Life is a Journey in Smart and Sustainable Districts

Valerie Graf-Drasch[1,2], Oliver Meindl[2], Hannes Voucko-Glockner[3]

[1] Chair of Digital Management, University of Hohenheim, Stuttgart, Germany
valerie.graf-drasch@uni-hohenheim.de
[2] Project Group Business & Information Systems Engineering of the Fraunhofer FIT, Augsburg, Germany
oliver.meindl@fit.fraunhofer.de
[3] FIM Research Center, University of Augsburg, Augsburg, Germany
hannes.voucko-glockner@fim-rc.de

Abstract. Worldwide, cities grapple with the expectation of putting the brakes on climate change. Before acting, smart districts often serve as a testing bed for strategies towards carbon-neutrality. If effective, scale-up agendas at city-level are formulated. Smart districts are touted for their sustainability lever, as their core rationale is encouraging residents to use 'smart energy technologies' which increase efficiency or integrate renewable energy sources. The primary focus of these districts is on technical implementations of available sustainability services instead of orienting their service-portfolio around citizens. The result is a mismatch of supply and demand of sustainability-inducing services. We take in a customer journey perspective when searching for literature and conducting qualitative interviews. Results reveal a framework for mapping service touchpoints into citizen journeys. The framework is meant to benefit district planners to tailor their service selection to meet their citizens' needs and exploit the district's sustainability potential at the citizen interface.

Keywords: Smart City, Smart District, Sustainability, Citizens, Customer Journey

1 Introduction

With over two-thirds of humanity living in cities by 2050, urban areas are constantly stretching and growing [1]. Providing a home for these masses of people has its price: Cities currently account for nearly 70% of the global energy demand [2] and produce approximately 80% of greenhouse gas emissions [3]. On this background, cities are a major lever to combat climate change [4]. As cities represent complex wired systems, smart city planners, public administrations, and governance stakeholders often design sustainability initiatives by focusing on urban integral subsystems: Smart and sustainable districts (SSDs) [5–11]. SSDs are based on advanced technologies and perform "in a forward-looking way in economy, people, governance, mobility, environment, energy […] that ensures benefits for [all], in particular a high quality of life for every citizen" [12]. Stated differently, in SSDs, advanced digital technologies enable sustainable services, triggering citizens' consciousness for sustainable living

17th International Conference on Wirtschaftsinformatik,
February 2022, Nürnberg, Germany

and improving their liveability [13–15]. Urban planners often focus too much on the SSD itself or technical implementations of services resulting in citizens not being properly involved and, subsequently, not using the services provided [13, 16]. Citizens are more likely to accept sustainable services and technologies of their SSD if they feel involved and match their needs [17]. To pursue sustainability-related goals effectively, the services of an SSD should be built upon citizens' needs [17, 18]. Although great importance is attributed to the participation and involvement of citizens, it has only been considered to a limited extent within recent smart city projects [19–21]. In this vein, citizens can be interpreted as customers of a city [22], expecting individual, high-quality, transparent, and innovative services based on digital technologies [23]. Knowing their customers allows service vendors to adjust their products and pricing strategies to a higher number of users and thus optimize their profits [24, 25]. Better services increase customer satisfaction, service acceptance and improve the quality of life [18]. According to Marsal-Llacuna and Segal [26], citizens' needs are not adequately determined, so more technologies and services than necessary are deployed. To improve the usage, deployment, and acceptance of SSD services and consequently improve consciousness for sustainable living [11, 27], it is necessary to structure the needs of citizens [28]. Customer journeys are established tools to analyze and understand customer experiences (CX) [29, 30]. Originating from corporate contexts, transferring the customer journey to the SSD context may foster an improved understanding of citizens' needs, aligned services, and high accessibility of identified touchpoints (TP). Overall, such a perspective would result in fostering the sustainability potentials of SSDs within cities.

Fellow researchers have already started to apply the concept of the customer journey to citizens [31, 32]. Recent approaches refer to single TPs between citizens and a limited set of transactional [31] or participatory budgeting services [32]. Yet, no approach provides a framework for the customer journey to be applied to an SSD from an integrated perspective comprising multiple services. Such a holistic framework would enable SSD planners and service providers to tailor service provision to individual citizen structures better and improve consciousness for sustainable living across citizens' lifetimes. Hence, we state the following research question:

How to apply the customer journey approach to citizens in smart and sustainable districts?

We follow a three-stage research process based on Hosseini et al. [9] to answer our research question. First, by conducting a broad literature search on smart cities and districts, we gain a holistic understanding of the problem domain and identify a set of related services. We secondly develop an initial citizen journey framework by performing a structured literature search on customer relationship management and customer journey concepts. Third, after creating the initial framework, we evaluate our approach through semi-structured interviews with six experts and exemplary apply the framework to a particular citizen group identified in the SSD project Stadtquartier 2050 [33, 34]. Results extend the current state-of-the-art with a holistic framework consisting of different life stages and service offerings. Individual citizen journeys with TPs between citizens and services in SSDs can be mapped. Applied in practice, urban planners can increase the usage of services offered, facilitating the pursuit of SSD goals.

2 Theoretical Background

2.1 Smart and Sustainable Cities and Districts

Smart cities have a history going back to the 1990s, with the Silicon Valley being the first smart city [9]. Since then, smart cities have evolved globally and are currently 'en vogue' to address our grand challenges, including urbanization, climate change, social inequality, or economic difficulties [35–37]. In their evolvement, smart cities have been criticized for being too technocentric and contributing too little to attaining the United Nations sustainable development goals (SDGs) [38–40]. To address criticism, the concept of smart and sustainable cities (SSCs) evolved [7], reconciling sustainability and advanced technologies [4, 38, 41]. Yigitcanlar and Cuguroullo [42] define an SSC as an urban environment comprising elements with sustainable practices (e.g., smart energy consumption), supported by technologies, community, and policy, creating desired outcomes sustainably. Table 1 presents the conceptual framework of Antwi-Afari et al. [43], who list dimensions in the first column where SSCs might leverage digital technologies to attain sustainable development. Currently, the digital technologies put in place in these dimensions were primarily installed in a top-down approach: Technologies were put in place without considering citizens' values and needs [44, 45], resulting in inefficient use of respective technologies and the services they offer. However, installing technologies in a bottom-up approach is not the ultimate remedy since a plethora of stakeholders may be involved. Each of them brings their preference to the table [12] (e.g., demographic diversity, the multitude of political and non-political influences, or pursuit of different goals), which might not suit urban planning goals [46]. Hence, urban planners often turn to districts as testbeds to pilot and tare bottom-up approaches.

SSDs are integral subsystems of SSCs but with reduced stakeholder relationships and, thus, complexity [9, 12, 47]. Due to the reduction in complexity, not all SSC dimensions of Antwi-Afari et al. [43] are equally relevant in SSDs. Table 1 gives a literature-backed overview of the relevance of these dimensions on district levels.

Table 1. Smart city dimensions [43] and their relevance at district levels

SSC dimension [43]	Relevance at SSDs	Sources
Mobility	✓	[35, 43, 48–51]
People	×	[18, 35, 43, 45, 48, 51, 52]
Living	✓	[5, 7, 35, 43, 50]
Economy	×	[35, 43, 48]
Environment	✓	[35, 41, 43, 48–50, 53]
Governance	×	[35, 43, 48, 53]

The dimensions people, economy, and governance can be excluded as they tend to be better implemented to a whole city rather than at a district level. The dimension *people* describes a society that improves creativity and fosters innovation in which people have access to digital education, and people work in technologies-enabled working. In line,

social policies are implemented to attract, motivate, and retain talented people. Furthermore, *governance* includes services that link the public, citizens, and civil organizations across a city to function as one transparent organism. This impacts the *economy* dimension of a city, which drives innovation and new business models in a city, integrating it into national and global markets.

By providing services and policies in the highlighted dimensions, SSDs can sustain themselves as essential parts within SSCs [12, 47, 54]. In each dimension, various service domains exist, which are served by various service vendors, as detailed in the following.

2.2 Citizen-centered Services in SSDs

The contribution of SSDs to a city's SDG attainment heavily depends on citizens accepting and using respective district services [16]. Therefore, it is necessary to provide an SSD-suitable set of services. This requires the consideration of a top-down and a bottom-up perspective. The top-down perspective determines the services offered by governance or service vendors purchased by citizens as customers from this marketplace represented by SSD vendors [19]. As only services included in the SSD dimensions can be offered in a district, the SSD dimensions can be used to determine a potential service set offered by service vendors. In each SSD dimension, various service domains exists and each domain contains a variety of service. Based on the smart city framework of Neirotti et al. [48] and the SSD dimensions, we identify relevant service domains. The dimension *mobility* includes the service domains transport & city logistics and mobility. In the area of *living*, services in the service domains of entertainment, culture, and buildings are offered. The dimension *environment* comprises energy and natural resource services. The bottom-up perspective assures that citizens' service needs are met [55]. Citizens are characterized as problem owners who use well-positioned services and contribute to technology innovations [16]. To this end, citizens have heterogeneous demands [56], rooted in their individual, basic needs [57]. Scholars have summarized citizens' needs in urban areas [e.g., 58, 59]. Zhang et al. [58] identified indicators for the respective hierarchy levels of needs [57] that services in a smart city should address. Mityagin et al. [59] divided citizens' needs into seven categories at a city level. Considering only needs at the district level, it can be stated that the services offered should address citizens' basic needs (e.g., housing, safety), social needs (e.g., education, society), transport needs (e.g., public transport), demand benefits (e.g., self-care, goods), and leisure needs (e.g., entertainment, sport).

To select services that are offered and consumed in an SSD, it is beneficial to combine both perspectives (they can be offered in an SSD, and they fulfill a need of citizens and thus are used). Considering this, we generate a holistic set of services for SSDs without any claim to completeness (see Table 2). Therefore, we narrow the basis of services provided in smart cities [28, 48, 60–63] according to SSD dimensions [c.f., 43] and citizens' demands arising from their needs [c.f. 58, 59].

Table 2. The preliminary set of services in SSDs

Service Domain	Services	Contribution to SDG Targets [40]	Supporting Literature
Transport & City Logistics	Transportation Road Schedule Parking	3.6; 7.1; 7.2; 7.3; 9.1; 11.2; 11.6	[43, 58, 59, 61, 62, 64–67]
Mobility	Carsharing Bike & E-Scooter Sharing Electric Vehicle Charging	3.6; 7.1; 7.2; 7.3; 9.1; 11.2; 11.6	[32, 58, 59, 65, 68–76]
Entertainment	Events Nightlife	11.3; 11.4; 11.7	[58, 59, 77, 78]
Culture	Green & Public Spaces Social Interaction	11.3; 11.4; 11.7; 12.b	[5, 58, 59, 62, 79, 80]
Buildings	District Management Facility Management Smart Window Shading Smart Security	6.4; 6.b; 7.1; 7.2; 7.3; 7.a; 9.1; 11.3; 11.6; 12.2	[58, 59, 61, 62, 81–85]
Energy	Smart Energy Supply Smart Grid Management	3.6; 7.1; 7.2; 7.3; 7.a; 9.1; 11.3; 11.6; 12.2	[58, 59, 62, 83, 86–93]
Natural Resources	Smart Waste Management Smart Water Management	3.9; 6.3; 6.4; 6.b; 11.6; 12.2; 12.5	[48, 58, 59, 62, 94–98]

2.3 Applying the Rationale of Customer Journeys to Citizen Journeys

Organizations must understand their customers to comprehensively meet their needs in a corporate context and adjust their offers accordingly [29]. Otherwise, they could not sustain on the market [99]. To gain a sound understanding of their customers, companies cluster them and analyze each cluster's journey, TPs, and overall CX, yielding targeted services [29, 100]. TPs are the interface between customers and service providers, serving to exchange messages between or granting access to stimuli [101]. The sum of activities passing through this interface generates a CX that embraces emotional, behavioral, and social impacts and result in a certain level of customer satisfaction [30]. To analyze the impact of a single service on the CX, customer journeys systematically depict all TPs between a customer and an organization, product, or service [31, 32]. Using the customer journey, organizations map TPs and respective CXs in a pre-purchase, purchase, and post-purchase phase [30].

Citizens residing in SSDs can also be seen as customers provided with services [22]. In that sense, the logic of customer journeys may be transferred to yield positive CXs. Scholta et al. [31] define the citizen journey as an illustration of the TPs that citizens have with a service in a city. An appropriate service provision increases citizens' satisfaction, improves the quality of life, and enhances the target pursuit of SSDs [18, 102]. Scholars have already started exploring citizen journeys given these opportunities [31, 32]. However, current approaches are limited to a set of service-dependent TPs focusing on transactional [31] or participatory budgeting services [32]. Therefore,

current versions of citizen journeys do not offer a holistic perspective on the multitude of services provided in an SSD.

Existing citizen journeys do not take the different life stages of the citizen and the concomitant changes into account. With changing age and life stages, the service demand of citizens and the corresponding TPs evolve. On top of that, citizens can use a wide range of fundamentally different services simultaneously that outmaneuvers the capabilities of contemporary citizen journey approaches and definitions (e.g., photovoltaic systems and waste management). Consequently, we expand the definition of Scholta et al. [31] and define the citizen journey in SSD context as follows: *"The citizen journey comprises all TPs between provided services within an SSD and a citizen throughout his/her lifetime."* On this background, we now develop a citizen journey framework.

3 Method

Citizens, services, and their interactions in SSD contexts are the core of our analysis. We conduct design science research as proposed by Hevner et al. [103]. To compose and evaluate the citizen journey framework, we proceeded in a three-stage process, as exemplary suggested by Hosseini et al. [9] and summarized in Figure 1. In the following, we elaborate on each stage in detail.

	Stage 1: Understanding	**Stage 2: Development**	**Stage 3: Evaluation**
Goal	▪ Gain a holistic understanding of the citizens' needs in smart and sustainable districts	▪ Model a preliminary literature-based citizen journey framework	▪ Validate, refine, and exemplary implement the citizen journey framework
Performed Steps	✓ Broad literature search on smart and sustainable cities, smart and sustainable districts, and citizens' needs ✓ Identification of a suitable solution concept ✓ Identification of an initial set of 18 services in smart and sustainable districts	✓ Structured literature search on customer journey and citizens journey approaches to conceptualize the citizen journey ✓ Synthesis of the previous results into a citizen journey framework through discussions within the research team	✓ Analysis of 6 conducted semi-structured interviews with experts and incorporation of the results into the framework ✓ Exemplary application of the refined framework to the smart and sustainable district project "Stadtquartier 2050"

Figure 1. Practical stages applied in accord to Hosseini et al. [9]

Understanding. This stage aims at obtaining a generic understanding of SSDs, including citizens and services, yielding a framework to display the customer journey as a suitable solution concept. We conducted an unstructured, broad literature search in the databases ScienceDirect, Springer Link, and AIS eLibrary with different search terms (e.g., smart city, sustainability, citizen). To refine the 7,960 results, we included papers published in the last five years reflecting the increasing sustainability trend and the UN's 2030 Agenda and excluded papers from domains not primarily relevant for districts (e.g., medicine, agriculture, or mathematics). We screened titles and abstracts of the remaining 2137 paper regarding their reference to services, citizens, and interaction at TPs. We read the remaining 127 papers in full text, identifying an initial set of 18 services from 48 papers representing citizens' needs in SSDs.

Development. In a structured literature search [104, 105], we explored the concept of customer journeys to verify their applicability to the SSD context. Our search string comprised the identified core constructs gained from the first stage:

("customer journey" OR "customer relationship management") AND "citizen" AND ("service" OR "information systems") AND ("smart" OR "sustainable") AND ("city" OR "district"). Using the already identified databases and filtering the total hits of 803 using pre-defined selection criteria, the search yielded 237 papers on customer journeys or customer TP management-related topics. While selecting suitable papers, we aimed to receive contemporary papers focusing on citizen-centric or customer relationship management approaches within the last five years. 27 papers served as a suitable knowledge foundation for establishing the generic citizen journey. Given this knowledge foundation, we iteratively derived the citizen journey framework through discussions within the research team. In doing so, we also followed Rosenbaum et al. [106] and combined our literature searches from both stages. The preliminary framework comprises two relevant dimensions: service and time. We composed the service dimension with the 18 services identified in the first stage and derived the time dimension from existing life cycle models from the literature [e.g., 107–114].

Evaluation. Practical validation is paramount for our citizen journey framework to ensure applicability and external validity. We validated and refined the citizen journey in the third stage with semi-structured interviews [115] and exemplarily applied the framework to the publicly funded SSD project Stadtquartier 2050 [34]. First, we conducted six semi-structured interviews with three researchers from SSC and SSD domain (#1-3), one customer relationship management expert (#4), and two urban service providers (#5-6). Each interview lasted between 35 and 50 minutes. We analyzed the interviews conducted and our field notes taken during the interviews [115] and performed a thematic analysis in line with Braun et al. [116]. Thereby, we focused on validating our dimensions, the practical applicability, and suggestions for improvement concerning our service set and the life stages. We reflected, completed, and improved the framework with the information gained. To reconcile the practical and theoretical insights, we secondly applied the framework to one SSD of the publicly funded project Stadtquartier 2050, which goal is to supply the residents of two SSDs in the two German cities Stuttgart and Überlingen, with climate-neutral energy in a socially acceptable way [34]. Thereby, we built upon the four citizen groups identified within Stadtquartier 2050 [33, 34] to combine first-hand insights gained from the project [11] with an in-depth understanding of our citizen journey framework. We focused on one specific citizen group and developed a detailed citizen journey with project-related services and TPs using the refined framework at hand.

4 The Citizen Journey Framework

4.1 Development

To design the citizen journey, we followed the seminal work of Rosenbaum et al. [106] on customer journey designs. A citizen's journey has two dimensions: The vertical axis maps cross-functional activities [106], which can be seen as customizable service offers in SSDs. The horizontal axis maps TPs in a process timeline [106]. Concerning the three purchase phases [30, 106], the TPs in a citizen journey can be categorized into

three phases: A pre-habitation, habitation, and post-habitation. The *pre-habitation phase* starts with a trigger leading to the citizen informing themselves about various SSD and housing options, evaluating them according to their criteria, and deciding about moving into an SSD. The *habitation phase* starts with moving in, during which the citizen has TPs with a multitude of services in the SSD. After moving out, the *post-habitation phase* begins. In this phase, the citizen still has lingering TPs with certain services arising from subsequent long-term service utilizations like the cancelation of energy contracts. The move-out marks the beginning of a new citizen's journey in another city or district. During the whole citizen journey, the citizen has multiple CXs emerging during service-specific customer journeys, which aggregated represent the citizens' experience during the journey. For example, a citizen's experience when using a carsharing service as a customer in an SSD (carsharing CX) can define their overall experience in the SSD. Previous experiences and future expectations influence the current citizens' expectations and experience in following citizen journeys in the same SSD and others. The citizen experience is a crucial factor that impacts the citizens' satisfaction and thus acceptance of further services. Figure 2 conceptualizes the citizen journey and the respective CX, building on and enhancing existing customer journey constructs [30].

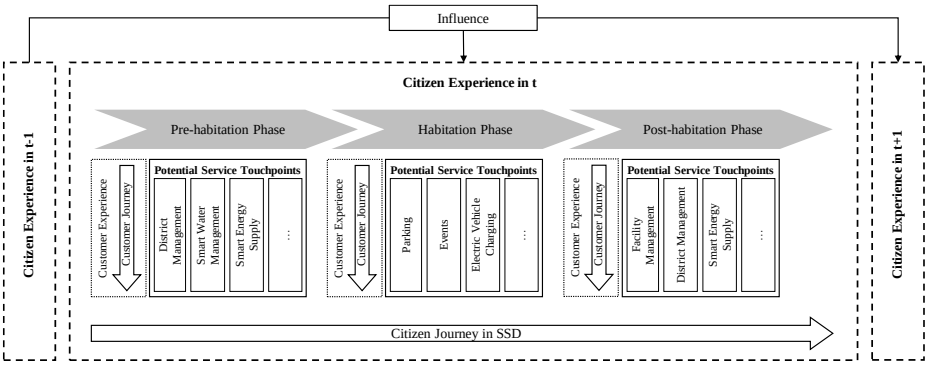

Figure 2. Citizen journey and experience based on Lemon et al. [30]

A framework needs to represent concepts and practices to understand a research field [117]. Hence, our framework has to include relevant dimensions of the citizen journey. Our citizen journey framework is two-dimensional, comprising a vertically displayed service dimension and a horizontally displayed time dimension, representing the scaffold of the citizen journey.

Service dimension. A suitable framework should contain all available or potentially relevant services that can be offered and satisfy citizens' needs. Since cities vary in their characteristics, forms, strategies, and policies while dealing with problems and challenges [118, 119], district planners conclude different contracts with different service providers, resulting in different service selections for citizens among various SSDs. As a result, the initial service set is elaborated in Section 2.2 as the vertical axis needs to be tailored before application in the respective SSD.

Time dimension. Demands change with different life stages, and thus, citizen journeys vary over time. Accordingly, the pre-habitation phase starts in different life stages, and following, citizens go through different life stages in their habitation and post-habitation phases, both comprising the horizontal axis. Life stages constitute a subdivision of the three habitation phases and can overlap or be mutually exclusive and partially or absent from a person's biological, social, and professional life [111]. These life stages need to be adapted to the citizen or citizen group considered since no fixed sequence of the individual life stages exists. As there is no holistic set of citizens' life stages in literature, we examine generic models of the entire life cycle [111, 113, 114], marital status [107, 108, 110], as well as psychological aspects and behavioral patterns [108, 114] to derive citizen-relevant life stages. Table 3 summarizes the derived set of life stages.

Table 3. The preliminary set of citizens' life stages

	Life Stages	**Supporting Literature**
L1	Leaving parental home	[108, 113, 120]
L2	Entering the world of work	[109, 113]
L3	Partnership	[109, 112]
L4	Marriage	[107, 112]
L5	Career	[108]
L6	Parents of children (young, grown, adult)	[107, 110, 112]
L7	Self-realization	[108]
L8	Separation or divorce	[109]
L9	Pension	[112]
L10	Death or widowhood	[107, 110]

We propose three steps (I-III) that evolved throughout our research process to populate the citizen journey with citizen-centric service TP. These steps should be continuously reperformed to match service demand and offer since they are in constant flux.

(I) Know your future personas. Urban planners can categorize citizens into different groups, for example, based on their technical affinity, social status, income, and demographic characteristics [33]. Based on the demographic characteristics of the future personas, the horizontal time axis can be adapted. For this purpose, data on the life course of similar citizen groups can be considered. In addition, the vertical axis must also be adjusted by listing the current service offering and potential new services that can be embraced in the SSD.

(II) Create individual citizen journeys for your personas. Urban planners and service providers can create individual citizen journeys within the framework for each group of citizens. Thereby, existing data of citizen groups similar to the personas can be examined to forecast the habitation phases and service usage in each life stage. Also, planners can analyze how citizens are constrained and what services can counteract these constraints. The associated TPs can be drawn in the framework based on the predicted service usage. The TPs can vary in nature, representing different channel categories through which citizen and service interact (e.g., digital, physical, or hybrid

TPs). Furthermore, several providers of one service can exist, and thus several potential TPs between citizens and a service offered from different vendors can be included within the citizen journey.

(III) Identify the appropriate service offer. Once citizen journeys have been created for each future persona, they can be merged. Personas are prioritized based on their prevalence in the SSD to identify service preferences and frequently occurring TPs. Once a meaningful collection of services has been determined, each service's appropriate channels to further increase the willingness to use the services can be deliberated.

Figure 3 serves as an exemplary application of the citizen journey framework to the persona "Energy Economics" identified in the Stadtquartier 2050 project [33, 34].

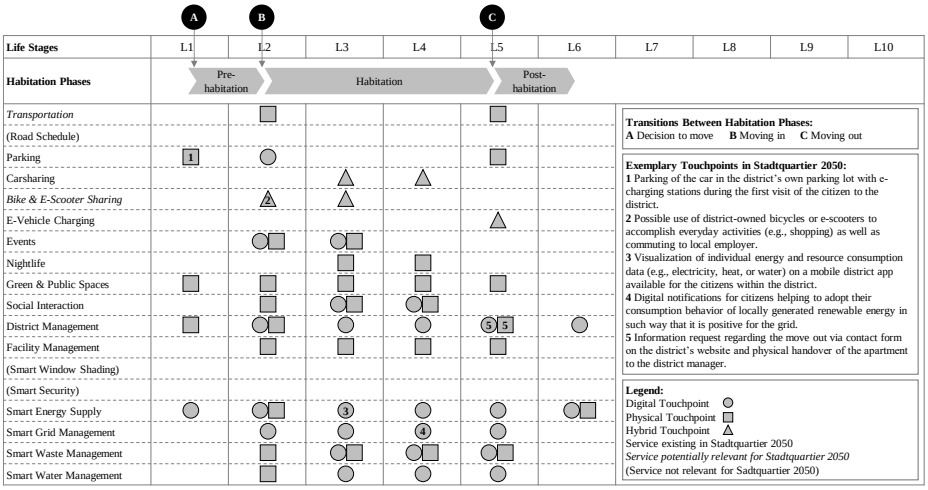

Figure 3. Citizen journey for the Stadtquartier 2050 persona "Energy Economics" [33, 34]

4.2 Evaluation

We validated our citizen journey framework with six expert interviews. Within the interviews, we emphasized the evaluation of the two dimensions of the framework, its practical applicability for urban planners, and the value-added for citizens. Therefore, the experts were asked to argue on the one hand from an urban planner or service provider perspective and on the other hand from a citizen perspective. After every interview has been conducted and the notes have been incorporated, the completeness, comprehensibility, practical applicability, and benefit for urban planners and citizens of the citizen journey framework were validated.

Feedback in the interviews pointed to three major changes: 1) Revision of the services, 2) concretization of citizen journey concepts, and 3) integration of methodological guidance for practitioners. 1) Expert #1 noted that our initial sets of services need modifications to improve the completeness and requested to include social interaction, district management, and smart security services. Additionally,

Expert #1 suggested removing the former service smart lightning since it is more likely on a city level. All other experts validated our initial services set as a suitable basis after the adjustment made after the first interview, but without claiming completeness. 2) In evaluating the comprehensibility, Expert #6 pointed to the importance for urban planners to know their (future) citizens, especially since service demands could change during the life phases. One expert stated that a one-size-fits-it-all approach to a citizen journey is not applicable for every SSD. Expert #2 and #4 emphasized that both dimensions of service and time need to be adapted carefully to the nature of the SSD and its citizens when composing one specific citizen journey. If this is ensured, all experts perceive the framework as suitable for the problem stated in the introduction. Accordingly, we have extended our framework by describing that the citizen journey must be designed for all identified future personas in an SSD. 3) Experts #5 and #6 suggested improving practical applicability by providing more guidance in the composition of the citizen journey. Since urban planners and urban service providers often lack a citizen-centric mindset, it is crucial to elaborate on steps necessary to populate the citizen journey. We synthesized the three main steps applicable for each SSD and provided a brief description of each.

On top of these three major changes, we introduced a categorization of TPs (digital, physical, or hybrid). While applying the framework to one particular Stadtquartier 2050 citizen group [33], we recognized TPs vary in their implementation (e.g., digital TPs in a mobile district app vs. physical TPs in face-to-face meetings during the apartment handover). This enhances the expressiveness of the citizen journey since service providers could (re-)evaluate TPs depending on the citizen group at hand.

5 Discussion

This work theoretically contributes to research in three domains. In the SSD domain, we contribute by extending existing theories on citizens in SSD by introducing habitation phases and life stages to structure the life of a citizen. Mapping the life of a citizen through the life stages and habitation phases could serve future sociological approaches in SSD and SSC research. To the research of citizen-centered services, we provide an initial set of services that can be offered in an SSD based on the SSD dimensions. The service set enables the improvement of consciousness for sustainable living and pursuit of the SDGs. SSD scholars can use the set as an initial service foundation in SSDs. Our framework also extends the body of knowledge in customer relationship management domain by enhancing the customer journey and respective CX to conceptualize the citizen journey. Additionally, this work provides a suitable framework for conceptualizing the citizen journey in SSDs, usable in further SSD, SSC, or customer journey research, and urban planners in practice.

The practical implication of our work is three-fold. First, urban planners can use our framework to develop a citizen journey systematically. We also provide a specific example by applying the framework to one particular citizen group of the Stadquartier 2050 SSD project. This could improve the service offering since urban service providers can identify arising demands or missing service opportunities. Second, urban

planners can actively communicate an overview of all available services to the citizen within the SSD, given a realized customer journey. Hence, citizens could be more aware or better informed and use services that foster a sustainable-conscious living more often. Third, our expert interviews indicate that urban planners and service providers need to gain a detailed perspective of their (future) customers within the SSD, namely the citizens. This includes a comprehensive understanding of their (future) service demands and the resulting interdependencies with the SDG pursuit.

Despite rigorously developing and validating the citizen journey framework, our work has limitations. First, we cannot claim our selected services and life stages to be exhaustive. Both dimensions have to be adjusted individually for each SSD. Fellow researchers could use our results to develop an overarching list of potential services and life stages within SSDs. Second, we only validated the framework through six interviews with German experts. Future research could improve the external validity by conducting further interviews with experts from diverse backgrounds and urban regions and applying the citizen journey within SSDs. In addition, further research could develop a holistic set of citizen groups for SSDs and apply our citizen journey framework to these to examine the difference in service preferences. Third, our research aimed to create a helpful tool that enables SSD planners and service providers to tailor service provision to individual citizen groups. Given the scholarly nature of this manuscript, it is necessary to deliberate further formats presenting how to apply the citizen journey framework in practice. To further improve the practical applicability, one future way could be to analyze potential barriers and hurdles perceived by different SSD stakeholders in applying the citizen journey framework.

6 Conclusion

SSDs are an essential lever in the fight against climate change and the pursuit of sustainable development. To foster sustainability, however, the services offered need to be accepted by the citizens. We take in a customer journey perspective in SSDs when searching for literature and conducting qualitative interviews. In this regard, we provide a framework for urban planners to understand their citizens better and tailor services to their needs by mapping service TPs into citizen journeys. Results highlight the importance of considering citizens in the planning process. Our framework can leverage SSD's full sustainability potential at the citizen interface by fostering sustainability-conscious living of citizens and, thereby, meaningfully restrains the vast energy demand from growing urban areas.

7 Acknowledgments

This research was supported in part by the BMBF (German Federal Ministry of Education and Research) and the BMWi (German Federal Ministry for Economic Affairs and Energy) under the funding of the PtJ (Project Management Jülich) in the course of the project „STADTQUARTIER 2050 – Herausforderungen gemeinsam lösen“ (03SBE116).

References

1. United Nations: World Urbanization Prospects - The 2018 Revision. New York: Department of Economic and Social Affairs, Population Division (2018)
2. World Economic Forum: Climate emergency: how our cities can inspire change (2020)
3. Gimpel, H., Graf, V., Graf-Drasch, V.: A comprehensive model for individuals' acceptance of smart energy technology – A meta-analysis. Energy Policy 138, 111196 (2020)
4. Ozkaya, G., Erdin, C.: Evaluation of smart and sustainable cities through a hybrid MCDM approach based on ANP and TOPSIS technique. Heliyon 6 (2020)
5. Macke, J., Rubim Sarate, J.A., Atayde Moschen, S. de: Smart sustainable cities evaluation and sense of community. Journal of Cleaner Production 239, 118103 (2019)
6. Chang, D.L., Sabatini-Marques, J., Da Costa, E.M., Selig, P.M., Yigitcanlar, T.: Knowledge-based, smart and sustainable cities: a provocation for a conceptual framework. Journal of Open Innovation: Technology, Market, and Complexity 4 (2018)
7. Bouzguenda, I., Alalouch, C., Fava, N.: Towards smart sustainable cities: A review of the role digital citizen participation could play in advancing social sustainability. Sustainable Cities and Society 50, 101627 (2019)
8. Svítek, M., Skobelev, P., Kozhevnikov, S.: Smart City 5.0 as an Urban Ecosystem of Smart Services. In: Borangiu, T., Trentesaux, D., Leitão, P., Giret Boggino, A., Botti, V. (eds.) Service Oriented, Holonic and Multi-agent Manufacturing Systems for Industry of the Future, 853, pp. 426–438. Springer International Publishing, Cham (2020)
9. Hosseini, S., Frank, L., Fridgen, G., Heger, S.: Do Not Forget About Smart Towns. Business & Information Systems Engineering 60, 243–257 (2018)
10. Schulte, A., Wittemund, T., Weber, P., Fink, A.: Preparing for an Uncertain Future: South Westphalia City Scenarios 2030. In: Proceedings of the 16th International Conference on Wirtschaftsinformatik (WI 2021) (2021)
11. Bonenberger, L., Graf-Drasch, V., Meindl, O.: Handlungsempfehlungen für die Gestaltung mobiler Apps in smarten und nachhaltigen Quartieren. HMD Praxis der Wirtschaftsinformatik 58 (2021)
12. Keller, R., Röhrich, F., Schmidt, L., Fridgen, G.: Sustainability's Coming Home: Preliminary Design Principles for the Sustainable Smart District. In: Proceedings of the 14th International Conference on Wirtschaftsinformatik (WI 2019) (2019)
13. Rosemann, M., Becker, J., Chasin, F.: City 5.0. Business & Information Systems Engineering 63, 71–77 (2021)
14. Giles-Corti, B., Lowe, M., Arundel, J.: Achieving the SDGs: Evaluating indicators to be used to benchmark and monitor progress towards creating healthy and sustainable cities. Health policy (Amsterdam, Netherlands) 124, 581–590 (2020)
15. Klopp, J.M., Petretta, D.L.: The urban sustainable development goal: Indicators, complexity and the politics of measuring cities. Cities 63, 92–97 (2017)
16. Wolff, A., Barker, M., Hudson, L., Seffah, A.: Supporting smart citizens: Design templates for co-designing data-intensive technologies. Cities 101, 102695 (2020)
17. Yeh, H.: The effects of successful ICT-based smart city services: From citizens' perspectives. Government Information Quarterly 34, 556–565 (2017)
18. Csukás, M.S., Szabó, R.Z.: The many faces of the smart city: Differing value propositions in the activity portfolios of nine cities. Cities 112, 103116 (2021)
19. Cardullo, P., Kitchin, R.: Smart urbanism and smart citizenship: The neoliberal logic of 'citizen-focused' smart cities in Europe. Environment and Planning C: Politics and Space 37, 813–830 (2019)

20. Thomas, V., Wang, D., Mullagh, L., Dunn, N.: Where's Wally? In Search of Citizen Perspectives on the Smart City. Sustainability 8, 207 (2016)
21. Wu, W.-N.: Determinants of citizen-generated data in a smart city: Analysis of 311 system user behavior. Sustainable Cities and Society 59, 102167 (2020)
22. Shareef, M.A., Dwivedi, Y.K., Kumar, V., Kumar, U.: Reformation of public service to meet citizens' needs as customers: Evaluating SMS as an alternative service delivery channel. Computers in Human Behavior 61, 255–270 (2016)
23. Gimpel, H., Hinterholzer, T., Lanzl, J., Marheineke, T., Pfauser, F., Röglinger, M.: Kunden umfassend kennenlernen – Erfahrungen einer Shadowing-Studie an einem internationalen Verkehrsflughafen. Wirtschaftsinformatik & Management 13, 222–229 (2021)
24. Venkatesh, Morris, Davis: User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly 27, 425 (2003)
25. Venkatesh, Thong, Xu: Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. MIS Quarterly 36, 157 (2012)
26. Marsal-Llacuna, M.-L., Segal, M.E.: The Intelligenter Method (I) for making "smarter" city projects and plans. Cities 55, 127–138 (2016)
27. Balderjahn, I., Buerke, A., Kirchgeorg, M., Peyer, M., Seegebarth, B., Wiedmann, K.-P.: Consciousness for sustainable consumption: scale development and new insights in the economic dimension of consumers' sustainability. AMS Review 3, 181–192 (2013)
28. Heaton, J., Parlikad, A.K.: A conceptual framework for the alignment of infrastructure assets to citizen requirements within a Smart Cities framework. Cities 90, 32–41 (2019)
29. Grewal, D., Roggeveen, A.L.: Understanding Retail Experiences and Customer Journey Management. Journal of Retailing 96, 3–8 (2020)
30. Lemon, K.N., Verhoef, P.C.: Understanding Customer Experience Throughout the Customer Journey. Journal of Marketing 80, 69–96 (2016)
31. Scholta, H., Halsbenning, S., Distel, B., Becker, J.: Walking a Mile in Their Shoes—A Citizen Journey to Explore Public Service Delivery from the Citizen Perspective. In: Viale Pereira, G., Janssen, M., Lee, H., Lindgren, I., Rodríguez Bolívar, M.P., Scholl, H.J., Zuiderwijk, A. (eds.) Electronic Government, 12219, pp. 164–178. Springer International Publishing, Cham (2020)
32. Reiz, A., Fellmann, M., Lorson, P., Haustein, E., Schult, H.-H.: Anwendung des Konzepts der „Customer Journey" zur Gestaltung von bürgerzentrierten Bürgerhaushalten. Wirtschaftsinformatik & Management 13, 206–214 (2021)
33. Arnold, L., Roser, A., Schakib-Ekbatan, K., Schmidt, M.: Identifizierung und Analyse relevanter Personengruppen. Erstellt im Verbundvorhaben STADTQUARTIER 2050 im Rahmen der Förderinitiative „Solares Bauen/ Energieeffiziente Stadt" aus dem 6. Energieforschungsprogramm (2020)
34. Stadtquartier 2050: Stadtquartier 2050 - Herausforderungen gemeinsam lösen, https://stadtquartier2050.de/
35. Alverti, M., Hadjimitsis, D., Kyriakidis, P., Serraos, K.: Smart city planning from a bottom-up approach: local communities' intervention for a smarter urban environment. In: Themistocleous, K., Hadjimitsis, D.G., Michaelides, S., Papadavid, G. (eds.) Fourth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2016). SPIE (2016)
36. Yigitcanlar, T., Kamruzzaman, M., Buys, L., Ioppolo, G., Sabatini-Marques, J., Da Costa, E.M., Yun, J.J.: Understanding 'smart cities': Intertwining development drivers with desired outcomes in a multidimensional framework. Cities 81, 145–160 (2018)

37. Elgazzar, R.F., El-Gazzar, R.: Smart Cities, Sustainable Cities, or Both? - A Critical Review and Synthesis of Success and Failure Factors. In: Proceedings of the 6th International Conference on Smart Cities and Green ICT Systems, pp. 250–257. SCITEPRESS - Science and Technology Publications (2017)
38. Huovila, A., Bosch, P., Airaksinen, M.: Comparative analysis of standardized indicators for Smart sustainable cities: What indicators and standards to use and when? Cities 89, 141–153 (2019)
39. Bibri, S.E.: A foundational framework for smart sustainable city development: Theoretical, disciplinary, and discursive dimensions and their synergies. Sustainable Cities and Society 38, 758–794 (2018)
40. United Nations: Transforming our world: the 2030 Agenda for Sustainable Development. A/RES/70/1, https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf
41. Ahvenniemi, H., Huovila, A., Pinto-Seppä, I., Airaksinen, M.: What are the differences between sustainable and smart cities? Cities 60, 234–245 (2017)
42. Yigitcanlar, T., Cugurullo, F.: The sustainability of artificial intelligence: An urbanistic viewpoint from the lens of smart and sustainable cities. Sustainability 12, 8548 (2020)
43. Antwi-Afari, P., Owusu-Manu, D.-G., Simons, B., Debrah, C., Ghansah, F.A.: Sustainability guidelines to attaining smart sustainable cities in developing countries: A Ghanaian context. Sustainable Futures 3 (2021)
44. Glasmeier, A., Nebiolo, M.: Thinking about Smart Cities: The Travels of a Policy Idea that Promises a Great Deal, but So Far Has Delivered Modest Results. Sustainability 8, 1122 (2016)
45. Trencher, G.: Towards the smart city 2.0: Empirical evidence of using smartness as a tool for tackling social challenges. Technological Forecasting and Social Change 142, 117–128 (2019)
46. Ekman, U.: Smart City Planning: Complexity. International Journal of E-Planning Research 7, 1–21 (2018)
47. Mattoni, B., Nardecchia, F., Bisegna, F.: Towards the Development of a Smart District: The Application of an Holistic Planning Approach. Sustainable Cities and Society 48, 101570 (2019)
48. Neirotti, P., Marco, A. de, Cagliano, A.C., Mangano, G., Scorrano, F.: Current trends in Smart City initiatives: Some stylised facts. Cities 38, 25–36 (2014)
49. Bracco, S., Delfino, F., Laiolo, P., Morini, A.: Planning & Open-Air Demonstrating Smart City Sustainable Districts. Sustainability 10, 4636 (2018)
50. Bottero, M., Caprioli, C., Cotella, G., Santangelo, M.: Sustainable Cities: A Reflection on Potentialities and Limits based on Existing Eco-Districts in Europe. Sustainability 11, 5794 (2019)
51. Patel, Y., Doshi, N.: Social implications of smart cities. Procedia Computer Science 155, 692–697 (2019)
52. van der Graaf, S., Ballon, P.: Navigating platform urbanism. Technological Forecasting and Social Change 142, 364–372 (2019)
53. Lim, C., Maglio, P.P.: Data-Driven Understanding of Smart Service Systems Through Text Mining. Service Science 10, 154–180 (2018)
54. Heaphy, L., Wiig, A.: The 21st century corporate town: The politics of planning innovation districts. Telematics and Informatics 54 (2020)

55. Ji, T., Chen, J.-H., Wei, H.-H., Su, Y.-C.: Towards people-centric smart city development: Investigating the citizens' preferences and perceptions about smart-city services in Taiwan. Sustainable Cities and Society 67, 102691 (2021)
56. Manchester, H., Cope, G.: Learning to Be a Smart Citizen. Oxford Review of Education 45, 224–241 (2019)
57. Maslow, A.H.: A Theory of Human Motivation. Psychological Review 50, 370–396 (1943)
58. Zhang, Y., Liu, F., Gu, Z., Chen, Z., Shi, Y., Li, A.: Research on Smart City Evaluation Based on Hierarchy of Needs. Procedia Computer Science 162, 467–474 (2019)
59. Mityagin, S., Yakimuk, I., Rudikowa, L., Myslivec, O., Andrei, D.: City Information Modeling: The System Approach for Formation Requirement in Spatial Development. Procedia Computer Science 178, 134–144 (2020)
60. International Standards Organization (ISO): IEC JTC 1 ISO/IEC JTC1 Information Technology - Smart City. Preliminary Report 2014 (2015)
61. Dey, K., Fries, R., Ahmed, S.: Future of Transportation Cyber-Physical Systems – Smart Cities/Regions. In: Transportation Cyber-Physical Systems, pp. 267–307. Elsevier (2018)
62. Díaz-Díaz, R., Muñoz, L., Pérez-González, D.: Business model analysis of public services operating in the smart city ecosystem: The case of SmartSantander. Future Generation Computer Systems 76, 198–214 (2017)
63. Bibri, S.E.: Data-driven smart sustainable cities of the future: An evidence synthesis approach to a comprehensive state-of-the-art literature review. Sustainable Futures 3, 100047 (2021)
64. Koumetio Tekouabou, S.C., Abdellaoui Alaoui, E.A., Cherif, W., Silkan, H.: Improving parking availability prediction in smart cities with IoT and ensemble-based model. Journal of King Saud University - Computer and Information Sciences (2020)
65. Šurdonja, S., Giuffrè, T., Deluka-Tibljaš, A.: Smart mobility solutions – necessary precondition for a well-functioning smart city. Transportation Research Procedia 45, 604–611 (2020)
66. Heumann, M., Pump, R., Breitner, M., Koschel, A., Ahlers, V.: Towards Sustainable Transport: A Strategic Decision Support System for Urban Logistics Operations. In: Proceedings of the 16th International Conference on Wirtschaftsinformatik (WI 2021) (2021)
67. Keller, K.: Intelligent Parking Systems – The Smart Assistant Thinks Around the Corner. In: Proceedings of the 41st International Conference on Information Systems (ICIS 2020). Association for Information Systems (2020)
68. Heinisch, V., Göransson, L., Erlandsson, R., Hodel, H., Johnsson, F., Odenberger, M.: Smart electric vehicle charging strategies for sectoral coupling in a city energy system. Applied Energy 288, 116640 (2021)
69. Zhang, H., Song, X., Xia, T., Zheng, J., Haung, D., Shibasaki, R., Yan, Y., Liang, Y.: MaaS in Bike-Sharing: Smart Phone GPS Data Based Layout Optimization and Emission Reduction Potential Analysis. Energy Procedia 152, 649–654 (2018)
70. Mouratidis, K., Peters, S., van Wee, B.: Transportation technologies, sharing economy, and teleactivities: Implications for built environment and travel. Transportation Research Part D: Transport and Environment 92, 102716 (2021)
71. Uteng, T.P., Christensen, H.R., Levin, L.: Gendering smart mobilities. Routledge, New York (2020)
72. Baumgarte, F., Brandt, T., Keller, R., Röhrich, F., Schmidt, L.: You'll never share alone: Analyzing carsharing user group behavior. Transportation Research Part D: Transport and Environment 93, 102754 (2021)

73. Baumgarte, F., Dombetzki, L., Kecht, C., Wolf, L., Keller, R.: AI-based Decision Support for Sustainable Operation of Electric Vehicle Charging Parks. In: Bui, T. (ed.) Proceedings of the 54th Hawaii International Conference on System Sciences. Hawaii International Conference on System Sciences (2021)
74. Mendoza, J.-M.F., Sanyé-Mengual, E., Angrill, S., García-Lozano, R., Feijoo, G., Josa, A., Gabarrell, X., Rieradevall, J.: Development of urban solar infrastructure to support low-carbon mobility. Energy Policy 85, 102–114 (2015)
75. Pardo-Bosch, F., Pujadas, P., Morton, C., Cervera, C.: Sustainable deployment of an electric vehicle public charging infrastructure network from a city business model perspective. Sustainable Cities and Society 71, 102957 (2021)
76. Schulz, T., Böhm, M., Gewald, H., Krcmar, H.: Door-to-Door Mobility Integrators as Keystone Organizations of Smart Ecosystems: Resources and Value Co-Creation – A Literature Review. In: Proceedings of the 14th International Conference on Wirtschaftsinformatik (WI 2019) (2019)
77. Elshater, A., Rodwell, D.: Transforming Urban Nightlife and the Development of Smart Public Spaces. Information Science Reference; IGI Global, Hershey, PA, Hershey, Pennsylvania, USA (2021)
78. Abusaada, H., Elshater, A.: Nightlife in Smart Public Spaces. In: Dima, I., Abusaada, H., Elshater, A., Rodwell, D. (eds.) Transforming Urban Nightlife and the Development of Smart Public Spaces, pp. 1–12. IGI Global (2021)
79. Biloria, N.: From smart to empathic cities. Frontiers of Architectural Research 10, 3–16 (2021)
80. Vogel, P., Mandelsloh, F.v., Grotherr, C., Gaidys, U., Böhmann, T.: Design and Evaluation of an Online Neighborhood Social Network for Fostering Social Connectedness and Participation: Lessons from Two Urban Neighborhoods. In: Proceedings of the 41st International Conference on Information Systems (ICIS 2020). Association for Information Systems (2020)
81. Lilis, G., Conus, G., Asadi, N., Kayal, M.: Towards the next generation of intelligent building: An assessment study of current automation and future IoT based systems with a proposal for transitional design. Sustainable Cities and Society 28, 473–481 (2017)
82. Iddianozie, C., Palmes, P.: Towards smart sustainable cities: Addressing semantic heterogeneity in Building Management Systems using discriminative models. Sustainable Cities and Society 62, 102367 (2020)
83. Palmer, M., Gibbons, R.: Smart lighting for smart cities. In: Solving Urban Infrastructure Problems Using Smart City Technologies, pp. 485–499. Elsevier (2021)
84. Ghazal, M., Akmal, M., Iyanna, S., Ghoudi, K.: Smart plugs: Perceived usefulness and satisfaction: Evidence from United Arab Emirates. Renewable and Sustainable Energy Reviews 55, 1248–1259 (2016)
85. Konstantoglou, M., Tsangrassoulis, A.: Dynamic operation of daylighting and shading systems: A literature review. Renewable and Sustainable Energy Reviews 60, 268–283 (2016)
86. Khalil, M.I., Jhanjhi, N.Z., Humayun, M., Sivanesan, S., Masud, M., Hossain, M.S.: Hybrid smart grid with sustainable energy efficient resources for smart cities. Sustainable Energy Technologies and Assessments 46, 101211 (2021)
87. Menniti, D., Bayod-Rújula, A.A., Burgio, A., García, D.A.L., Leonowicz, Z.: Solar Energy and PV Systems in Smart Cities. International Journal of Photoenergy, 1–2 (2017)
88. Li, C.: Designing a short-term load forecasting model in the urban smart grid system. Applied Energy 266, 114850 (2020)

89. Alirezazadeh, A., Rashidinejad, M., Abdollahi, A., Afzali, P., Bakhshai, A.: A new flexible model for generation scheduling in a smart grid. Energy 191, 116438 (2020)
90. Petritoli, E., Leccese, F., Pizzuti, S., Pieroni, F.: Smart lighting as basic building block of smart city: An energy performance comparative case study. Measurement 136, 466–477 (2019)
91. O'Dwyer, E., Pan, I., Acha, S., Shah, N.: Smart energy systems for sustainable smart cities: Current developments, trends and future directions. Applied Energy 237, 581–597 (2019)
92. Paukstadt, U.: A Survey of Smart Energy Services for Private Households. In: Proceedings of the 14th International Conference on Wirtschaftsinformatik (WI 2019) (2019)
93. Bitomsky, L., Meindl, O., Schmidt, M., Regal, C.: The Effect of Real-Time Feedback on Indoor Environmental Quality. In: Proceedings of the 15th International Conference on Wirtschaftsinformatik (WI 2020), pp. 1140–1155 (2020)
94. Franchina, L., Calabrese, A., Inzerilli, G., Scatto, E., Brutti, G., los Ángeles Bonanni, M.V. de: Thinking green: The role of smart technologies in transforming cities' waste and supply Chain's flow. Cleaner Engineering and Technology 2, 100077 (2021)
95. Figueiredo, I., Esteves, P., Cabrita, P.: Water wise – a digital water solution for smart cities and water management entities. Procedia Computer Science 181, 897–904 (2021)
96. Cheela, V.S., Ranjan, V.P., Goel, S., John, M., Dubey, B.: Pathways to sustainable waste management in Indian Smart Cities. Journal of Urban Management (2021)
97. Sharma, M., Joshi, S., Kannan, D., Govindan, K., Singh, R., Purohit, H.C.: Internet of Things (IoT) adoption barriers of smart cities' waste management: An Indian context. Journal of Cleaner Production 270, 122047 (2020)
98. Gimpel, H., Graf-Drasch, V., Hawlitschek, F., Neumeier, K.: Designing smart and sustainable irrigation: A case study. Journal of Cleaner Production 315, 128048 (2021)
99. Ruivo, P., Oliveira, T., Mestre, A.: Enterprise resource planning and customer relationship management value. Industrial Management & Data Systems 117, 1612–1631 (2017)
100. Halvorsrud, R., Kvale, K., Følstad, A.: Improving service quality through customer journey analysis. Journal of Service Theory and Practice 26, 840–867 (2016)
101. Barann, B., Hermann, A., Heuchert, M., Becker, J.: Can't touch this? Conceptualizing the customer touchpoint in the context of omni-channel retailing. Journal of Retailing and Consumer Services (2020)
102. Dudley, E., Lin, D.-Y., Mancini, M., Ng, J.: Implementing a Citizen-centric Approach to Delivering Government Services (2015)
103. Hevner, A.R.: A Three Cycle View of Design Science Research. Scandinavian Journal of Information Systems (2007)
104. vom Brocke, J., Simons, A., Riemer, K., Niehaves, B., Plattfaut, R., Cleven, A.: Standing on the Shoulders of Giants: Challenges and Recommendations of Literature Search in Information Systems Research. Communications of the Association for Information Systems (2015)
105. Wolfswinkel, J.F., Furtmueller, E., Wilderom, C.P.M.: Using grounded theory as a method for rigorously reviewing literature. European Journal of Information Systems 22, 45–55 (2013)
106. Rosenbaum, M.S., Otalora, M.L., Ramírez, G.C.: How to create a realistic customer journey map. Business Horizons 60, 143–150 (2017)
107. Duvall, E.M., Miller, B.C.: Marriage and family development. Harper & Row, New York (1985)
108. Gould, R.L.: Lebensstufen. Entwicklung und Veränderung im Erwachsenenleben. Fischer, Frankfurt am Main (1979)

109. Golan, N.: Passing Through Transitions: A Guide for Practitioners. Social Work 28, 86–87 (1981)
110. Jungbauer, J.: Familienpsychologie kompakt. Beltz PVU, Weinheim (2009)
111. Hasebrook, J., Zinn, B., Schletz, A.: Lebenslang kompetent: Lebensphasenorientiertes Kompetenzmanagement zwischen Anforderung und Überforderung. In: Hasebrook, J., Zinn, B., Schletz, A. (eds.) Lebensphasen und Kompetenzmanagement, pp. 1–13. Springer Berlin Heidelberg, Berlin, Heidelberg (2018)
112. Schein, E.H.: Career dynamics. Matching individual and organizational needs. Addison-Wesley Publishing Company, Reading, Massachusetts, Menlo Park, California, London, Amsterdam, Don Mills, Ontario, Sydney (1978)
113. Levinson, D.J.: Das Leben des Mannes. Werdenskrisen, Wendepunkte, Entwicklungschancen. Kiepenheuer u. Witsch, Köln (1979)
114. Wilkening, F., Freund, A.M., Martin, M.: Entwicklungspsychologie kompakt. Beltz, Weinheim (2013)
115. Myers, M.D., Newman, M.: The qualitative interview in IS research: Examining the craft. Information and Organization 17, 2–26 (2007)
116. Braun, V., Clarke, V.: Using thematic analysis in psychology. Qualitative Research in Psychology 3, 77–101 (2006)
117. Schwarz, A., Mehta, M., Johnson, N., Chin, W.W.: Understanding frameworks and reviews. ACM SIGMIS Database: the DATABASE for Advances in Information Systems 38, 29–50 (2007)
118. Flamant, A.: The local turn in integration policies: why French cities differ. Ethnic and Racial Studies 43, 1981–2000 (2020)
119. Chen, T.-L., Chiu, H.-W., Lin, Y.-F.: How do East and Southeast Asian Cities Differ from Western Cities? A Systematic Review of the Urban Form Characteristics. Sustainability 12, 2423 (2020)
120. Carter, E.A., McGoldrick, M. (eds.): The expanded family life cycle. Individual, family, and social perspectives. Allyn and Bacon, Boston (1999)