28).

In these cases the aspect of novelty of the materials also contributed to the curiosity. Further, in all three cases the curiosity of the practitioners was triggered in a specific moment when the interviewees were exposed to the QR-Code. This shows the interrelation between the material aspect and the curiosity.

However, two practitioners changed their meaning towards the practice based on their previous experience. Specifically the QR-Code content had an impact in this development.

“The first time I did it, I thought it was really cool and I thought it would become the thing to do. [...] I haven’t had it in a while just because I don’t really find the use for it all too much. I haven’t really

found much use for myself just looking at advertisements. I am not that interested to the extent that I would scan that”

“Since that time, I have seen codes in every sort of place but honestly didn't find them useful or valuable. The content is often related or not very helpful. It is not helpful to what I seek” (Peter, male, 28).

This notion is confirmed by the business professionals. The industry expert³ points out that “the users want to see value for the investment of time and action”, while the CEO of a US-based advertising agency refers to the basic QR-Code content. According to the CEO, initial QR-Codes just linked to Facebook or companies website, this is “how the perception of QR-Codes became negative” and is still affecting the practice today.

“Now here in the US we are suffering the results from what could have been a really interesting marketing tool” (CEO & President, Advertising Agency).

In explaining the cause of the redundant QR-Code content, the industry expert points towards a relationship between consumer and producer. Brands are only willing to invest in the technology if the user base is big enough. The advertiser delivers a similar explanation, highlighting how priorities affect the choice of the advertising channel.

“It is just not enough people using QR-Codes for them [brands] to invest in content around QR-Codes (Industry expert, CEO & Founder).

One of the things that I always talk about is that we [the USA] are not a mobile first yet, we are mobile always. [...] Always should a brand present through mobile marketing communications, but it is not the number one priority yet. [...] QR-Codes are not necessarily a top priority in your marketing toolbox” (CEO & President, Advertising Agency).

³ The industry expert for the USA is the CEO and founder of a technology company that offers products that facilitate the mobile engagement of consumer. The expert has been with the company since 2007.

Most Recent Practice

With reference to the more recent scanning practice, the two interviewees that reported to have changed their meaning towards QR-Codes related to advertising have scanned QR-Codes, consequently, in different situations. While the other interviewee scanned – like the first time – a QR-Code related to advertisement.

“The last time I used a QR-Code was the last JetBlue flight that I had. I just have the JetBlue app, I logged in, checked in and it just popped up a QR-Code immediately” (Sophie, female, 23).

“It was pretty much the same, it was something about a promotional thing, I guess it was on an advertisement card. Maybe someone just handed it out to me.” (Jane, female, 20).

“The last time I used a QR code was last week, they have reinvented themselves within POS applications. At Subway, a sandwich shop here in the US, they have included codes in their payment processing for secure transactions” (Peter, male, 28).

The empirical findings show that QR-Codes are now used in a wider commercial context. Thereby, the practice is reproduced in a different form and multiple types of practices exist around scanning a QR-Code in the USA.

This multiplication also affects the *material* aspect of the QR-Code scanning practice. The materials involved are shaped by the specific needs of the context. In two cases the demand for QR-Codes were generated indirectly through the mobile payment and the flight with JetBlue.

The use of the materials in a specific context also affects the *meaning*. In these two cases, the interviewees evaluated the use of QR-Codes relative to the context and described it as “practical” and “handy”.

“I think it is very practical. I think airlines that don't have it already, should definitely implement it. [...] But the actual procedure of using the mobile ticket is even easier than using a paper ticket because a paper ticket you fold up, stuff in the bottom of your backpack and always have to get out. But your phone you always have with you. [...] You have it easily in your hand at your disposal” (Sophie, female, 23).

“When I think about it, it was actually easier than paying with credit card. I just grab my phone, unlock it and scan it. You can do all that with one hand - very handy” (Peter, male, 28).

In particular, the smartphone had a great impact on the evaluation. The interviewees related to specific attributes of the smartphone, the reachability and the ease-of-use, which then transferred to the “practical” meaning of the practice. In the case of the advertisement, the respondent referred to the material aspects as “a regular thing right now, it is everywhere. So I just felt it was natural for it to be there” (Jane, female, 20). Thereby the initial excitement has given away to a matter-of-fact perspective on the QR-Code scanning practice, in which even the QR-Code content is anticipated.

“I knew that it was just like a scan, you don’t need to fix it, you don’t need to frame it from corner to corner. I know that it just going open a website, its not going to do anything magical” (Jane, female, 20).

This citation also shows that the practitioner got more familiar with the scanning procedure. In the two other cases the practitioners reported a similar experience, however specific in context to the practice.

“So first I would print out the ticket but still have my mobile ticket just in case as a back-up. I thought that maybe the only concern is that the battery lasts, the older the devices get the shorter the battery lasts. But nothing ever happened” (Sophie, female, 23).

“It wasn’t new to me and it is not that hard. We all can open an application and we all take photos with our phones. I think mobile payment is just those two things together. You open an app and you hold it over the QR-Code” (Peter, male, 28).

The empirical data shows that the practices of scanning a QR-Code changed over the time. QR-Codes are integrated into established practices and products. The industry expert and the business professional confirm that QR-Codes are still used for classical advertising. However, they are part of a broader context. “People are using it nowadays, as a technology within a

broader solution” (Industry expert, CEO & Founder).

Discussion

Despite its short history, the QR-Code scanning practice in China, Sweden and the USA showed a tremendous development. The practice is seen as part of the everyday life in China. Whereas, in Sweden and the USA, the performance of the practice is limited to specific sites and not viewed as part of the everyday life. In order to explain this development it is important turn to the view of practitioners as well as the institutional context. Further, specific aspects in the development are highlighted.

In China, the practice is closely linked to the application WeChat. In the beginning practitioners found pleasure and excitement in the novelty of the materials and were hooked by the technology and its possibilities. Further the performance was seen as a convenient way to add friends. However, within a set of repeated performances, practitioners reevaluated the material aspects of the practice. Through this reevaluation the initial novelty and the technical fascination were given way and convenience remained as a meaning. Due to the convenience, practitioners continued to perform the practice. This resonates with Shove and Pantzar (2007) conclusion that a positive experience for practitioners, give rise to a process of repetition and reproduction. In the case of China this helped to build a constituency of competent practitioners behind the practice. Further, the constituency of practitioners was increased due to a interpersonal recruitment process. Since the practice is characterized by the interplay between two person, practitioners draw other into the practice. In drawing an interim conclusion, it becomes clear that due to WeChat the practice of QR-Code scanning was able to set root in China and build a base of competent practitioners equipped with QR-Code reader applications. This base influenced the trajectory of the practice. On one side, the success of

WeChat lead to the diversification of the practice into different application. Moreover, these application were part of the mundane life of Chinese citizens and, thereby, increased the opportunity to carry out the practice. In line with Southerton et al. (2012) the diversification lead to the spread of the practice. On the other side, as the practice became more common, the materials, precisely the QR-Codes in the commercial space, became increasingly adopted. Both of these factors influenced the view of QR-Code as part of the everyday life in China.

Turning towards the development of the practice in Sweden and the USA, the empirical data shows a different trajectory of the practice. The practice emerged in the broader commercial space, the initial use cases were promotional efforts and publishing activities. Similar to China, in the beginning practitioners were excited about the novelty of the materials and hooked by the technology and its possibilities. It is interesting to note, that in all countries a similar meaning existed that had an great impact on the recruitment of practitioners. This relates to scholars in the field of technology acceptance highlighting that curiosity is a proximal antecedent of the intention to use technology (Venkatesh, 2000). Compared to China, the practice was not accompanied with convenience or any other meaning. As the practitioners reevaluated the practice within a set of repeated performances, the initial novelty and the technical fascination were given way and a new meaning rose. In fact, practitioners evaluated the quality of the QR-Code content and realized that the content provided by companies was redundant and, therefore, the practice itself was seen as unnecessary. This interrelation shows that the technology use is affected by previous performances of the practice. In the terminology of Shove and Pantzar (2007), the QR-Code content did not offer a sufficient experience, practitioners turned away from scanning QR-Codes related to advertising and publishing. Therefore, in comparison with China, the practice could not recruit a constituency of practitioners. Hence, the practice could not take root in the everyday life of the practitioners, due to the

negative experience of the practice. Further, the involvement of the negative perception of QR-Codes for commercial purposes, still prevents potential practitioners to carry out the practice today. However, independently from the initial use of QR-Codes, the practice reborn itself in different sites. Nevertheless, compared to China two factors appear to explain why QR-Codes are not seen as part of the everyday life in Sweden and the USA. Firstly, the use cases are less mundane. Event-ticketing, flying and the booking of group study rooms are hardly activities of the everyday live. Secondly, as the practice did not recruited a base of practitioners, business professionals turned way from the use of QR-Codes as a advertising tool. Thereby, the omnipresence of QR-Codes that reinforced the meaning of common in China, could not happen. Which intern decreased the opportunity to carry out the practice.

In further understanding how and why these trajectories developed this way, it is important to take note of the institutional context. In China, the main institutional actor was Tencent, the developer of WeChat. Tencent added the QR-Code reader as a function to their messaging application in order to increase the convenience. Thereby, Tencent had a clear understanding of the function of QR-Codes, which determined their action. The company made efforts to educate the users about QR-Codes, an important aspect in the development of the practice. Hence, Tencent not only provided the material aspect, but also contributed strongly to the elements competence and meaning.

In contrast, in Sweden and the USA great variety of different actors were in involved in providing the elements that constitute the practice as the practice emerged in the broader commercial space. Specifically the brands and advertising agencies that created the QR-Code content, in one case the publishing company, mobile operator and QR-Code system provider. However, in the case of Sweden each actor had different ideas about the technology. The empirical data concerning the USA reveals a similar picture, brands were not willing to invest

in the technology due to the small base of practitioners. Thereby, the institutional context in Sweden and the USA is characterized by a diverse range of actors with a conflicting understanding of QR-Codes.

Beside the role of the consumers and producers, the comparison between the three countries reveals another important aspect. The empirical data shows that specific Chinese aspects impacted the emergence and development. The logographic language and the population size offered a fertile soil on which the practice could unfold. In particular, these aspects shaped the meaning of the practice. Neither in Sweden nor in the USA, did a similar aspect impact the emergence and development of the QR-Code scanning practice.

In drawing the threads together, it becomes clear that both consumers and producers affect the emergence and development of the QR-Code scanning practice. Specifically, the development of the practice is shaped by the recursive relation between consumer and producers. The empirical data shows that it needs a critical mass of practitioners for actors to invest and support the practice. However, practitioners only keep on carrying out the practice if they get a good experience, which demands the investment of the producer.

In China, the practice emerged in a specific site and then gradually developed into the wider commercial space. Scholars in sociology of technology and evolutionary economics have emphasized the importance of such niches as they help to “build a constituency behind a new technology” (Kemp et al., 1998, p. 184). In this terminology, WeChat offered the practice a protected space. This incubation room helped, on one side, to recruit and educate practitioners, and on the other side, to diffuse the QR-Code reader application. The existence of the logographic language and the great population size increased consumer recruitment. As the base of competent practitioners developed, the producer started to invest in the development of the practice. As outlined before, this led to the

diversification of the practice and the multiplication of QR-Codes. Both aspects were relevant for the practice to become part of the everyday life.

In Sweden and the USA, the practice emerged in the wider commercial space, in the terminology of the niche strategy, the mainstream market (Geels & Kemp, 2007). As the practice emerged in the mainstream market, the practice could not overcome the causality dilemma between consumer and producer. Hence, it was not able to build up a base of competent practitioners which in turn attracts the investment of actors. Further, a greater variety of different actors were involved in providing the elements that constitute the practice, making the establishment of the practice more difficult. This is problematic as especially close-knit networks of key actors are helpful for the emergence of practices (Shove & Pantzar, 2005; Shove et al., 2012).

Concluding Remarks

This article aimed to illustrate consumers' and producers' role in the emergence and development of the QR-Code scanning practice in China, Sweden and the USA. The presented study shows that a recursive relationship between consumers and producers exists, which affects the trajectory of QR-Codes in each country. In China, WeChat offered a protected space that helped to overcome this causality dilemma between. Further, logographic language and the population size offered a fertilizer for the practice. In contrast, in Sweden and the USA the practice was not able to overcome this dilemma. In the light of these findings, the different usage levels of QR-Codes between each country are seen as a produced outcome of the relation between consumer and producer, rather than the effect of the behavioral intention of the consumers.

In this light, the current study suggests several implications to scholars and professionals. Regarding research, this study shows the relevance of a socio-material perspective in order

to explain the consumers' acceptance of technology. The study illustrated that the relationship between consumer and producer has an impact on the usefulness of technology. This contribution is especially interesting turning towards the Technology Acceptance Model (TAM), which sees the consumers' perceived usefulness as an indicator of the use (Davis, 1989). Thereby, the model might be less applicable in case of recursive relations. Considering the trajectory of the QR-Code scanning practice and its integration into various sites, the study suggests the need to consider the intersection between different practices, and include all elements into the empirical analysis. For business professionals the study illustrates the appropriateness of strategic niche management (Kemp et al., 1998) for innovation in technology that faces a casualty dilemma between consumer and producer. This point also leads to implications for the product development process. The study supports the suggestion of Ingram, Shove, and Watson (2007) for a cyclical model of designing and consuming. Thereby, consumer practice affects the use of technology, while technology affects the practice.

Empirical studies based on the consumer practice theory face some challenges and critiques. Since the study describes only three practices each country, it cannot state to which extent the described performances are widely diffused. However, as the findings from the consumers are coherent with description from the industry experts the findings indicate an important trend of change and diversification of the QR-Code scanning practice. Nevertheless, this can be addressed in qualitative study in order to complement the findings presented in this article. A final limitation points method of data collection. Data collection was restricted to interviews even though practice theory supports the adoption of several data sources (Shove et al., 2012) and ethnography is seen as "the key methodology with which to observe social and situated practices" (Corradi, Gherardi, & Verzelloni, 2008, p. 23). This is limitation is acknowledged, however in regards of the research

aim to trace the emergence and development it is seen as possible to focus purely on interviews.

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