Holistic Customer Experience in Smart City Service Systems – A Conceptual Model

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ABSTRACT

Recent developments such as increasing online competition, changing customer behavior, and the impact of the COVID-19 pandemic result in a decoupling of service provision and consumption from physical service loci. This tremendously decreases city attractiveness for customers. Against this backdrop, we propose an experience-oriented and integrated perspective on service development in smart cities. Research lacks in examining how customer experience can be created in complex service systems involving multiple actors, such as smart cities. Therefore, we develop a customer experience model consisting of ten determinants (social environment, service interface, atmosphere, service selection, price, access, alternative channels, brand, city brand, and previous experience) and two moderators (situation and consumer moderators) in a design science research (DSR) approach (Peffers *et al.*, 2007) involving an extensive literature review and the analysis of 40 international real-world smart city services. Our artifact supports researchers and practitioners in the design and evaluation of customer-oriented smart services in smart city contexts.

Keywords: Customer experience, Smart city, Smart service, Service system, Conceptual model, Design science research

INTRODUCTION

As a result of technological advancements and rapid urbanization, smart cities have emerged as initiatives consisting of multiple actors which are focused on creating smart services to improve customers' quality of life (Lipkin, 2016; Giourka *et al.*, 2019). As complex and multilayered smart service systems, smart cities offer many physical and digital touchpoints where interactions with customers can occur. These touchpoints can be integrated at different levels to stimulate service creation by bringing together different resources, such as data (D'Aniello *et al.*, 2020; Kühne and Muschkiet, 2021). At present, however, service design and delivery in cities is mostly highly parceled out and isolated by individual providers (Nam *et al.*, 2011). In consequence, smart cities are lacking in collaboratively designing and integrating smart services to exploit the potential for customer-oriented value creation (Muschkiet *et al.*, 2022). This isolated consideration of services could be identified as one of the central weaknesses of today's cities. Increasing online

competition, related changing consumer behavior, and the COVID-19 pandemic are leading to a growing decoupling of work, leisure and shopping from physical locations and thus from the city as a place to stay and a place where value emerges (Zwermann, 2021). These developments have negative impacts on the attractiveness of cities for customers (Baersch *et al.*, 2021). To strengthen the development of cities, it is necessary to attract customers back by making the experience attractive as a combination of value contributions across customers' activities in their daily lives toward a holistic customer experience (Polese *et al.*, 2019; Källström, Persson and Westergren, 2021). Meanwhile it has been argued that customer experience in cities is more holistic than the experience in dyadic service encounters, such as in retail stores, there is a lack in research in exploring how customer experience creation in complex service systems (i.e., smart cities) can be conceptualized (Lipkin, 2016). Consequently, this work aims to answer the following research question: *How can a holistic customer experience in smart city service systems be created?*

To answer this question, we develop a conceptual model for a holistic customer experience, which we call city experience, as an orientation for an integrative service design in smart cities, following the DSR process provided by Peffers et al. (2007). Therefore, we propose an integrative view on literature in the fields of smart city, smart services, and customer experience as a basis for our model's design and analyze 40 real-world smart city services to identify the central determinants of a city experience.

RELATED LITERATURE

To achieve their overall aim of improving customers' quality of life, smart cities involve a variety of stakeholders from manifold inter-disciplinary domains, such as energy, mobility, health and education, to create value with and for customers using information technologies (Chourabi *et al.*, 2012; Lim, Kim and Maglio, 2018). Being considered as smart service systems, smart cities are complex socio-technical systems which are focused on co-creation of value, with smart services being a central element of interaction in a continuous process of collaboration between customers and public and private companies (Böhmann, Leimeister and Möslein, 2014; Polese *et al.*, 2019; D'Aniello *et al.*, 2020). The term smart service involves actions, processes, and performances, enabled by smart products that serve as boundary objects and leverage value co-creation for customers through service, based on digital interactions with service providers (Allmendinger and Lombreglia, 2005; Beverungen *et al.*, 2019). Smart services play a key role in delivering consumer-centric value to improve customer experience (Betzing, 2018). Customer experience has been traditionally conceptualized as a customer's internal and subjective response to any direct or indirect contact with a company (Meyer and Schwager, 2007). It involves "the customer's cognitive, affective, emotional, social, and physical responses" (Verhoef *et al.*, 2009, p. 32) to an organization and is shaped by the combination of all experience clues perceived by the customer – consciously and unconsciously (Berry, Carbone and Haeckel, 2002). In today's complex service landscapes, such

as in cities, customer experience is not limited to such dyadic relationships between customers and a single service provider, but is formed by the diversity of a customer's value-creating interactions with multiple actors (Betzing, Beverungen and Becker, 2018; Becker and Jaakkola, 2020). It appears as a unique phenomenon dependent on different stimuli which are inside or outside of the service providers' control and interpreted through the customer's individual social and cultural contexts (Verhoef et al. 2009; Akaka and Vargo 2015). Most studies on customer experience focus on a dyadic view and a particular set of firm-controlled touchpoints, with a lack of attention to the way experience emerges in smart service systems. Thus, our work aims to close this gap by conceptualizing the holistic customer experience in smart cities as an example of smart service systems, which span the life of customers and all their consumption worlds within the physical space of a city.

DESIGN SCIENCE RESEARCH APPROACH

Our research design follows DSR, which offers a suitable approach to create meaningful and practitioner-oriented artifacts, to develop a conceptual model describing customer experience in smart city service systems (Hevner *et al.*, 2004). The city experience model represents a "general solution concept" (Van Aken, 2004, p. 226), that is applicable to a variety of integrated services (class of problems) in the context of smart cities and should assist in the design and evaluation of integrated smart city services. A design science project should traverse three cycles (rigor, relevance, design) (Hevner *et al.*, 2004). The design cycle of our conceptual model is grounded in existing literature on service science and smart city (rigor cycle) and based on the model of customer experience creation in the context of retail services (Verhoef *et al.*, 2009). It is informed by 40 smart service cases from smart cities all over the world (relevance cycle). For the design of our artifact, we follow the process as suggested by Peffers et al. (2007). The procedure model consists of six consecutive and iterative phases (1) identify problem, (2) define objectives, (3) design and development, (4) demonstration, (5) evaluation, and (6) communication (Peffers *et al.*, 2007) that are detailed for our research endeavor in the following: The (1) research problem was already described in the introduction and theoretical foundation. Further, we explored its practical relevance working on a smart service platform initialized by a smart city project in a medium-sized German city. The project participants identified the need to understand the overall customer experience in cities as a strategic orientation to guide customer-centered service design and integration. Therefore, we defined the need for related concepts and determined the (2) objective of this research as developing a model of holistic customer experience in smart city service systems. For the (3) design of the model, we examined a set of 40 international real-world services from an integrative perspective regarding their contribution to a holistic customer experience and derived ten city experience determinants. The services were taken from the bee smart city database that provides overviews of globally realized smart city projects across different application fields, such as smart economy and smart environment (Lombardi *et al.*, 2012; bee smart city, 2022). We enriched our study
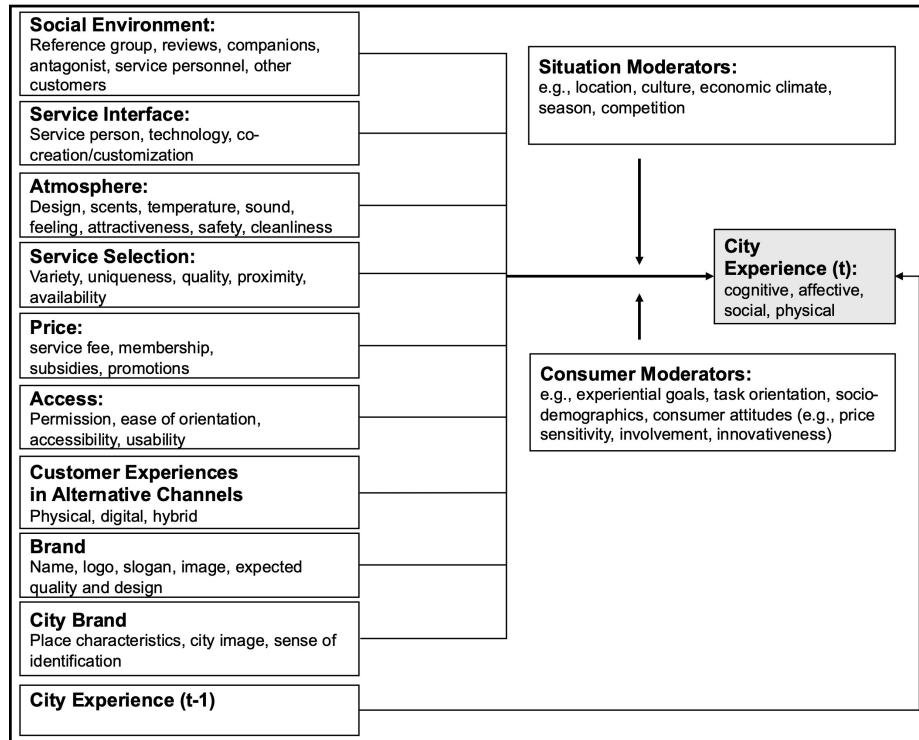
Figure 1: City experience model.

with a literature research of existing customer experience models to develop a basis for the model design. We (4) demonstrate the conceptual model using the integrated case of the mentioned smart service platform. The (5) evaluation of the developed model is done in the discussion section based on this case, using informed arguments (Hevner *et al.*, 2004). Our research results are (6) communicated in this and related research (Schütte, Muschkiet and Wulfert, 2022).

CITY EXPERIENCE MODEL

We define city experience from a service design perspective as the customer's internal and subjective responses to all interactions he/she has with a city and its actors in the continuous process of value co-creation (Becker and Jaakkola, 2020). As an extension to the dyadic conceptualization provided by Verhoef et al. (2009), our conceptual model (Figure 1) provides a systemic view on customer experience. It depicts determinants that can be addressed by a variety of city actors on different levels of aggregation, ranging from single service cues to a broader focus of customers' journeys or activities in their daily lives, and that can elicit different subjective responses depending on individual consumer and situation moderators (Becker and Jaakkola, 2020). The city experience is influenced by the customer's *social environment* (Verhoef et al., 2009). It includes a customer's perceived interactions and relationships with a place or other people (e.g., service personnel, antagonists) in the environment (Hart, Stachow and Cadogan, 2013). Antagonists directly

participate in value co-creation in multi-sided services, such as lost and found services or incident reporting platforms. The *service interface* forms the central point of contact between a customer and a service. The customer interacts with service personnel or a technical system (e.g., interface of a kiosk system, smartphone app) to co-create and consume a service (Verhoef et al., 2009; Paukstadt, Strobel and Eicker, 2019).

Atmosphere represents the atmospheric conditions in the physical environment of a customer, for example the perceived attractiveness and sensory stimulations (e.g., sound, temperature) (Källström, Persson and Westergren, 2021). Services which influence the city experience according to the latter include umbrella sharing services and solutions to analyze the air quality in the city. The *service selection* in a city includes the unique product and service assortment of stores, the variety of available courts on a booking platform for sport facilities, or the set of mobility solutions and free parking spaces close to the customer's current location. The *price* of a service or product is determined by a pricing model, such as a transactional fee which the customer pays for using or customizing a service, a membership with a subscription model, or promotions. The customer's *access* to services can reflect the physical accessibility, including the ease of orientation in the city, mobility options and parking conditions (Hart, Stachow and Cadogan, 2013; Källström, Persson and Westergren, 2021). Further, the usability of technical components has an impact on the access to a service. Another factor is the permission of customers to access and consume a service (e.g., gym membership to unlock digital key). Further determinants of city experience include the *brand* related to a certain product, service, store or restaurant (Verhoef et al., 2009; Kilian, 2011) or the *city brand* itself (e.g., image, sense of identification, place characteristics) (Källström, Persson and Westergren, 2021). With an increasing convergence of the digital and physical worlds, the city experience is considered as a composition of the experiences in all channels that the customer uses as part of his or her urban activities (Bolton et al., 2018). The sum of the individual experience in the channel regarded and the customer experience in *alternative channels* contributes to the overall city experience. Looking at the individual experiences from a process perspective, the city experience manifests itself as a bundle of individual service experiences. A customer's expectations of an experience at a time (t) are influenced by previous experiences, such as the *city experience (t-1)* (Verhoef et al., 2009). As city experience has been conceptualized as a subjective and context-specific phenomenon, the customer's responses to the described offering-related stimuli depend on a variety of situation moderators and consumer moderators, including cultural and seasonal factors or the customer's attitudes, task orientation and socio-demographic variables (Verhoef et al., 2009). These contextual factors can make some determinants more or less recognizable or they can affect the evaluative outcomes of particular experiences (Becker and Jaakkola, 2020).

DISCUSSION AND CONCLUSION

In contrast to the widely researched dyadic view on customer experience (e.g., in single retail encounters) there is a lack of attention in research to

conceptualize and depict the holistic customer experience in smart service systems (e.g., in smart cities), which is characterized by the variety of a customer's value-creating interactions with multiple actors. Building on this gap, we developed a conceptual model of a holistic customer experience in smart city service systems – the city experience. Our work supports researchers and practitioners in the design and evaluation of customer-oriented smart services. Our results show that smart city services address a wide-ranging set of factors that form a holistic city experience. However, the examined services are mostly implemented as isolated solutions and not integrated to reflect and create the city experience as a bundle of individual experiences in the city. Thus, we propose to align service design to the overall goal of creating this holistic experience.

A practical example of service integration was used to illustrate and validate the set of determinants from our model for creating a holistic experience. One of this work's authors is involved in the development of a customer experience-oriented smart service platform in a medium-sized German smart city. The goal of the project is to support collaboration among a multitude of city actors in the design and integration of smart services on a focal platform to create valuable city experiences. Using a single city account and a mobile app, customers can get access to personalized services and recommendations that combine different activities within the city to build an optimized experience. For example, customers can discover different neighborhoods by scanning QR codes at popular sights and additionally earn rewards to receive personalized offerings and vouchers for nearby shops. Another example is the combination of a search function for the product assortment in multiple stores across the city and a recommendation system which presents the best store and travel options based on product availabilities and the customer's current location and preferences. As there is a lack of attention in research in examining technical approaches to support such an integrated service design with a focus on city experience, we call for research that defines requirements for such systems and provides solutions to enhance the creation of personalized and holistic customer experiences in smart city service systems.

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