A Consumer Behavior and Service Marketing Perspective on Smart Technology: Understanding smart consumption experiences, their contexts, consumer trust, and smart service encounters

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Vorgelegt
von
Jonas Föhr
aus
Aachen

Für meine Familie

Geleitwort

Promotionsschriften haben den Zweck, die Eignung zur selbständigen wissenschaftlichen Arbeit zu belegen. Dies gelingt, wenn die dort dokumentierte Forschung ein Themenfeld in einem Detailgrad erschließt, der einer Tiefenbohrung gleichkommt: Ein kleines Feld wird mit geeigneten Methoden durch alle Schichten der Literaturebenen hindurch so erschlossen, dass ein Erkenntnisgewinn entsteht. Wegen der geringen Größe des Themengebiets bleiben diese Erkenntnisse aber zumeist so spezialisiert, dass sie nur selten aufgegriffen werden.

Die Promotionsschrift, die Doktor Jonas Föhr vorgelegt hat, geht weit über eine akademische Tiefenbohrung hinaus. Mit seiner hier nun im Druck vorliegenden Schrift *A Consumer Behavior and Service Marketing Perspective on Smart Technology: Understanding smart consumption experiences, their contexts, consumer trust, and smart service encounters* gelingt es Jonas Föhr, nicht nur ein breites Forschungsgebiet zu kartographieren. Diese Doktorarbeit zählt zu den ganz wenigen Ausnahmefällen in der Wissenschaft, in denen eine Doktorarbeit nicht nur ein bestehendes Feld erschließt, sondern ein neues Feld definiert.

In seiner Dissertationsschrift gelingt es Doktor Jonas Föhr, die Technokultur aus der Perspektive der Konsumentenverhaltenswissenschaften zu durchdringen und die gegenseitige Beeinflussung von Menschen, Dienstleistungen und (physischen) Objekten am Beispiel von Smart Voice Interaction Technologies zu analysieren. Diese ausgesprochen anspruchsvolle Aufgabe hat er mit Bravour gelöst.

Doktor Föhr entwickelt in seiner Arbeit einen eigenständigen Zugang zu smarten Technologien, der auf Beziehungen beruht. Dabei gelingt es ihm quasi en passant, eine innovative Sicht auf Smart Devices zu entwickeln, die auf einer Organismus-Organ-Metapher beruht. Diese neuartige Sichtweise ermöglicht es ihm, die Notwendigkeit anschaulich zu machen, gegenseitige Beziehungen zwischen Technologien, Konsumenten und Kontexten zu erforschen, und nicht auf die oft auf Einweg-Kausalitäten ausgerichteten Technologieakzeptanzmodelle zurückgreifen zu müssen. Es gelingt ihm zudem, mit dem Smart Homescape einen völlig neuen Ansatz zu finden, mittels eines klug begründeten Totalmodells die neuen Herausforderungen von digitalen, smarten Service-Geschäftsmodellen abzuleiten: Die Herausforderungen liegen nicht mehr in von den Dienstleistungsanbietern kreierten (virtuellen) Räumen, sondern im Zuhause der Konsument*innen.

Mit seiner Dissertationsschrift ermöglicht Doktor Föhr auch einen wichtigen Fortschritt im Umgang mit den Forschungsparadigmen auf dem Feld smarter Technologien. Er zeigt auf, dass Beiträge aus dem Customer Centricity-Paradigma der Human Computer Interaction-Forschung vor dem Hintergrund neu zu bewerten sind, dass smarte Geräte selbst „Erfahrungen" machen können, die der einer Customer Experience nahekommen (und ähnliche Wirkungen haben). Dieser Vorschlag ist durchaus mutig zu nennen, und dürfte kontrovers diskutiert werden, zeigt aber zugleich die gedankliche Schärfe und den Mut zur eigenständigen Positionierung dieser Doktorarbeit auf.

Die Schrift, die Herr Doktor Föhr vorgelegt hat, ist originell im besten Sinne, nämlich neu, frisch und selbständig in den Zugängen und Lösungen. Selten hatte ich eine Arbeit in den Händen, die eine so fundamentale Kenntnis der Literaturzugänge so klug zur Gewinnung ganz neuer Einsichten ermöglicht. Herr Doktor Föhr hat mit seiner Arbeit das Feld der smarten Technologien wesentlich vorangebracht. Seine Einsichten haben, wie

die Zitationen seiner Publikationen auf dem Weg dorthin belegen, die Diskussion im Marketing und der Konsumentenverhaltensforschung bereits wesentlich beeinflusst.

Es war mir eine große Ehre, diesen Weg begleiten zu dürfen, vom dem zu hoffen ist, dass er noch lange nicht zu Ende ist: Die Dissertationsschrift zeigt, wie viele neue Erkenntnisse durch den von Doktor Föhr etablierten Perspektivwechsel zur Beziehungsfokussierung noch möglich sind. Man kann sich keinen besseren Forscher als Doktor Föhr vorstellen, diesen Weg weiterzuführen und mit weiteren qualitativen und quantitativen Studien zu einem besseren Verständnis von smarten Technologien zu kommen. Die akademische Welt, wie auch die Welt der Praxis dürfen sich auf viele weitere Beiträge zur zentralen Frage freuen, wieso Konsument*innen smarte Technologien in ihr Leben hineinlassen. Ohne Zweifel wird die Dissertationsschrift von Doktor Jonas Föhr zu den Schlüsselbeiträgen zum „Smart Turn" in der Forschung zu Technologien und Konsument*innen zu zählen sein, weshalb ihre Lektüre der Wissenschaft und der Praxis sehr ans Herz gelegt sei.

Bayreuth, im Juni 2022

Prof. Dr. Claas Christian Germelmann

Danksagung

höflich ertragen haben) und mir vielfach neue Perspektiven auf meine Forschungsarbeit eröffnet haben.

Abschließend gilt mein größter Dank meiner Partnerin Lena für Ihren unglaublichen Einsatz und ihr riesiges Verständnis in den vergangenen Jahren, sowie meinen Eltern und meiner Familie, deren bedingungsloser Unterstützung ich mir immer sicher sein konnte und die auch dann an mich und meine Arbeit geglaubt haben, wenn ich es selbst vielleicht mal nicht getan habe. Ihr alle habt mir gezeigt, dass es auch in einer smarten und digitalen Welt ziemlich analoge Dinge wie Fleiß, Neugier, Ausdauer und Hingabe sind, die zu Erfolg führen können – dafür danke ich Euch von ganzem Herzen!

Bayreuth, im Juni 2022

Jonas Föhr

Abstract

Smart (home) devices, often comprising some degree of artificial intelligence, have recently gained centrality in consumers' lives. Likewise, marketing research shows growing interest in consumers' use of smart technology, which has resulted in a plethora of works on the topic. However, extant research projects have tended to either take a prophetic, future-oriented or prematurely specific stance. Hence, a substantial theoretical understanding of consumption experiences with smart technology is as of yet missing. Adopting a consumer behavior and service marketing perspective, this thesis aims to close this research gap. Across four research projects, both conceptual and empirical, this dissertation first delimits and specifies the phenomenon of smart digital consumption, before analyzing the transformative impact of smart devices on consumers' domestic contexts. Additionally, this thesis investigates how consumers build and maintain trust in their smart devices (in this case, smart voice-interaction technologies), and finally examines the hybrid influence of digital and analog contexts on smart service value generation. The findings of this thesis suggest that if marketing researchers aim to contribute to meaningful knowledge about consumers' smart technology use and want to generate original research results, they first need to establish a more contextual understanding of smart technologies as such and their impact on consumption experiences. To stimulate scientific progress, this thesis concludes by identifying avenues for future research.

Zusammenfassung

Smarte (Heim-)Technologien haben zuletzt eine immer zentralere Rolle im Leben von Konsumenten eingenommen. Gleichermaßen hat das Interesse der Marketingforschung an der Nutzung dieser Technologien durch Konsumenten zugenommen, was eine Fülle an Veröffentlichungen zu dem Thema herbeigeführt hat. Jedoch neigen bestehende Arbeiten entweder zur Verfolgung eines prophetischen, zukunftsfokussierten oder voreilig detaillierten Forschungsansatzes. Somit fehlt bislang ein substantielles, theoretisches Verständnis der Konsumerfahrungen mit smarten Technologien. Die vorliegende Arbeit intendiert diese Forschungslücke zu schließen, indem Sie eine konsumentenverhaltens- und dienstleistungsmarketing-zentrierte Perspektive einnimmt. Im Rahmen von vier konzeptionellen und empirischen Forschungsprojekten grenzt sie zunächst das Phänomen der Smart Digital Consumption ein und beschreibt dieses, bevor sie die transformativen Auswirkungen smarter Technologien auf das Zuhause von Konsumenten untersucht. Zudem erforscht diese Dissertation, wie Konsumenten Vertrauen zu ihren smarten Technologien (in diesem Falle zu Smart Voice-Interaction Technologies) aufbauen und aufrechterhalten, und zuletzt wie hybride (d.h. digitale und analoge) Kontexte die Wertgenerierung smarter Dienstleistungen beeinflussen. Die Ergebnisse dieser Arbeit legen nahe, dass wenn Marketingforscher einen bedeutsamen Beitrag zu einem vertieften Wissensstand zur Nutzung smarter Technologien leisten möchten und zudem eigenständigere Forschungsbeiträge generieren wollen, sie zunächst ein kontextuelles Verständnis von smarten Technologien als solches sowie deren Einfluss auf Konsumerfahrungen erarbeiten müssen. Abschließend zeigt diese Dissertation Wege für Anschlussforschung auf.

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List of Abbreviations

AI	Artificial Intelligence
CASA	Computers Are Social Actors
CDL	Customer-Dominant Logic
HCIF	Hybrid Context Impact Framework
SDC	Smart Digital Consumption
SDL	Service-Dominant Logic
SVIT	Smart Voice-Interaction Technology; (plural: SVITs)

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1. Theoretical Foundations of Consumer Experiences with Smart Devices and Smart Services

1.1 Introduction

"[S]omething new is currently happening, something previously unseen and unforeseen. More and more, our technological creations are reflecting us, connecting us, shaped like us, shaping us, replacing us, controlling us."

—Robert V. Kozinets (2019, p. 620), "Consuming Technocultures: An Extended JCR Curation"

Imagine, for the sake of illustration, a liaison between Steven Spielberg's eponymous creature from the film *E.T.* and an ordinary vacuum cleaner, and you will have a rough idea of the design of Amazon's most recently introduced smart device, the Amazon Astro. As a smart household robot, it is intended to aid its users in handling the tasks of everyday life, such as autonomously observing consumers' homes when they are absent, delivering small items from room to room, and calling the kids for family dinner (Newman 2021). Using the Astro, like many other smart devices, is surprisingly simple for consumers: the inclusion of Amazon's Alexa voice interface enables consumers to utilize their voices, their most natural mode of expression, to command their device (Weise 2021; Nass and Brave 2005). From a usability perspective, smart devices certainly offer unpreceded levels of convenience for consumers (Kuang and Fabricant 2019). From the consumer behavior and service marketing research perspectives, however, they point to a number of areas, such as the increasing relocation of consumption activities into consumers' (smart) homes, the establishment of new interfaces for consumer interaction with marketers, and novel forms of smart service provision (i.e., of services provided via smart devices), which research to date has not addressed sufficiently – especially from a theoretical perspective.

This does not imply that consumer behavior and service marketing research are ignorant to the topic per se. Quite the contrary: Extant literature has elaborated on the various ways in which smart devices and artificial intelligence (AI) will affect marketing as such (e.g., Davenport et al. 2020; Grewal et al. 2020; Rust 2020; Huang and Rust 2021), influence services and their delivery (e.g., Huang and Rust 2018; Bock, Wolter, and Ferrell 2020; Klaus and Zaichkowsky 2020; McLeay, Osburg, Yoganathan, and Patterson 2020; Paluch and Wirtz 2020), and modify customer relationship management (e.g., Libai et al. 2020) and customer experience (e.g., Ameen et al. 2021). In the same vein, researchers have predicted that smart technology and AI will simplify marketing communication and

advertising (e.g., Kietzmann, Paschen, and Treen 2018; Rodgers 2021), alter marketing education (e.g., Ferrell and Ferrell 2020), and dramatically transform retailing (e.g., Shankar 2018; De Keyser et al. 2019; Guha et al. 2021). In view of this variety of research, it is certainly reasonable to conclude that the topic of smart devices has resonated widely among the academic discipline – albeit with a strong focus on marketing practice or strategy, and less on theory, particularly not on consumption contexts and experiences or service encounters with smart technology. Moreover, many works have taken a prophetic stance, such that they tend to underestimate that smart technology and AI are not exclusively a topic of the future, but instead are important elements of consumers' day-to-day lives in the present already. One could get the impression, therefore, that "[r]esearchers and technologists [interested in smart devices] spend far too much time focusing on the sexy what-might-be, and far too little time on the important what-is" (Bergstrom and West 2020, p. 184).

In a similar vein, some consumer and service marketing research on smart technology has dealt with explicit causal relationships between constructs already without departing from a substantiated theoretical understanding of consumers' use experience of smart devices and the (smart) services connected to them (e.g., Brill, Munoz, and Miller 2019). As a result, smart devices' impact on consumption experiences may be either overestimated in future-oriented works (à la "smart technology will change everything") or underestimated in premature "findings first" projects (Lynch et al. 2012, p. 475), in which the smart technology is merely considered yet another mediator of customer experiences (Mele, Polese, and Gummesson 2019). A detailed theoretical understanding of the experiential phenomenon of smart technology use in consumers' everyday lives is, however, missing (for a few notable exceptions, see, e.g., Kozinets 2019; Puntoni et al. 2021).

This dissertation therefore sets out to build a theoretical bridge between the prophetic and the prematurely granular works. In so doing, it sheds light on how smart devices influence consumers' consumption experiences, their use contexts, and the service encounters made possible through them. Herein, consumption experiences with smart devices – in line with Holbrook and Hirschman (1982) and Carù and Cova (2003) – are understood primarily in terms of consumers' mundane and ordinary day-to-day experiences with their smart devices (e.g., in their smart homes). These experiences are not necessarily limited to commercial consumer–marketer exchanges and often exist somewhat separately from the company-designed customer experiences with smart technology or even exceed these pre-

planned experiences at times – although occasional overlaps between consumption and customer experiences are common in smart technology use (Lanier and Rader 2015; Ramadan, Farah, and El Essrawi 2021). To explore the phenomenon of consumption experiences with smart devices and smart services, this dissertation does not concentrate on one particular focal theory (Jaakkola 2020); rather, it adopts and combines two distinct research lenses (i.e., the perspectives of consumer behavior and service marketing) and draws from a variety of literature streams, including digital consumption, servicescapes, consumer trust, and smart services, to establish a holistic understanding of (1) consumers' experiences during smart technology use, (2) how smart technologies transform their use context, and (3) the hybrid characteristics of smart services. Thereby, this dissertation contributes to both understanding the *phenomenon* of consumers' smart technology use and to expanding extant *theory* on consumer trust, servicescapes, and smart services (see also Lynch et al. 2012).

In response to its research question, one of the fundamental claims of this thesis is that before marketing and consumer research can investigate the effects of individual variables influenced through consumption experiences involving smart technology, it first needs to establish a more substantiated general theoretical understanding of the phenomenon of these consumption experiences as such. Thus, this dissertation strictly opposes propositions that because of the sheer amount of behavioral data generated through smart device use (i.e., big data), their availability and assumed predictive ability, a body of theory explaining consumers' behavior in the context of smart technology use is superfluous. On the contrary, in line with others (e.g., Strong 2013; Kitchin 2014; Lehmann 2020), this work demonstrates that such view has fostered reductionist thinking that obscures the existence of complex explanations for consumers' complex use behavior of equally complex smart technology.

1.2 Approaching Consumption Experiences Involving Smart Devices with the POPS Framework

When one shifts focus from the "what-might-be" to the "what-is" dimension of consumption experiences with smart technology, one gets an impression of the scope of transformations that smart technology has introduced in the present already. More precisely, one finds that smart devices as artifacts, the practices of consumers' use of

these devices, and their integration into certain use contexts all challenge established assumptions in marketing, consumer behavior, and service research. For instance, as both Kamleitner (2018) and Schmitt (2019) argue, smart devices call into question extant notions of psychological ownership in that for consumers they obscure the boundaries between physical and digital ownership, that is – as Schmitt (2019) puts it – between atoms and bits. In so doing, smart devices and the services provided through them challenge what it means to be a consumer, as consumers have difficulties recognizing them as their possessions. This effect, Atasoy and Morewedge (2018) find, is even amplified the more autonomous smart devices become, which hints at the fact that smart devices are indeed different from other technologies, let alone other non-technical products.

Along the same lines, Hoffman and Novak (2018) suggest that smart devices and their unique capabilities force consumer researchers to rethink their focus on human actors in consumption. Instead, the authors clarify, smart devices can have basic consumption experiences themselves, thus challenging some of the field's extant theoretical paradigms and (human) consumer-centric research foci (e.g., Inman et al. 2018). In addition, Woodside and Sood (2017) propose that smart devices have introduced new modes of marketer-to-consumer interaction and relationship building, in which the physical product (i.e., the smart device) serves as both a vehicle for service delivery and a brand relationship touchpoint. Consequently, consumption experiences involving smart devices not only connect consumers and marketers throughout the entire lifespan of the smart device as a product; they also challenge the notion that consumption is about consumers' longing for consummation (Holbrook 1987). In other words, consumption experiences involving smart devices dispute the prevalent idea that the act of consumption is sequential and instead render it continuous. For marketers this means, as Decker and Stummer (2018, p. 60) suggest that formerly singular and individual customer touchpoints merge into coherent series of interactions, or "touchlines". The case of smart voice-interaction technologies (SVITs) like the Amazon Echo smart speaker illustrates the point: smart speakers, once they are installed within their use context, offer consumers permanent availability via always-on microphones that listen to consumers' voice commands. While the consumer can request individual services through active deliberate voice command, the constant availability of the device's microphone also represents a service in its own right, which the marketers offer and the consumer deploys more or less consciously (Mele, Russo-Spena, and Peschiera 2018).

Ultimately, Malter et al. (2020) note the ways consumers integrate smart technology in their thoughts, personal relationships, or identities (and sometimes physical contexts) and thus challenge the idea that consumers use such devices primarily because of the convenience they offer in day-to-day use. While the authors remain vague as to how this integration unfolds, they nevertheless posit that smart device use "and other technology-related topics will be dominant subjects in consumer research circa 2040" (Malter et al. 2020, p. 145). With almost twenty years until that point, this dissertation aims to lay a much needed theoretical cornerstone for this development.

The previous paragraphs show that smart technology and the AI applications built into it are "likely to turn consumers' lives upside down" (Schmitt 2019, p. 825). What is particularly fascinating about this technology-induced transition is that it unfolds itself tacitly – that is, mostly without consumers consciously noticing how the inclusion and interconnection of a variety of smart devices impacts their cognition, affect, and behavior (Gram-Hanssen and Darby 2018; Kozinets 2019; Melumad and Pham 2020).This revolutionary potential is grounded in, among other things, the increased levels of connectivity characteristic for consumption experiences with smart devices.

Therefore, to explore these consumption experiences in more detail, this thesis employs Verhoef et al.'s (2017) framework of consumer connectivity as an overarching structure for its content. This framework conceptually maps consumer connectivity initiated through smart devices as an interconnection of the people (P) using the devices, the smart objects or devices themselves (O), and the physical environments (P) in which consumption experiences incorporating smart technology are made – thus, the authors' abbreviation of the POP framework.

This dissertation builds on these three POP elements but argues that the original POP framework does not sufficiently account for service encounters as part of these consumption experiences (as remarked above, smart objects are, among others, vehicles for smart services). Hence, this research suggests extending the structural framework with a service component (S), thus transforming it into the POPS framework (see Figure 1). To accommodate for the consumer behavior perspective underlying this work, this dissertation also deviates from the original understanding of the "people" dimension of the framework: instead of considering connectivity in this dimension as customer-to-customer (as originally proposed by Verhoef et al. 2017), the POPS framework shifts emphasis to consumer-to-technology connectivity and the resulting relationships.
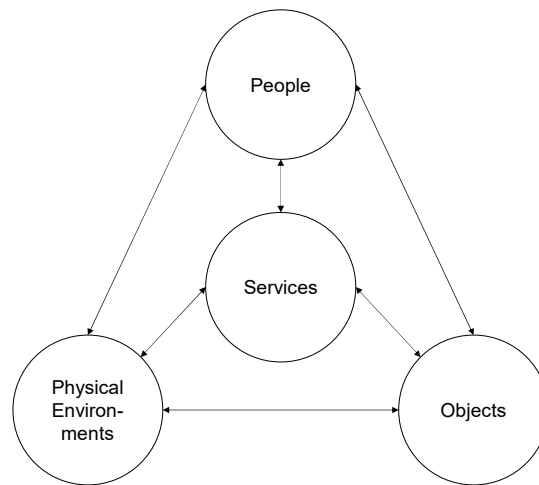
Figure 1:   The POPS framework serves as the overarching structure for the content of this dissertation

Source: Adapted from Verhoef et al. (2017)

The remainder of this introduction expands on the POPS framework by explicating and discussing theories and concepts that aid in shedding light on the impact of smart devices on consumption experiences. Considering that most new phenomena are somewhat "messy" (Kohli and Haenlein 2021, p. 6) – and consumption experiences with smart technology are no exception – they deserve a more extensive theoretical contextualization, which this introduction presents.

Consequently, Section 1.3 begins by elaborating on the object (O) dimension of the POPS framework. It emphasizes that although smart devices are not the research object of this thesis per se, a basic understanding of smart technology, especially one that includes a consumer behavior and service marketing perspective, is vital for comprehending its potential impact on consumers, contexts, and services.

Following this conceptualization of smart devices, Section 1.4 briefly introduces the people (P) dimension of the POPS framework. As Guzman (2017, p. 72) points out, smart devices – especially SVITs, which occupy a central position in this thesis – are essentially rooted in a certain "cultural milieu of dueling perspectives". These perspectives, Guzman (2017) continues, are particularly fostered through these technologies' embeddedness in a variety of discourses, both real and fictional. This embeddedness, in turn, has

contributed to the development of consumers' expectations of the devices and the practices of their day-to-day use and has led to the wide variation in perceptions of smart technology present today, ranging between hype and horror (Degani 2003). Comprehending these perceptions, myths, and expectations is important as they build the backdrop against which all consumer interactions with the devices, in both the present and future, are evaluated (Möllering 2001).

This comprehension is particularly relevant for understanding the physical environment (P) and service (S) dimensions of the POPS framework: decisions about which physical contexts are adequate for smart device use (e.g., consumers' homes or retail settings), as well as which abilities (e.g., services) smart devices should provide at all, and in what ways, all depend on consumers' expectations and imaginations of what it means for a technology to be "smart". Thus, as Guzman (2017) emphasizes, only when researchers comprehend both the real and the fictional lineage of smart devices can they understand how consumers negotiate their use of smart technology.

Moreover, when investigating smart technology use, researchers have often adopted a contradictory perspective that focuses on superficial dimensions, such as perceived convenience, instead of the underlying and often extremely complex cognition and behavior of consumers. Section 1.5 introduces this "Fridge Fallacy" (in reference to the smart refrigerator as the prototypical smart technology; Bunz and Meikle 2018, p. 14) and illustrates how it has spawned reductionist research approaches to consumers' negotiation of smart technology use and in that way has contributed substantially to the problem addressed in this thesis (i.e., the dearth of conceptual knowledge and theoretical understanding of consumption with smart devices among consumer behavior and service marketing research).

In their negotiation of smart technology use, consumers inevitably face controversies and paradoxes, which elicit cognitive dissonances (Mick and Fournier 1998). A central argument of this thesis is that one way consumers cope with these paradoxical cognitions is through developing trust in their smart devices (see also Johnson, Bardhi, and Dunn 2008). Trust in the technology, this dissertation argues, thus must be considered a critical element for understanding consumption experiences incorporating smart devices; however, as a determinant for smart technology use, consumer trust has remained understudied thus far. These introductory chapters provide only a cursory conceptual overview of consumer trust in smart technology; Chapter 4 explores in detail how

consumers develop and maintain trust in their smart devices. For the time being, in the paragraphs that follow, this thesis will first explore the meaning of smart technology.

1.3 On the Ubiquity of Smart Technology and the Smartness of Ubiquitous Technology

"As we might by now expect of networked things, nothing about the physical form of these objects goes any way at all toward conveying their purpose or intended mode of function"
—Adam Greenfield (2018, p. 38), *Radical Technologies: The Design of Everyday Life*

At first glance, a thesis section on the concept of smart technology might be considered counter-intuitive. After all, smart devices (herein, this term is used interchangeably with smart technology and smart products) are so pervasively interwoven into the fabric of our everyday lives that we rarely reflect on what these devices epitomize (Weiser 1991). At the same time, the label "smart" now accompanies such a vast array of heterogeneous products and services that is has become difficult to identify what it essentially denominates (Alter 2020). Smartness as an attribute, it seems, has become as ubiquitous as the devices it is thought to characterize. In this regard, it is of little help, of course, that the attribute "smart" typifies for what De Wilde (2000) and McGee (1980) have called an ideograph, a concept widely used in everyday language whose normative meaning nevertheless is abstract, flexible, individual, and thus complicated to pinpoint. Ergo, consumers (and researchers) generally assume to have an idea of what smart stands for; however, their individual conception of the term may vary greatly.

Just as consumers have increasingly embraced smart devices, scientific interest in the technology as such, as well as what consumers do with it, has recently surged (Raff, Wentzel, and Obwegeser 2020; Mele et al. 2021) and thereby exceeded beyond the focus of the computational disciplines such as human–computer interaction or information systems. By now, smart technologies and their use have become multidisciplinary fields of inquiry – with all the perks and quirks this implies; one being that so far, academia lacks a uniform conceptual understanding of smart technology (Raff et al. 2020).

Departing from such conceptual fuzziness, how then are we to better understand both smartness and smart devices? For a start, this thesis proposes to emancipate from two dynamics that permeate the current scientific discourse on smart technologies. First, scholars from a wide variety of disciplines have made attempts to conceptualize and

define the "smartness" of technological artifacts. In this undertaking, the engineering and computational disciplines often enjoy a conceptual prerogative over others, thereby (1) establishing a possibly restricted focus on the technological particularities of the devices and (2) consolidating what has been termed a "technology push perspective", that is a view that centers on "what is technically possible rather than what is desirable" (Aldrich 2003, p. 27; Solaimani, Keijzer-Broers, and Bouwman 2015). As Bunz and Meikle (2018) among others, have argued however, for consumers, the meaning of smart technologies extends their technological and design features and instead manifests itself in the diverse ways they use these devices and lend meaning to these practices of use. Hence, this thesis suggests rejecting the conceptual monopoly of selected disciplines and instead synthesizing existing definitions from various fields, particularly from marketing and consumer behavior research.

Second, scholars have attempted to conceptualize and define smart technologies by referring to existing devices on the market (e.g., Moorthy and Vu 2014; Lopatovska et al. 2018), thereby disregarding the heterogeneity of smart products (see Woodall, Rosborough, and Harvey 2018), and neglecting the speed of their technological development. Yet, as recent examples of smart devices (most notably, Google Glasses) have illustrated (Rauschnabel, Brem, and Ivens 2018), the industry's technological turnover rates and consumers' buying patterns cause individual technologies to disappear from the market almost as quickly as they are introduced. Therefore, researchers should avoid conceptualizations based on existing technological artifacts and instead aim at grasping and understanding their underlying concepts – in this case, the concept of smartness (Bunz and Meikle 2018).

With these premises in mind, it could be argued that from a marketing standpoint, few approaches to smart devices have been as elaborate and differentiated as Raff et al.'s (2020) recent conceptualization. Using an extensive, cross-disciplinary, systematic literature review, the authors generate a capability-based conceptualization of smart devices that builds on a variety of smart product archetypes. In essence, the authors conclude, the smartness of a device can be thought of as a function of its software complexity and hardware versatility, which allows for a corresponding range of capabilities. Thus, smart devices in their most basic sense can be thought of as both analogue and digital in nature; that is, they consist of a tangible artifact as a carrier medium and a basic operation software that enables data processing and storage (Raff et

al. 2020). More sophisticated archetypes of smart technology additionally allow for network connectivity with other (similar) devices and thus for a minimum level of device-to-device or consumer-to-device interaction (Raff et al. 2020). Again, even more advanced smart devices are responsive, meaning they are equipped with additional sensor and actuator technology that enables real-time context awareness and reactivity, as well as adaptability to contextual circumstances (Raff et al. 2020). Last, according to Raff et al.'s archetypes, smart devices, in their most advanced form include AI software that allows for the technology to engage in decision-making independently from consumers (Raff et al. 2020). In a nutshell thus, Raff et al.'s (2020) approach distinguishes smart products on the basis of the degree of complexity that manifests itself in their interplay of hardware and software components. Here, the main qualities of Raff et al.'s (2020) work become evident: (1) they provide a helpful overview of the technological components of smart devices (referring to their hardware and software), and (2) they emphasize the point others have made before (e.g., Anker 2020) that smartness as a characteristic of technological devices is not to be thought of in binary terms (i.e., as smart vs. not smart) but rather as a continuum.

Yet, it is surprising that despite the extent of Raff et al.'s (2020) literature review and the inclusion of works from consumer research (e.g., Hoffman and Novak 2018), the authors nevertheless slip into a narrow, technology-centered perspective on smart technology. In so doing, they neglect the fact that smart devices not only differentiate themselves from their less-smart counterparts through their technological configurations, but also – and eminently so – through the responses they initiate among consumers (e.g., Hoffman and Novak 2018; Melumad and Pham 2020). Thus, to fully understand the underlying concepts of smartness and smart devices, it suggests itself that they must be considered in terms of a behavioral perspective as well, which will be aim of the following paragraphs.

As Hoffman and Novak (2018) discuss in their influential conceptual work in consumer research, smart devices, depending on their technical configuration, possess three core behavioral capabilities that allow them to affect the network or assemblage that they partake in with (1) the consumer, (2) other smart devices, and (3) the context within which they are located. Smart devices hence have some degree of agency; that is, "they possess the ability for interaction" and have "the capacity to affect and be affected" (e.g., through other smart devices in their network; Hoffman and Novak 2018, p. 1187). In addition,

smart devices possess some degree of autonomy, meaning that they can interact with other devices independently from human command (Hoffman and Novak 2018). Finally, smart devices have varying levels of authority, that is in the degree to which "smart objects with the agency and autonomy have the rights to control how they respond to other entities and how other entities respond to them" (Hoffman and Novak 2018 p. 1187). Taken together, these abilities, called triple-A characteristics henceforth, allow smart devices to act – that is, to *exhibit* behavior that is directly or indirectly discernable to the consumer. For instance, it has been shown across a variety of works that smart devices can create impressions of social presence for consumers (e.g., van Doorn et al. 2017; Čaić, Mahr, and Oderkerken-Schröder 2019; Jörling, Böhm, and Paluch 2019) and are able to assume certain roles within the assemblages in which they are integrated (Novak and Hoffman 2019; Schweitzer et al. 2019; Foehr and Germelmann 2020). These roles, in turn, influence how consumers experience the use of the smart device and how they consider individual devices within their overall network of devices, such as a smart home (Harvey et al. 2020). Schweitzer et al. (2019), Novak and Hoffman (2019), and Ramadan et al. (2021), for instance, show that consumers build various types of relationships with their (voice-operated) smart devices, ranging from digital partnerships on equal terms to subservient master–servant relationships in which consumers feel dominated by the technology. These findings indicate that smart devices not only are able to exhibit behavior themselves, but also have the ability to *elicit* certain behavioral responses in consumers; many of these responses were originally thought of as unique to interpersonal interaction among humans (Nass and Brave 2005).

From the perspectives of information systems or human–computer interaction research, disciplines that investigate smart technologies as systems and consumers' interaction with smart devices, it would certainly be tempting to be content with what has been compiled about smart devices here so far. However, a consumer research and service marketing perspective, particularly one which sets out to understand smart technologies and how they impact consumers and digital consumption, needs to go beyond these topics by, for example, including less obvious facets of smartness, such as the contextual embeddedness of devices. To make a case in point: Raff et al.'s (2020) conceptualization of smart devices highlights the importance of built-in sensor technology in the distinction of smart and less-smart technology; however, they disregard that these sensors can only meaningfully function because the smart device as an artifact is embedded within a certain socio-spatial context or environment, such as consumers' homes (Aldrich 2003). In the same vein,

Alter (2020) notes that the smartness of a device arises from, but eventually also depends on, its contextual embeddedness. Thus, "[a]n entity that might seem smart along some of the dimensions of smartness within a context might be totally unsmart on those dimensions in another context" (Alter 2020, p. 383). For instance, a smart vacuum cleaner that autonomously cleans consumers' apartments may appear smart within this particular context, which encompasses comparably little variation and where interference is rather predictable. However, if placed within a different spatial context – say, a busy university corridor, a context with high variation and great unpredictability (e.g., persons continuously moving) – the device would have difficulty functioning and thus would appear less smart to consumers, even though its service as such (here: autonomous vacuum cleaning) remains unchanged. Hence, it is important to understand that the environment within which a smart technology is situated functions as more than just input information for the devices' sensors (Mani and Chouk 2017); rather, smart devices' smartness – and thus their perceived value – depend on consumer perceptions (Roy et al. 2019) that are formed only when the devices are meaningfully embedded in certain physical contexts and behavioral routines (Woodall et al. 2018; Harvey et al. 2020). The reciprocal interplay of smart devices and their use context additionally becomes evident when considered in reverse: the use context may render the smartness of a technology meaningful to consumers, but it is only through the embeddedness of smart technology in certain socio-spatial contexts that this context is in its entirety considered smart. Thus a smart home can only become smart because of the technology embedded inside its four walls; conversely, the technology embedded inside is only considered smart by consumers because its functionality is meaningful within its use context. Therefore, in line with Wetzels (2021, p. 246) this thesis argues that "[s]mart products and services create value to customers as a *bundle of cyber-physical arrangements*" (emphasis added).

After exploring the particularities of smart devices (including their non-technical dimensions) in more detail, how can these particularities be consolidated in one coherent concept? As Bowdle and Gentner (2005) propose, one of the most fruitful ways of linking concepts and ideas from different domains and academic fields is the use of metaphors. The preceding discussion has made clear that smart devices can be understood as a concept that includes a variety of interdependent dimensions. To capture this dimensional interdependency, this thesis proposes metaphorically equating a smart device with a biological organism that has individual organs (here: its dimensions) but that as a whole can only meaningfully function if all organs cooperate in synergy (Tansley 1935) (see

Figure 2). Additionally, biological organisms, like smart devices, co-exist with and often depend on other organisms in their ecosystem (e.g., within the internet of things; Bunz and Meikle 2018). In that sense, smart technologies, as single devices, are connected to and interact with other smart devices, creating a network or ecosystem of smart technologies.

To synthesize the points raised above and to improve understanding of the single organism (i.e., the smart device), this dissertation proposes delving into the details of its individual organs (i.e., dimensions), beginning with the technical dimension. From this dimension, smart devices offer some level of connectivity with other smart devices (e.g., to exchange data), are equipped with sensors and actuators that sense details of their use environment (e.g., the presence or absence of persons in a room), and produce correspondent reactions and usually offer some form of user interface to consumers. This interface can either be a built-in feature of an individual device, as is the case in SVITs, for instance, or they depend on the connectivity with other bottleneck or hub devices to provide a user interface (for a detailed account on bottleneck devices see Chapter 3). In addition, smart devices often – though not necessarily – incorporate a dynamic component in that they integrate elements of AI (Boden 2018), which allows them to learn consumers' preferences and consequently offer highly personalized services (Schweitzer and Van den Hende 2016; Marinova et al. 2017). Note, however, that conceptually, smartness does not necessitate the availability of AI; yet AI enables more sophisticated levels of smartness by extending the range of tasks a device can fulfill and thus broadening the range of device responses to consumer requests (Raff et al. 2020). This dynamic, often unpredictable element of smart devices is closely related to their behavioral dimension: from a behavioral perspective, exhibition of behavior – or what consumers interpret as such – is a central characteristic of smart devices. Thus, smart devices, building on their technical capabilities, have differing levels of triple-A characteristics (Hoffman and Novak 2018) and are thus able to perform actions tacitly without active human command (Weiser 1991). Simultaneously, smart devices elicit unique behavioral responses in consumers, such as the development of unusually close consumer–technology relationships. It has been argued in turn that these relationships are partly dependent on the physical dimension of smart devices – that is, their use contexts (Foehr and Germelmann 2020). Hence, smart devices are always embedded in certain use environments (e.g., consumers' homes, retail settings) (Woodall et al. 2018) and corresponding use routines (Harvey et al. 2020) (Chapter 3 and 4). To underline the point,

note that smart devices are artifacts; that is, they depend on some form of tangible carrier medium (Boden 2018) that is situated within certain physical use contexts. Thereby, the device is affected in its technical dimension (because they use sensor data, every smart device functions slightly differently in different contexts) and affects its physical context (e.g., consumers' homes) in turn.
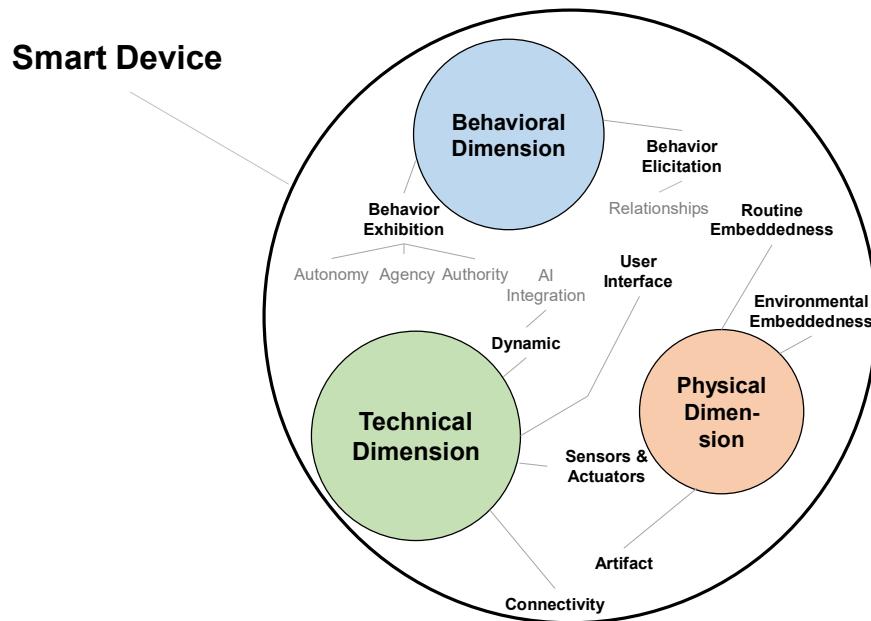
Figure 2:   The smart device can be metaphorically equated to an organism with mutually dependent organs

Source: Own illustration

To sum up, the preceding discussion illustrates that to date, researchers' comprehension of smart devices has strongly leaned toward those established by the computational disciplines. By including theories and findings from marketing, consumer behavior, and service marketing, this dissertation develops a broader conceptualization of smart devices that considers their technical capabilities as only one among several dimensions, the meanings of which are interdependent. Accordingly, smart devices can be thought of metaphorically as organisms that consist of different organs (or dimensions) that only meaningfully function in synergy. Like most organisms, smart devices unfold their full potential in co-existence with other smart devices – for instance, within smart homes. Extending on this understanding of smart devices, the following chapter analyzes how

consumers, through their interpretation of various discourses circulating around smart devices, have built expectations of the technology. Consumers' expectations of smart devices, are vital to understand, as they form the cognitive and affective foundation for consumers' subsequent technology use behavior.

1.4 Tracing Consumer Expectations of Smart Technology

"'The Machine,' they exclaimed, 'feeds us and clothes us and houses us; through it we speak to one another, through it we see one another, in it we have our being. The Machine is the friend of ideas and the enemy of superstition: the Machine is omnipotent, eternal; blessed is the Machine'"

—E.M. Forster (1928), *The Machine Stops,* p. 42

The preceding sections demonstrate that – from a theoretical and conceptual standpoint – smart technologies represent a contested and by no means monolithic notion. However, just as researchers from various disciplines have theorized the concept of smart devices in different ways, consumers have developed ambivalent expectations of smart technology and the artificial intelligence software built into them. As this dissertation also adopts a consumer behavior perspective on smart technologies and their use, especially of SVITs like the Amazon Echo or Google Assistant, this chapter explores how consumers have come to think about smart devices and in this process, have built expectations of the use of these technologies (see Figure 3). Expectations, as Borup et al. (2006, p. 286) argue, can be viewed as "real-time representations of future technological situations and capabilities". Consumers' expectations of smart technology are thus based on future scenarios, but these scenarios influence consumers' current use of that technology (van Lente, Spitters, and Peine 2013). This dissertation hence posits that if we are to understand consumers' experiences with and use behavior of smart technology, it is essential to first fathom the expectant dimensions underlying that behavior – including all the associated hopes and biases (Haenlein and Kaplan 2021).

In particular, the following paragraphs shed light on how media products like movies and fiction novels, as well as public discourses and advertising, have shaped myths surrounding smart devices and the forms of artificial intelligence built into them and, in so doing, have affected consumers' use of smart devices. It should be clarified here that these discourses rarely involve individual smart devices but instead circulate around the notions of smart machines (Zuboff 2019) as umbrella terms for smart technology, AI,

machine learning, and robotics. In this way, abstract concepts such as AI become more tangible for consumers, while the individual technologies as such tend to be diluted in the discourse. Although this thesis acknowledges that consumers' expectations of smart devices develop as an overall impression across different discourses and media channels (Mager and Katzenbach 2021), for the sake of illustration, it investigates the nature of these discourses separately for fiction, corporate voices, and public discourses in the following sections.

AI and smart technology as a topic in fiction

While the term "AI" initially only appeared in the mid-1950s (Cave and Dihal 2020), the idea of life with machines and robots – in both its positive and negative forms – has been an integral object of fiction, from the first medieval visions of Cockaigne to more recent Hollywood blockbusters like *2001 A Space Odyssey*, *I, Robot*, and *Her* (De Wilde 2000; Zdenek 2003; Belk, Humayun, and Gopaldas 2020). In the discursive construction process of smart machine myths, fiction and movies have come to occupy a dialectic role. On the one hand, they function as realms of vision development, in which technologies and their impact on society are drafted and reflected before such technologies actually exist (as in, e.g., classic dystopian novels like George Orwell's *1984*, or Forster's *The Machine Stops*) (Irsigler and Orth 2018). On the other hand, fiction negotiates various future scenarios and human–technology constellations and thus plays with and pinpoints human hopes and fears about the technology (Cave and Dihal 2020). Fiction has thus emphasized the dichotomous nature of AI and smart technology, mirroring, for instance, human hopes of immortality through technology with the prospect of inhumanity, convenience versus obsolescence, and human dominance versus the uprising of uncontrollable technology (Degani 2003; Cave and Dihal 2020). In short, AI and smart technology in fiction builds on a narrative that oscillates between fascination and anxiety, as well as realism and futurism (Belk 2017; Ernst et al. 2019). In so doing, fiction around AI and smart devices often serves to close discursive gaps between its technological state of the art and its socio-cultural imaginaries (Ernst et al. 2019; Ryder 2020). Fiction then creates a trajectory of consumers' future life with smart machines and in that way provides consumers with prospects (be they realistic or fantastical) and guidance to their technology use in the future (Humphry and Chesher 2020; Mager and Katzenbach 2021).

AI and smart technologies as topics of corporate voices

In many ways, corporate voices in the overarching discourse of smart machines build on the imaginings devised in fictional discourses, for instance, in terms of human–technology interaction modes (Bory 2019). However, as Hennig and Hauptmann (2019) argue, whereas fiction on AI and smart devices constitutes a proxy discourse that negotiates values and norms associated with human–technology constellations, corporate voices on AI and smart devices aim to produce added semantic value for consumers; that is, they transfer desirable (cultural) values and behaviors onto a particular smart product or device. In this process, companies create a nimbus of newness around their products (Natale 2016), facilitating consumers' curiosity about the device (Neville 2020) and thereby address normative controversies and paradoxes consumers may have encountered in fictional discourses (Hennig and Hauptmann 2019).Thus, corporate communications about smart machines (in the form of, e.g., advertising, corporate reports) frame smart machines as a means of raising efficiency in consumers' daily routines, a personalized tool for harmonizing relationships among humans (e.g., in families), or an assistant for optimizing hedonic day-to-day experiences (Hennig and Hauptmann 2019). Along the same lines, others have concluded that smart machines are mostly contextualized by appealing to the unprecedented levels of convenience, control, and choice that they allow for consumers, thereby promoting the narrative of a techno-hedonist consumer (Dahlgren et al. 2021). Hence, corporate voices often attempt to position smart devices and AI as a compensatory counterforce against the frequently dystopian accounts in fiction by providing them with an explicit balance of power that grants humans full control over their devices (Hennig and Hauptmann 2019). Critical media scholars have maintained that such accounts adopt a determinist position that "presents digital media corporations as the main or the only agency informing broader societal change" surrounding smart technology and AI use, while simultaneously presenting the corporation and its smart products and services as unequivocally benevolent and utilitarian (Natale, Bory, and Balbi 2019, p. 324).

AI and smart technology as a topic of public discourse

In tandem with the fictional and corporate voices in the discourse of smart machines, a third, public voice has arisen. The divergent opinions in the discourse of AI and smart technology have evoked, as Roberge, Senneville, and Morin (2020, p. 2) conclude, the perception that smart machines have "always existed in a state of public controversy".

This controversial and ambiguous nature of smart machines has led to the current hype surrounding the subject, which ultimately builds on the myths and speculations produced by fictional or corporate voices in the discourse (Roberge et al. 2020). Such hype can be understood as "waves of high rising expectations" of the technology (van Lente et al. 2013, p. 1615) that – similar to the expectations raised in fiction and corporate discourses – are performative, in that they not only affect consumers' current use of the technology, but equally "shape the dynamics of […] [its] innovation trajectory" by attracting (research) attention and (financial) resources (van Lente et al. 2013, p. 1615f). Public debates (e.g., in official declarations, political hearings, the media) occupy an important role in this constellation in that they mediate and decipher across discourses and aid in meaning-making by translating fiction, advertising, and scientific reports into commonly understood language (Roberge et al. 2020). In so doing, they help consumers navigate between overly optimistic and potentially exaggerated expectations and subsequent disappointment of the technology (van Lente et al. 2013; Gartner 2020). Past public discourse on smart machines has been particularly concerned with algorithmic biases underlying AI and smart technology (e.g., Phan 2018; Cave and Dihal 2020; Strengers and Kennedy 2020), the clarification of the concept of AI autonomy (e.g., Johnson and Verdicchio 2017), and the de-humanization of consumers (e.g., Giuliano 2020).
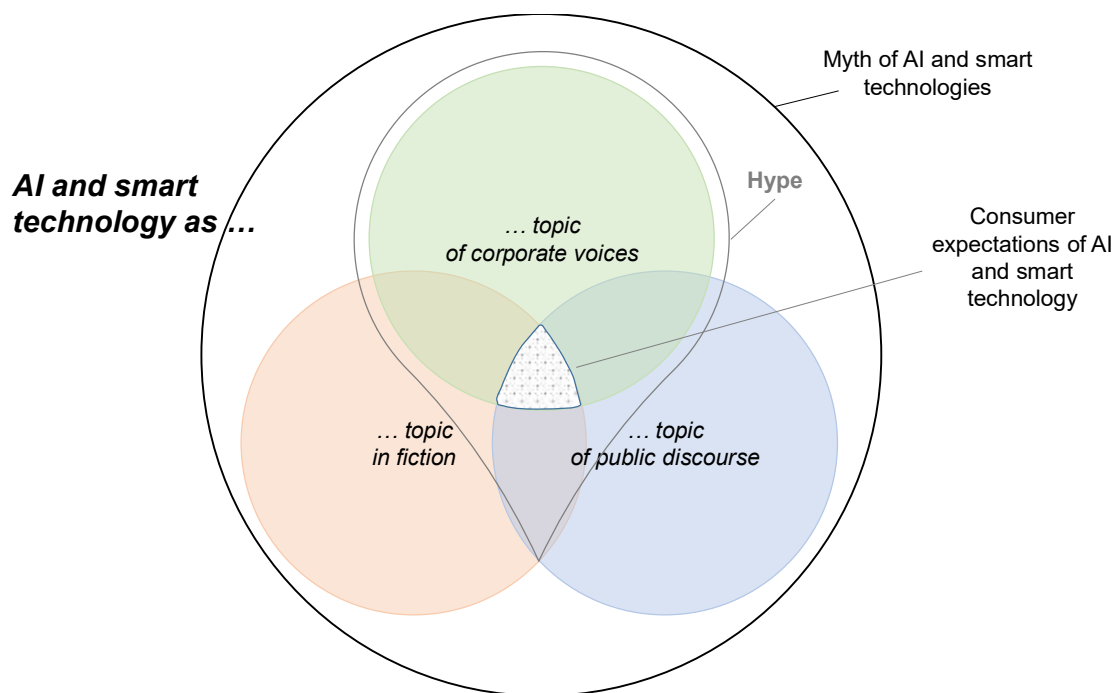
Figure 3: Consumer expectations of AI and smart technology develop with reference to intermingling discourses

Source: Own illustration

In summary, the overarching discourse on smart machines consists of multiple voices, or sub-discourses, each of which occupies a different role in shaping consumers' expectations – and, potentially, the subsequent use – of smart devices (see Figure 3). Fictional discourses offer the opportunity to negotiate the potential (social) effects of smart technology, by sketching and evaluating the co-existence of human beings and smart devices in both utopian and dystopian visions. Corporate voices frequently respond to these visions by attempting to resolve the paradoxes highlighted in fictional accounts by emphasizing the underlying hedonic possibilities of smart technology. Public discourses in turn translate and converge voices within the overarching discourse and therefore represent a form of meta-discourse that focuses on meaning-making processes surrounding smart technology. Consumers interpret these discourses (Möllering 2001) and consequently build and calibrate their expectations of smart devices and decide whether to adopt them. Ergo, how consumers perceive of a technology, what they expect from it, what aspects of a technology they find concerning, and how they ultimately use it are determined to a large extend by the discourses surrounding smart technology. This short analysis re-emphasizes that consumers' use of smart devices can only be meaningfully understood against the backdrop of these discourses – a finding that is ignored in most reductionist acceptance research approaches to smart devices. Such approaches often consider smart devices as just another technological development that firms can persuade consumers to adopt through ease of use or perceived usefulness (Baron, Patterson, and Harris 2006). The fact that neither of these notions are self-evident to consumers per se but instead are also constructed across technology discourses is mostly neglected in these studies.

1.5 Avoiding the "Fridge Fallacy" – Why Researchers Need to Look Beyond the Surface of Smart Technology Use

"Here is one of the most advanced technologies in the world and it needs no instruction manual [...] We now expect almost every aspect of our lives to work as simple as something on our smartphones"
—Cliff Kuang and Robert Fabricant (2019 p. 44f), *User Friendly – How the Hidden Rules of Design Are Changing the Way We Live, Work, and Play*

The complexity of consumers' expectations of smart technology stands in stark contrast to the current state of research on the topic in marketing and its adjacent disciplines.

Rather, one could get the impression that the smart technology hype has also steered research foci across marketing and consumer behavior research (van Lente et al. 2013). As a result, despite the multiplicity of voices in the overarching discourse of smart technology and AI, certain topics have received more academic attention than others (Borup et al. 2006), in particular consumers' perceptions of privacy during smart technology use (e.g., Aguirre et al. 2016; Mani and Chouk 2019; Acquisti, Brandimarte, and Loewenstein 2020; Bleier, Goldfarb, and Tucker 2020; Pizzi and Scarpi 2020; Massara, Raggiotto, and Voss 2021) and how smart devices alter, extend, or augment existing (retail) service encounters (e.g., with new levels of convenience for consumers; e.g., Collier and Kimes 2012; De Ruyter, Keeling, and Yu 2020; Huang and Rust 2020; Pitardi et al. 2021; Ramadan 2021). In many cases, researchers have fallen prey to the pitfall dimension of the smart technology hype (van Lente et al. 2013), which potentially has led researchers to neglect interesting topics and unorthodox research questions concerning smart technology because of too strong a focus on blatant factors such as privacy and convenience or enjoyment (e.g., Ewers, Baier, and Höhn 2020). In this process, researchers often seemed to have erroneously drawn parallels between the simplicity of the smart device use and the effects this use may have on consumers' behavior. Such inferences tend to obscure the fact that while the actual use of smart devices may be surprisingly simple, consumers' decision to adopt and integrate smart technology in their daily routines is extremely complex and oftentimes full of controversies and frictions (Mick and Fournier 1998). Bunz and Meikle (2018, p. 14f) identify this antagonism (or fallacy) as one of the central paradoxes of the internet of things: smart devices, they argue, have become so simple to use for consumers that researchers often tend to reduce them to the convenience they bring to consumers in day-to-day use, while underestimating the complexity of consumer responses that this technology use may elicit.

Extending on Bunz and Meikle's (2018) argument, this thesis claims that because of the unique behaviors smart devices exhibit themselves and elicit among consumers, as well as their physical / contextual embeddedness, consumers' interaction or engagement with smart devices requires more than just their (functionality-based) acceptance of the device (as is asserted in the recent surge of studies on consumers' acceptance of smart devices) (e.g., Kowalczuk 2018; McLean and Osei-Frimpong 2019; Moriuchi 2019; Ewers et al. 2020; Fernandes and Oliviera 2021). Beyond the reductionist paradigms prevalent in most technology acceptance studies, this dissertation asserts that acceptance as a concept may

prove difficult to apply to smart devices. Rather, in line with others (e.g., Kim, Giroux, and Lee 2021), this thesis posits that consumers' use of smart technology first and foremost requires unusual levels of trust in their devices, for instance, with respect to the constant generation of data or the inclusion of smart devices in extremely private (domestic) contexts – all of which create consumer vulnerability, a factor not included in most acceptance studies.

Resulting from the discussion above, this dissertation finds that marketing and consumer behavior research on smart devices currently faces two substantial challenges. First, while researchers have been swift to investigate the effects of smart technology use on consumers, for instance, in terms of consumer resistance towards technology (e.g., Mani and Chouk 2017; 2019), customer satisfaction (e.g., Brill et al. 2019), or service loyalty (e.g., Hernandez-Ortega and Ferreira 2021), an overarching understanding of how smart devices affect digital consumption experiences on a more general level is yet missing. Chapter 2 responds to this research gap by providing a conceptual framework of smart digital consumption as a new mode of digital consumption experience that includes smart devices and accounts for these devices' unique capabilities, arguing that digital consumption featuring smart technology must not be considered an exclusively digital phenomenon, but rather one that incorporates elements of its analog physical context, shared co-consumption experiences of consumers and technologies, as well as consumption experiences made by smart devices themselves. Ultimately, smart digital consumption for consumers exceeds consumption experiences made through (i.e., mediated by) a smart device only, as is suggested in the discussions on convenience and privacy, and instead represents a multidimensional phenomenon.

Second, and as a result of the aforementioned, much research has focused on individual symptoms of smart technology use rather than the underlying phenomena of these symptoms themselves (see Chapter 2 for a more extensive discussion of this topic). In this context, the ways consumers build trust in their smart devices (e.g., as a means of coping with the paradoxical cognition of simultaneously experiencing both convenience and privacy intrusion during smart technology use) have been highlighted as one phenomenon, where as of yet, research remains scarce (Foehr and Germelmann 2020; Hu, Lu and Gong 2021; Klaus and Zaichkowsky 2021; Pitardi and Marriott 2021).

1.6 Trust as a Determinant for Consumers' Smart Technology Use

"Our trust in technology like laptops and mouse clickers has rested in a confidence that the technology will do what it's supposed [...] to do. [...] But a significant shift is underway; we are no longer trusting machines just to do something but to decide what to do and when to do it. [...] But who, or more precisely, what exactly are we trusting when we put our faith in an AI device? [...] Alexa, after all, is not 'Alexa'. She's a corporate algorithm in a black box".

—Rachel Botsman (2018, p. 182ff) *Who Can You Trust? How Technology Brought Us Together – and Why It Could Drive Us Apart*

The preceding quote quite neatly merges some of the key points raised in this introduction so far. This dissertation begins by observing that smart devices technically represent a new category of products, the use of which builds on a variety of consumer expectations, that offer unprecedented levels of convenience and control to consumers. At the same time, their functionalities and characteristics call into question some of the extant paradigms and viewpoints prevalent in marketing, service marketing, and consumer research, for instance in terms of consumer–technology relationships. To this point, most research in the field has considered (smart) technology from a tool view – that is, as an artifact that consumers utilize and apply in the limited ways for which the technology was originally intended and designed for (Orlikowski and Iacono 2001). Technology in this view is seen as an instrument that ought to work based on consumers taking action, while consumers consciously rely on the functioning of that instrument (Orlikowski and Iacono 2001). As indicated in section 1.2 of this thesis, however, smart devices exceed this notion in that they can take action themselves (i.e., without conscious consumer command), this action can have consequences for consumers, and these consequences often affect multiple consumers as well as the technology's use context.

Across disciplines, trust in technology has therefore been identified as one of the key determinants to understanding consumers' smart technology use (e.g., Mulcahy et al. 2019; Michler, Decker, and Stummer 2020; Schomakers, Biermann, and Ziefle 2021). This dissertation argues that the reason is threefold. First, consumers' homes constitute one of the most prominent loci for smart technology use (e.g., in the form of a smart home) (Gram-Hanssen and Darby 2018; Hoffman and Novak 2018; Woodall et al. 2018). In Western societies, however, the home is considered a segregating space (Castilhos and Dolbec 2018), in which consumers carefully separate the private from the public (Fox 2016). Smart devices, particularly their generation and transfer of possibly sensitive

consumer data, deprive consumers of this gatekeeping function and thus potentially create personal vulnerability and risk (Shin 2014). This is particularly so, as smart technologies introduce an element of information asymmetry: as a by-product of using smart devices, consumers provide substantial amount of private data; how that data is processed and who is granted access to it, however, is largely unknown to consumers (Zuboff 2019). Yet, with their use of smart devices consumers approve such privacy intrusion – not only because of the convenience they receive in return (Weinberg et al. 2015) – but also because they trust these devices. Similarly, since consumers integrate smart technology in their homes, which generally represents a context shared with others, individual decisions to use the technology usually affect other household members as well (Lee, Lee, and Sheehan 2020). The use of smart devices thus incorporates responsibility for other consumers who may be uninvolved in the decision to adopt the technology in the first place. This responsibility again includes elements of consumer trust in technology.

Second, the use of smart devices confronts consumers with paradoxical experiences (Mick and Fournier 1998; Cukier 2021; Puntoni et al. 2021). For instance, smart devices enable consumers to experience new levels of control – say, within the context of a smart home, in which consumers could steer a multitude of factors (e.g., lighting, room temperature, security systems) via smart devices – but simultaneously, such technology could introduce elements of chaos when malfunctioning (Mick and Fournier 1998). Likewise, smart devices can both extend and reduce consumers' perceived competencies in that they "facilitate [consumers'] feelings of intelligence or efficacy" on the one hand (think of an SVIT that consumers can ask for assistance at any time), while limiting consumers' use of language on the other hand, such as when consumers need to adapt their language to an SVIT's limited language processing capabilities (Mick and Fournier 1998, p. 126; Schweitzer et al. 2019). Consumers have found ways to cope with such paradoxical experiences, many of which involve trusting the technology (Johnson et al. 2008). Tolerating the ambiguity and uncertainty that accompanies the use experience of smart devices hence requires consumers to take leaps of faith, accept the risk of the unknown, and, ultimately, trust the technology.

Lastly, as briefly broached previously, this dissertation posits that the conception of trust in technology as reliance on its functioning does not do justice to the complexity and richness of consumption experiences introduced through smart devices. Instead of considering smart technologies an interchangeable tool, as a result of automatic

processing (Nass and Brave 2005), consumers often anthropomorphize and personify their devices (Epley, Waytz, and Cacioppo 2007; Hoffman and Novak 2018; Schweitzer et al. 2019; Ramadan et al. 2021). Researchers have argued, therefore, that, instead of mere reliance, such relationships foster the development of rich, interpersonal forms of consumer trust in technology (Li, Hess, and Valacich 2018; Linnemann and Jucks 2018; Tolmeijer et al. 2021) – that is, a form of trust previously considered exclusive to human-to-human relationships. Despite the existence of a solid base of literature on this topic, however, few research projects have investigated the nature of such interpersonal human-to-technology trust relationships. The research presented in Chapter 4 of this thesis is among the first of such works.

In essence, trust within interpersonal relationships involves a dyadic setting, in which the trustor relies on the trustee to perform some action to reach an outcome of importance to the trustor (Castelfranchi and Falcone 2010). The notion of trust thus exceeds the act of mere reliance in two important aspects: (1) consumers have heightened expectations in the outcome of the trust relationship, and thus in the behavior of the trustee, and (2) because consumers are aware of each other's interdependency in the trust relationships (i.e., the fact that the trustor is counting on the trustee), their reactions to each other's misbehavior are more profound (Hawley 2012). From a social perspective, interpersonal trust then represents a human mechanism to cope with the autonomy and agency of other human beings – or in this case, smart devices – by expecting the good (Fukuyama 1996; Schumann et al. 2010; Pitardi and Marriott 2021). Consumers' expectations of smart technology and AI, which have been explored in previous sections of this thesis, thus influence consumers' decisions about trusting their smart devices (Möllering 2001).

Trusting another entity requires consumers to evaluate the trustworthiness of that entity, an upstream process that precedes the behavioral act of trusting (Butler 1991; Blöbaum 2016). This evaluation constitutes a calculative process (Mayer, Davis, and Schoorman 1995), particularly in first-time interpersonal relationships (Rousseau et al. 1998), in which consumers decide about the integrity, ability, and benevolence of a potential trustee, and that converts to an affective and emotional evaluation in more established long-term relationships (McAllister 1995). Trust relationships and the evaluation of trustworthiness are hence dynamic: as the duration of this relationship increases, the aspects and evaluation criteria that consumers use to estimate the perceived risk associated with trusting a trustee change from a calculation of potential gains and losses

to relational trust based on positive experiences with the relationship (Rousseau et al. 1998). To clarify terminology here: consumers evaluate a potential trustee's *trustworthiness* by means of the aforementioned factors; the conative act of *trusting*, however, which includes the trustor's willingness to making oneself vulnerable and taking risks, then follows from this evaluation process.

Consumers' decision to engage in trusting behavior has been thought of as the crossing of a threshold point at which trustors consider the chances of the trustee performing a certain action that is beneficial to the trustor as high enough (Gambetta 1988). Trustworthiness and trust therefore must be viewed as conditional or domain specific (Hoffman et al. 2013): consumers' evaluation of a human or technological trustee's trustworthiness is always limited to certain tasks and the corresponding abilities necessary to fulfill that task (Mayer et al. 1995). In other words, "[t]rusting someone to do something is often a matter of believing they are trustworthy in the *relevant respect*" (Hawley 2012, p. 78; emphasis added); this may not necessarily hold true for another respect. With smart devices, this may, for instance, translate to consumers trusting their SVIT to decide when to lock or unlock the smart door lock of their apartment but not trusting their device to do automatic product purchases on their behalf.

This section illustrates that consumer trust in smart technology constitutes an important determinant for consumers' smart technology use but that merely equating trust with reliance in the context of smart devices does not do justice to their unique characteristics. This dissertation argues that marketing and consumer researchers should rather apply findings from the diverse literature on interpersonal trust to consumers' use of smart devices. In so doing, it emphasizes the nature of trust as a dyadic setting that involves reliance, vulnerability, and ultimately risk taking on the part of the trustor in expectation of the trustee acting so as to reach a certain outcome. Interpersonal trust as a behavior is based on consumers' evaluation of the trustor's trustworthiness, which may lead to dynamic, multilayered, and domain-specific trust relationships. Although most of the findings presented here and in more detail in Chapter 4 are seamlessly applicable in the context of smart devices, recent research has uncovered important peculiarities for interpersonal trust in smart devices (e.g., Pitardi and Marriott 2021).

The idea of interpersonal trust as a dyadic setting implicitly assumes that trustor and trustee are consciously aware of whom they are interacting with when they engage in a trust relationship (Lewicki, Tomlinson, and Gillespie 2006; Castelfranchi and Falcone

2010). This implies that consumers have a clear reference point for their trustworthiness assessment – here, the human trustee (Mayer et al. 1995). With regard to smart technologies, particularly those offering an anthropomorphic user interface, such as smartphones or SVITs (Melumad and Pham 2020), this reference point is less distinct. Instead of having a single reference point for their trustworthiness evaluations (and hence a distinct trustee), consumers relate their evaluations to various reference points, such as the device's voice interface, its software, its producing company, or the device as such (Foehr and Germelmann 2020; Major et al. 2021; Pitardi and Marriott 2021). Consumers' trust in smart devices may therefore be thought of as not only domain specific but also dependent on its reference point.

To date, few research projects have investigated consumer trust in smart devices (or do so as part of extended technology acceptance models only; e.g., Kowalczuk 2018; Hsieh and Lee 2021). Hence, many of these projects have either not included or insufficiently accounted for (1) the characteristics of smart devices and the consumer responses they elicit, (2) the expectations that shape consumers handling of these devices, and (3) the context within which smart devices are used. The project introduced in Chapter 4 accounts for exactly these limitations and contributes insights into the various paths through which consumers build trust in smart technology.

1.7 Overview and Structure of this Thesis

As Puntoni et al. (2021) and Cukier (2021) both stress, current research on AI and smart devices has often neglected the contextual dimension of smart technology use, on the one hand, and the experiential consideration of consumption involving smart technology, on the other hand. This thesis therefore aims to provide answers to the question of how smart devices influence consumers' consumption experiences, their use contexts, and the service encounters made possible through them. Since this main research question covers a broad area of literature streams and academic disciplines, the following chapters will address corresponding sub-questions.

To start with, the second chapter of this thesis begins by analyzing and mapping how smart technologies have impacted on established forms of digital consumption as depicted by Llamas and Belk (2013). In so doing, it provides a curated literature overview

and fleshes out distinct research lenses that have analyzed the phenomenon of smart digital consumption this far. The presented findings not only help delimit the focal phenomenon under scrutiny in this thesis, but also provide a helpful tool for segmenting smart digital consumption as a research object in follow-up projects.

The contributions in Chapter 2 hint at the physical components of smart digital consumption. In response, Chapter 3 extends this research facet by exploring how consumers' smart homes – a context that has been mostly neglected in marketing literature – transform into scenes for service encounters when they include smart devices. Employing a theory synthesis approach (as devised by Jaakkola 2020) that merges findings from service research, consumer behavior, architecture, marketing and related disciplines, this chapter departs from Bitner's (1992) servicescape model to arrive at the smart homescape framework. This chapter clarifies that smart devices mostly tacitly influence their spatial use contexts and initiate their transformation from segregated, domestic spheres into spaces for commercial exchange. Chapter 3 then traces these theoretical transformations and merges them into a conceptual framework that improves researchers' understanding of smart technology-induced context transformations and provides opportunity for future research.

Chapter 4 departs from the observation that the use of smart devices, especially within consumers' homes, requires unusual amounts of consumer trust in the device. While acknowledging the importance of consumer trust in the context of smart device use, Verhoef et al. (2017) stress that research on the development and maintenance of such trust relationships is sparse – Chapter 4 addresses this research gap. Across three qualitative studies, most of which (1) are performed within the context of consumers' homes and (2) include consumers' SVIT as an active element of the data collection process, this chapter analyzes and retraces the paths that consumers take to build trust in their SVITs as part of their consumption experiences with smart devices.

Chapter 4 indicates that consumers' trust in their smart device also develops through repeated interactions. These interactions in turn are usually embedded in the provision of smart services, that is, services provided via smart devices (Beverungen et al. 2019). Value generation associated with smart services has mostly been investigated within relatively rigid research paradigms, which, as Helkkula, Dube, and Arnould (2018) conclude, has hindered a fuller understanding of smart services as such and the processes associated with their value generation. Maintaining this dissertation's contextual and

spatial emphasis, Chapter 5 investigates how the physical service context impacts on smart services and the generation of value through them. In so doing, it provides a conceptual analysis of smart services and their value generation processes, detached from any specific research paradigm. It augments smart service literature by extending the concept of hybrid experiences as developed by Šimůnková (2019) to provide a better understanding of the interplay of digital and analog realms in smart service value generation.

Chapter 6 concludes this dissertation by reflecting on its overall contributions for consumer behavior and service marketing theory, as well as for marketing practice. In addition, it identifies avenues for future research on bigger themes connected to smart devices and AI and invites researchers to further contribute to the expansion of our understanding of smart digital consumption.

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2 Researching the Black Box: A call for methodological diversity, transdisciplinarity, and creativity in research on smart digital consumption
(Conceptual Paper)

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The accepted manuscript was formally adjusted to the remaining parts of this dissertation, form errors were corrected; the reference style remained in its original form.

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Introduction

Today, we meet the first generation of undergraduate students for which life without smartphones is unknown. In fact, many have developed unheard-of close relationships with their devices (Melumad and Pham 2020). And yet, what we are observing here, may just be harbingers of a more substantial transformation: Digital consumption experiences today increasingly incorporate, depend on, and even are made by smart devices – and thus affect digital consumption as we know it. So far, however, how smart technologies impact on digital consumption experiences largely remains a black box. This chapter sets out to investigate and map the conceptual nature and characteristics of smart digital consumption (SDC) as a new form of consumption experience. Thereby, it will propose a systematic lens on SDC literature by sketching the topics' status quo in marketing and consumer research, and by curating selected works that the authors consider seminal to understanding SDC as a phenomenon. Then, possible paths for future research will be identified and attention will be raised for why SDC research should adopt transdisciplinarity as its core premise but remain critical when incorporating theories and findings from other technical disciplines. Ultimately, this chapter aims at establishing a preliminary understanding of SDC as a multifarious research phenomenon and wants to encourage researchers to leave their epistemological comfort zones to generate interesting and creative findings.

Mapping the Conceptual Field: The facets of SDC

In recent years, affordable, easy-to-use smart technologies have surged the market, leading consumers to embedding these devices in multiple new contexts of their lives (e.g., their homes), and thus to initiating a plethora of new consumption experiences (Puntoni et al. 2021). Accordingly, digital consumption as a phenomenon has gained a variety of new experiential facets, for consumers and researchers alike. Smart technologies represent consumer technology devices which are connected to the internet and interconnected to other smart devices (Hoffman and Novak 2018). Their smartness, among others, results from the possession of varying levels of agency, authority, and autonomy (Hoffman and Novak 2018; Novak and Hoffman 2019), meaning that smart devices can respond to consumers' behaviors, can act without consumer command (i.e., in response to sensor data), and can control other smart devices connected to them. Often, this is made possible through the inclusion of artificial

intelligence (AI) (Davenport et al. 2020). Some smart devices enable new consumer – technology interaction modalities: Smart voice-interaction technologies (SVIT), like Amazon's Alexa, for instance allow for vocal interaction between consumers and technologies (Foehr and Germelmann 2020). Additionally, a devices' smartness is not to be understood as purely digital characteristic; instead, it is dependent on the technology's use context. What may be considered smart by consumers in one physical context may be un-smart (or even stupid) in another (Alter 2020).

For the notion of SDC this means that it manifests itself as an unprecedented close interrelation of consumers and technological artifacts, enabling innovative and rich consumption experiences that are shared between consumer and technology or that are made by technology alone (Kozinets 2019; Hoffman and Novak 2018). SDC thus incorporates active as well as passive (i.e., technology-initiated) consumption experiences for human consumers.

In what follows, we propose that SDC as a phenomenal extension of "traditional" digital consumption consists of five overarching experiential facets or research lenses, of which some, more than others, have been explored in marketing and consumer research (see Figure 4). As we aim to provide a brief (and by no means exhaustive) overview of the status quo of knowledge in the field, we will additionally present selected works that we consider particularly conducive to establishing an experiential interaction-focused understanding of SDC from a consumer behavior perspective.
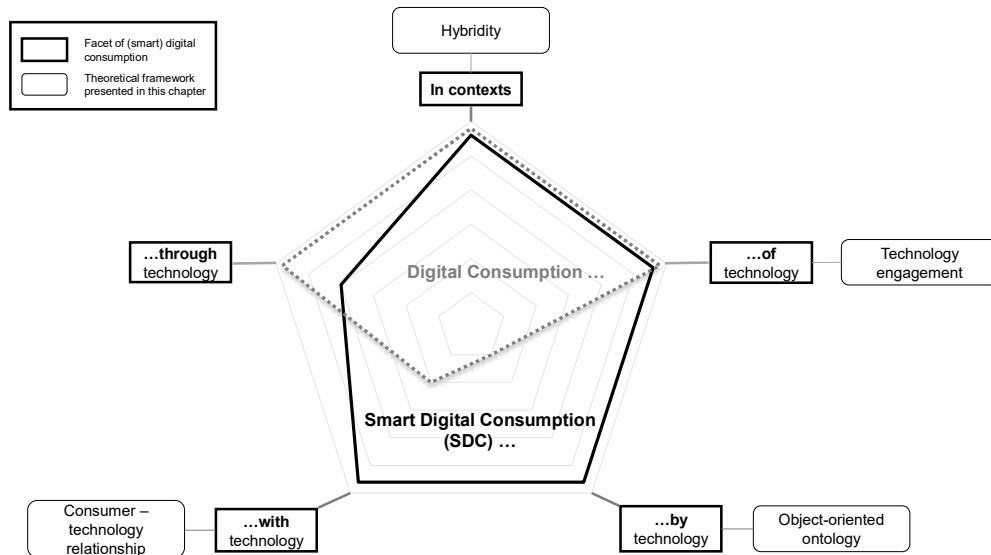
Figure 4:   Smart Digital Consumption as research phenomenon and curated theoretical frameworks in this chapter

Source: Own illustration

SDC in contexts

The centrality of smart devices in SDC experiences can suggest that SDC is mainly a digital phenomenon (Strong 2013). Services marketing research has underlined this view by investigating the impact of smart technologies on retail contexts (Davenport et al. 2020; Yadav and Pavlou 2020; Chérif and Lemoine 2019; Kim, Schmitt, and Thalmann 2019), while mostly considering online and offline contexts in SDC as conceptually separate entities which are connected via smart devices. Although literature in humanities has long refuted this techno-centric perspective (Venkatesh 1996; Spigel 1992), such findings have been slow to pass through to the marketing discipline. An analysis of how exactly this online / offline connection manifests itself and how it in turn affects SDC experiences is thus still in its infancy.

Smart technologies and the ways in which services are provided through them, initiate a merging of online and offline contexts. Consumers thus do not enter "virtual locations of consumption" anymore, as they did with social media, for instance (Boellstorff 2013, 416). Instead, SDC extends and dissolves contextual boundaries that have previously coined digital consumption (Šimůnková 2019). Consumption experiences in SDC may thus be situated in a certain physical locus (e.g., consumers' homes) but the experience as such may be hybrid, both digital and analog, real and virtual at the same time. Among

extant work, exploring this blurring of contextual boundaries, we consider few as elaborate (and as radical) as Šimůnková's (2019) article on consumer hybridity.

Šimůnková (2019) departs from the features and skills of smart technology and consumers' use of it, to challenge established epistemological distinctions between online and offline spheres. She argues that technological devices have become ubiquitous and miniaturized to such extent that they have become invisible to consumers during the interaction. These technological features, Šimůnková (2019) claims, have often been ignored by authors in marketing and consumer research so far, thus obviating a fuller understanding of the contextual influences of SDC experiences. Resulting from the invisibility and ubiquity of smart technologies, their interaction with them for consumers has become habitual and unconscious, leading to a blurring of boundaries between online and offline spheres with consumers automatically and unknowingly switching between them. Hence, what was once a digital *or* physical space has transformed into a hybrid space "in which the virtual is part of reality and reality is part of the virtual." (Šimůnková 2019, 50) Technology in this constellation holds a paradoxical role: it becomes invisible to consumers during the interaction, yet its presence is required for hybrid spaces to come into being (Šimůnková 2019). We imagine that future research focusing on the contextual facet of SDC may profit from integrating findings from consumer – technology relationships to better understand how consumers intentionally construct their (contextual) SDC experiences.

Experiencing SDC with smart technologies

Because of smart technology's social presence (van Doorn et al. 2016), as well as its interconnection with other smart devices (Hoffman and Novak 2018), consumers experience SDC as consumption shared *with* technology, usually in response to active consumer command. By virtue of their interaction modality (e.g., voice), many smart technologies induce social responses from consumers (Nass and Moon 2000; Epley, Waytz, and Cacioppo 2007). Hence, consumers frequently perceive of such devices to possess a distinct personality or include them in their social system (Purington et al. 2017). SDC thus incorporates consumption experiences in which the formerly tacit technology transcends its function as a medium and instead participates in consumption experiences with its user.

Consumer research has only recently begun to show increased interest in this participatory facet of SDC. Among the contributions published this far, we consider those of Novak and Hoffman (2019) and Schweitzer et al. (2019) as seminal. Both works reject the assumption that consumers utilize technology merely as an anonymous problem-solving tool (Orlikowski and Iacono 2001). Instead, consumers build interpersonal and dynamic relationships with the (voice) interfaces of their smart devices. Both works depart from similar theorizing, that is consumers' tendency to anthropomorphize technological devices and an assemblage theory approach yet differ slightly in their perspectives. As a result of their studies, Schweitzer et al. (2019) present three overarching forms of consumer-smart technology relationship types that follow from consumers' continuous interaction with their devices: First, some consumers were found to consider their device as servant-like, meaning that they regard the technology as subservient entity that aids in fulfilling certain tasks. Secondly, consumers engaged in relationships that resembled partnerships, ranging from those of a digital child that wants to be educated, to partnerships of a romantic nature. Thirdly, Schweitzer et al. (2019) identified that some consumers feel intimidated by their devices and consider them as dominant within a master-servant relationship.

While Schweitzer et al. (2019) adopted a static perspective, Novak and Hoffman (2019) illustrated how consumer-smart technology relationships developed over time and changed in their nature. By employing Kiesler's circumplex model, the authors mapped consumers' continuous relationship journeys with their smart devices, based on the allocation of different roles (agentic vs. communal) of consumers and technologies within the overall (infrastructural and functional) setting of consumers and smart objects. Building on that, Novak and Hoffman (2019) were able to offer a more granular understanding of consumers' relationships with their technologies on a meso level, while on a macro level they substantiated the importance of understanding how humans experience digital consumption together with smart technologies.

Follow-up research has extended on the works of Schweitzer et al. (2019) and Novak and Hoffman (2019) and has looked at contextual influences on consumer-smart technology relationships or the impact of relationship types on other consumer-related variables such as trust (Pitardi and Marriott 2021; Foehr and Germelmann 2020) or consumer well-being (Henkens, Verleye, and Larivière 2020). Future research on this SDC facet could aim at

understanding in more detail what roles consumers attribute to their devices and how this attribution affects shared SDC experiences

SDC experience by smart technologies

Research has suggested that smart technologies can have basic SDC experiences themselves (Novak and Hoffman 2019; Hoffman and Novak 2018): That is, smart technologies can adopt an agentic role within an overall network of smart devices and hence are able to initiate consumption experiences for the consumer – SDC in this view is a passive experience for the consumer, in which s/he occupies the role of an observer or bystander. This perspective on SDC requires that researchers adopt an object-oriented stance: a view in which the non-human object is granted equal experiential capacities as the human consumer (Hoffman and Novak 2018). To explore this SDC facet consumer researchers need to deviate from their focus on the (human) consumer as epicenter of consumption experiences. Thus, smart technologies and their capacity to autonomously initiate and experience basic forms of consumption themselves, could be a "game-changer" for consumer research (Kozinets 2019, 623).

Here, again, Hoffman and Novak (2018) provided one of the most elaborate theoretical accounts on the topic. In their article, they depart from the idea that consumption practices involving humans and smart objects can be thought of as multi-level assemblages, or dependent and independent networks that can be human centric (e.g., consumers actively interacting with their SVIT) or non-human centric (e.g., smart thermostats reacting to the presence of persons in a room) (Hoffman and Novak 2018). In these assemblages, every human and non-human participant is considered ontologically equal (Hoffman and Novak 2018). Smart devices in these constellations – possessing agency, authority, and autonomy – are able to interact with other smart devices and to initiate interaction with human consumers (Hoffman and Novak 2018). Building on current customer experience literature, the authors show that customer experiences come into being through interaction and can be considered multi-level (Hoffman and Novak 2018). Based on their technical abilities and their inclusion in different assemblages, Hoffman and Novak (2018) argue that smart objects currently can have at least basic (consumption) experiences (i.e., they are able to detect and react to patterns) and aware experiences (i.e., they are able to filter, categorize and process stimuli and in doing so can direct their attention). While still in its early stages, Hoffman and Novak (2018) have initiated an important

dialogue that has consequences for SDC research in particular and marketing in general. Research on (human) consumption experience in smart contexts cannot establish a full understanding of the phenomenon if it excludes non-human technological parts of the smart technology assemblage from its research focus. As Hoffman and Novak (2018, 1198) conclude "we have arrived at [a] place where our usual human-centric perspective may be limiting our opportunities to address these important questions about the future of consumer behavior and the object consumers we are creating." For marketing practice, the question arises to whom future marketing efforts should be directed, bearing in mind that SDC involves multiple human and non-human actors that can act independently while simultaneously influencing each other (Davenport et al. 2020). Here, SDC research could provide helpful insights.

SDC of technology

Additionally, SDC involves an element of consumption *of* the technology itself, meaning that in the experience of SDC consumers use the devices itself. To distinguish between this SDC facet and the facet of "SDC through technology" (see below), consider a consumption experience of a SVIT like the Amazon Echo smart speaker. Imagine consumers sitting in their living room commanding the voice interface of their device to play their favorite song via a music application (like *Spotify*). Research on SDC *through* technology would for instance investigate perceived customer satisfaction *with the provided service* (here: playing music). SDC research *of* technology rather considers the technology as a product or service in its own right, which is consumed by its user, therefore rather investigating consumers' *overall satisfaction with the technology use* (Schweitzer and Van den Hende 2016; Brill, Munoz, and Miller 2019).

Inspired by Human-Computer-Interaction (HCI) research, marketing and consumer behavior literature has tended to equate consumers' active use of smart technologies with factors like technology acceptance. Such works have not only tended to underestimate the complexity of consumers' technology use (Baron, Patterson, and Harris 2006), but also insufficiently reflected on the implicit understanding of technology underlying their research projects (Orlikowski and Iacono 2001). We observe that more seminal works have focused not so much on how consumers *perceive* of a technology (as technology acceptance does), but instead have looked at what consumers *do* with smart devices and

how their actions impact on technology adoption, for instance in terms of privacy concerns (Mani and Chouk 2019) or craft consumption (Harvey et al. 2020).

We consider the work by Woodall, Rosborough, and Harvey (2018) as particularly helpful in terms of understanding consumers' use (i.e., consumption) of smart devices in the context of SDC. Extending on theories from diffusion and appropriation studies, and service dominant logic, the authors conceptualize consumers' adoption and use of smart devices as manifested in their technology engagement, that is the degree of which the devices are embedded in consumers' minds. Thereby, the authors point out that smart technologies and their use are contextually embedded physically (e.g., in consumers' homes), socially and psychologically in consumers lives, and informationally in a "computer-mediated network of distributed intelligence." (Woodall et al. 2018, 59) As a result, consumers go through a succession of stages in which they carefully decide about the appropriation of the technology, based on their active use of it (Woodall et al. 2018): Initially, consumers become aware of the existence of the smart device – through marketers' proposal (e.g., TV commercials) – and reflect on its affordances and constraints, as well as on the social effects its adoption might include. Engagement at this stage is mainly behavioral as consumers evaluate the technology in terms of its location and possible use. In the follow-up "project" stage, consumers begin to better understand how s/he can co-operate with the smart device and adjust the device individually to its use environment and socio-cultural context. The third, "practice" stage marks the point at which consumer and technological device have united to such extent that they blend together and become ontologically alike. Consumers' cognitive, affective and behavioral engagement with the technology now is potentially absolute, with the technology being fully embedded in consumers' day-to-day routines. However, the authors also suggest that the practice stage is neither a necessary outcome of consumers' technology possession, nor the end of consumers' smart technology adoption. Rather, consumers' use of their devices may become habitual and unconscious, introducing a fourth "pause" stage in which consumers' engagement with the technology is disrupted, suspended or terminated, depending on consumers' perceived personal advantage that they associate with the smart device and all its socio-material consequences (Woodall et al. 2018). The work by Woodall et al. (2018) work represents a particularly valuable starting point for further research addressing the use of technology as a facet of SDC, because 1) through its conceptual subdivision of the smart technology adoption process, it has introduced auxiliary levels of analysis that enable more granular follow-up research , 2)

it has offered an alternative to the dominant technology acceptance frameworks, which conceptually puts consumers and technology and their interaction on equal terms in researchers' focus, and 3) it raises awareness for the fact that despite the ostensible dominance of digital factors in consumers' use of smart technologies, the devices, the consumers, and consumers' engagement with their devices are situated in a variety of different (physical and social) contexts that need to be taken into researchers' account if we aim to fully understand SDC.

SDC through technology

Finally, several works in consumer research have considered digital consumption experiences that involve smart technologies as just another form of consumption which is mediated by a digital device. SDC here is understood as consumption *through* technology. Smart technology in this view serves as a setting for other factors of interest in marketing research, for instance attitude formation (Wang et al. 2020) or decision-making (Hilken et al. 2020), and is primarily considered as a medium through which services are provided (Dekimpe, Geyskens, and Gielens 2019; Henkel et al. 2020; Hollebeek, Sprott, and Brady 2021; Wünderlich, v. Wangenheim, and Bitner 2012).

We thus observe among this literature that research projects here predominantly consider smart technologies or AI either as a stimulus that influences other consumer-related variables, usually set into comparison to other media forms (Belanche et al. 2020; Choi, Mattila, and Bolton 2020; Melumad and Meyer 2020), or merely as experimental context (van Pinxteren et al. 2019). Therefore, it is difficult to highlight one outstanding contribution, as we did for the other SDC facets. Most of the work on SDC *through* technology tends to adopt a narrow, functional perspective on smart technologies. In so doing, researchers try to capture and analyze intricate, often paradox, human technology use behavior (Mick and Fournier 1998) in terms of a computational logic (Strong 2013); that is complex behavior is reduced to its presence versus absence, acceptance versus rejection, or 0 versus 1. Essentially, as Strong (2013, 339) argues, quantitative research on (smart) technologies and big data often steps into the pitfall "in which the paradigm of technology is being applied to humans". The reason for such simplification, we assume, is rooted in marketing researchers adopting methods and technology theories from other technical and computer-related disciplines without questioning their underlying technology paradigms.

So far, this chapter has characterized and mapped the different facets of smart digital consumption. Thereby, we have attempted to stress the double role of the SDC facets, which function 1) as a tool to fragment SDC experiences as a phenomenon, and 2) as a classification of research objects for SDC research. Although conceptually the SDC facets may appear selective, in both consumption and research practice it is likely that experiences simultaneously overlap facets. While such overlaps emphasize the richness of SDC experiences, we hope to have raised researchers' awareness for the underlying theoretical paradigms of each SDC facet, which need to be considered and disclosed in research projects. Additionally, we have pointed at opportunities for future research which generally might be most promising when it combines multiple SDC facets in its projects. Because of the multidisciplinary nature of SDC, in the remainder of this chapter we want to encourage researchers to enter new research territories.

The way to generating novel findings and unique contributions

The tight (inter-)relationship between marketing and technology has been stressed repeatedly in the literature as a "magic mix" (Kiel 1984, 7). On the one hand, this nimbus has often led marketing researchers to underestimate potential problems and challenges consumers could face with technology (Kozinets and Gretzel 2021), and, on the other hand, to view technology as a self-explanatory, monolithic entity, thereby accepting the prerogative of interpretation that technical disciplines claim on the subject (Orlikowski and Iacono 2001). As a result, researchers tend to adopt a view on technology that could prevent the development of an original research paradigm of consumer – smart technology interaction in marketing and consumer research.

Fortunately, there have been attempts by marketing and consumer researchers to emancipate from the technology push perspectives of the computational disciplines (Solaimani, Keijzer-Broers, and Bouwman 2015) and to conceptualize and investigate consumers' adoption and inclusion of smart technology in SDC from a new direction (Nysveen, Pedersen, and Skard 2020). We believe that developing an original stance towards consumers' interaction with smart technologies, their negotiation of technology uses in everyday practices, but also their abandonment of technological devices (Belk, Weijo, and Kozinets 2020), will enable marketing and consumer research on smart technologies to generate unique contributions that differ from those in computer-related disciplines (such as Human-Computer-Interaction). One key to theoretical emancipation

may be hidden in the choice of research topics in marketing and consumer behavior, which we recon should not only be theoretically and methodologically rigorous, but first and foremost interesting and creative.

Interesting works, as Davis (1971) proposes, are those that defy implicit assumptions held in the research community. Hence, interesting research on SDC may aim at countering a reductionist technology push perspective on smart technologies. Creative works originate from SDC researchers being motivated to identify an important research topic; put differently: "It is not about putting familiar pieces together in new ways but about finding new phenomena or looking at phenomena in a new way." (Stewart 2020, 66) For SDC research this may require crossing disciplinary boundaries while maintaining awareness for discipline-specific paradigms and perspectives.

To aid SDC researchers in identifying interesting topics, choosing creative methods, and generating novel results, we propose three guidelines that we consider particularly helpful and which we will present below, together with selected works that either adhered to a single one or a combination of guidelines.

Go to where the party is

SDC experiences are bound to a physical space and (hybrid) context. Yet, contextual aspects are mostly neglected in extant (quantitative) research designs on SDC phenomena. To fully understand the contextual complexities of SDC however, we believe that researchers need to leave their ivory towers and to go to where SDC experiences are made. For guidance, SDC researchers may want to study the work by Porcheron et al. (2018) which investigated how consumers incorporate smart technology use in their daily routines. To generate data in the original technology use context, the authors adopted an ethnomethodological approach and equipped their study participants' homes with recorders that tracked their vocal interaction with their SVIT over a month-long period. The results of their analysis of consumers' conversations with their SVIT contributed to the ongoing research discussion of how consumers embed technology in their domestic routines, and how social contexts impact on technology use. Some studies in marketing and consumer research have been inspired by Porcheron et al.'s (2018) and have equally been able to generate helpful findings by researching consumers in their domestic contexts (Foehr and Germelmann 2020).

Use novel methods

New research contexts, new technologies, and new ways of consumer- technology interaction urge researchers to rethink their use of research methods to investigate SDC phenomena. This also implies incorporating new measures and indicators of consumers' behavior in research designs, like consumers' vocal utterances which have been successfully utilized to balance consumers' self-reports (Waber et al. 2015). For instance, Hildebrand et al. (2020) have developed a conceptual framework that links consumers' vocal features to their emotional states and traits, and which may not only serve as a helpful point of departure for research on SDC, but also gives detailed guidance on the technicalities of voice analysis.

It should be noted, however that these novel methods do not necessarily need to be digital in nature or need to employ digital tools for data analysis; given the intertwined nature of digital and analog contexts of SDC, often a combination of different methods might work best.

Look at the collective

In close connection to the point above, we believe that relevant and inspiring SDC research may want to expand its focus by considering SDC experiences not as individual phenomena but as collective and participatory consumption experiences. Here, researchers could be inspired by Pauser and Wagner (2019) who applied sociometric badges (i.e., wearable electronic devices that capture consumers' interaction including their non-verbal signals) to a retail context to analyze consumer – sales assistant interaction. We believe that the analysis of consumers' individual non-verbal behavior and their non-verbal exchanges, particularly in collective SDC experiences, could help researchers to draw a fuller picture of, for instance, how consumers perceive of technology failures and how SDC experiences gain value and meaning to consumers outside of technology performance.

Conclusion

Digital consumption experiences have changed immensely in the past few years and will continue to do so in the future. In this chapter, we have attempted to account for the changes evoked on digital consumption by smart technology and have elaborated on the phenomenon of smart digital consumption (SDC) that accounts for the multiple new and

occasionally overlapping facets of smart consumption experiences. Thereby, we hope to have raised awareness for the fact that in SDC experiences, the technological artifact and its characteristics gain centrality for marketing and consumer research. While it may be helpful for researchers to look at theories and findings from other (technical) disciplines for links, we advocate for the necessity of challenging the implicit underlying paradigms in research on smart technologies stemming from technical and computational disciplines. Therefore, we want to encourage researchers to leave their comfort zone to try out unfamiliar, creative research methods and to explore new ways to generate interesting contributions that not only combine the multiple facets of SDC, but that also help in emancipating SDC research from those in the extant tech disciplines.

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3 Rediscovering (Smart) Homes as Service Frontline – The Smart Homescape Framework
(Conceptual Paper)

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Introduction

Marketing theory, service marketing, and consumer behavior researchers have dedicated substantial efforts to understanding consumption and marketing activities in a plethora of (retail) contexts (e.g., Mari and Poggesi 2013; Kannan and Li 2017; Higgins and Hamilton 2018). A closer examination of the literature reveals however that one context tends to be sidelined: consumers' homes. A surprising omission, considering the average American, even on an ordinary workday, spends roughly 13 hours at home (Deloitte 2018). Simultaneously, the number of Americans traveling from home to purchase goods or services declines steadily (Deloitte 2018) – a development that has been attributed to the increasing use of (smart) home technology. Sales of smart voice-interaction technologies (SVITs) such as *Amazon Echo* and *Google Assistant* smart speakers recently peaked, while current device owners' use of these technologies further intensified (Forbes 2020; Techcrunch 2020). Combining these factors, it becomes clear that today consumers' homes are not just places to eat, sleep, and socialize in between working days; rather, homes have become equipped with digital, interconnected, sensing and often responsive and intelligent devices (i.e., *smart* devices) that are embedded in domestic routines and which bring consumers convenience and comfort (Harvey, Poorrezaei, Woodall, Nica-Avram, Smith, Ajiboye, Kholodova, and Zhu 2020; Raff, Wentzel, and Obwegeser 2020). In consequence, consumers' homes have not only become *smart* themselves but also developed into *new frontlines for smart service encounters*: Through smart technologies consumers can directly or indirectly interact with service providers and marketers from their homes and, in doing so, deploy services or buy goods (Huang and Rust 2018; Marinova, de Ruyter, Huang, Meuter, and Challagalla 2017). As of yet, however, a thorough conceptual understanding of smart homes as consumption contexts, particularly one that integrates consumers' interactions with smart home devices and service providers respectively, as well as smart service encounters (i.e., service encounters through smart home technologies) (Wünderlich, von Wangenheim, and Bitner 2012), is still missing. This article sets out to fill this research gap.

Extant work on smart home technologies (e.g., Harvey et al. 2020; Kang, Kim, and Kwon 2019; Kang, Kwon, Kim, and Park 2017; Woodall, Rosborough, and Harvey 2018) has tended to treat smart home contexts as similar to traditional commercial service contexts (e.g., retail settings), thus neglecting the contextual complexities of consumers' (smart) homes. Likewise, literature extensively addressed technology use in retail contexts (e.g., Beatson, Lee, and Coote 2007; Blut, Wang, and Schoefer 2016; Curran and Meuter 2005),

but omitted the vital role of consumers' homes as an environment for the negotiation of their technology use in other (possibly public) contexts (Lehtonen 2003; Moorthy and Vu 2014). We posit that by understanding consumers' smart homes as save and private testing grounds for smart technology use and development of use patterns, researchers can better explain consumers' reactions to and interactions with regard to smart technologies in other (retail) settings.

This article employs Bitner's (1992) servicescape model as its epistemological starting point or focal theory and develops a framework of the smart homescape to conceptualize consumers' smart homes as the locus for novel service encounters, consumer- service provider interaction and value co-creation. We begin this article with a brief overview of servicescape literature before adopting an interdisciplinary stance to investigate the conceptual complexities of consumers' homes. Extending on this, we then explore in more detail the peculiarities of smart homes as a setting for consumer activities and problematize how marketing and service research have largely overlooked important research topics because of a narrow focus on the technical possibilities of smart (home) technology. Based on a theory synthesis approach (Jaakkola 2020), we develop the smart homescape framework, organized around four overarching conceptual building blocks. After a discussion of our framework, we conclude by identifying avenues for future research.

Evolving Thought on Servicescapes and Consumers' (Smart) Homes

The spatial dimension of service encounters

Research on the contextual influences of service settings on consumer behavior and service experience has a long tradition in service marketing and marketing research (Akaka and Vargo 2015). In 1992, Mary Jo Bitner famously illustrated that environmental elements in service settings influence cognition, emotions, and behavior of consumers and employees. Building on work on service encounters (Bitner 1990; Zeithaml, Parasuraman, and Berry 1985) and adopting an interdisciplinary perspective, Bitner (1992) developed the now firmly established servicescape model.

The model posits that environmental factors, like ambient conditions (e.g., room temperature, noise), spatial functions (e.g., room layout), and symbols and artefacts (e.g., style, décor) in combination serve as stimuli that consumers and service provider employees perceive during a service encounter. This holistic environmental perception in

turn leads to individual cognitive, emotional, and physiological responses. The specificity of these internal responses consequently initiates either approach or avoidance behavior (Bitner 1992). As a central conclusion, the model posits that through careful planning of the environmental dimensions of servicescapes, marketers can actively influence consumer and employee behavior and thus contribute to the achievement of marketing goals (Bitner 1992). Servicescapes can therefore be understood as "staged" environments which are purposefully created by marketers to elicit the desired customer and employee behaviors (Akaka and Vargo 2015).

To date, the servicescape model resonated widely in research and has been adapted to a variety of mostly public (retail) contexts (for overviews, see Ezeh and Harris 2007; Mari and Poggesi 2013; Sherry 1998). Thereby, particular attention has been devoted to the ways in which social dimensions (e.g., the number of consumers in a service setting; consumer – service employee interactions) (Tombs and McColl-Kennedy's 2003), or socio-symbolic dimensions (e.g., signs and symbols as signifiers of subcultures) (Rosenbaum and Massiah 2010; Johnstone 2012) complement physical factors in servicescapes. Also, the diffusion of internet-connected devices has motivated researchers to extend the servicescape framework to virtual contexts, too, resulting in various theoretical interpretations of online servicescapes (e.g., Ballantyne and Nilsson 2017; Harris and Goode 2010; Hopkins, Grove, Raymond, and LaForge 2009).

Of these, few prove as elaborate as Venkatesh's (1996, 1998), which illustrates how the convergence of communication, information, and computerization technologies has created "a space of information flows, databases, and networked / hypertextual links to people and places", thereby producing "a parallel space to the physical / Euclidian space but without its transparent certainty" (Venkatesh 1998, 346). Over time, marketplace institutions (e.g., marketing, shopping environments) have evolved in this "cyberscape" and have facilitated commercial exchange with consumers, leading to the development of a "cybermarketscape." Consumers gain access to the cybermarketscape through digital technology, primarily stand-alone personal computers (PC) (Venkatesh 1998). The technology as a medium connects the physical space of consumers' life worlds with the cybermarketscape and with consumers' virtual and real social space (Venkatesh 1996, 1998; Venkatesh, Kruse, and Shih 2003), and thus allows for an unprecedented interplay between physical and virtual environments during service encounters (Venkatesh 2008).

From today's perspective of ubiquitous smart technologies, the idea of a cybermarketscape that consumers actively need to access through a single stand-alone PC seems somewhat nostalgic. Interestingly, subsequent servicescape extensions responding to the unique characteristics of smart technologies have not originated from marketing but from human–computer interaction (HCI) and design theory, most recently the idea of the smart servicescape developed by Kang et al. (2017, 2019). In their approach, the authors build on Bitner's (1992) model and expand it by constructing a service experience blueprint of smart home services (Kang et al. 2017). As a result, they augment the original servicescape model with (1) a layer that concerns the single smart device itself; (2) a "datascape" layer, referring to the exchange of data between technologies, and consumers and technologies; and (3) a connected scape, referring to the data infrastructure. The authors conclude that the physical dimension of their smart servicescape would be less relevant than in Bitner's (1992) model because consumers' focus during service provision would be predominantly directed to the smart technologies themselves (and not their surrounding). In a follow-up publication, Kang et al. (2019) present a revaluation of their framework in which they subdivide the smart device and datascape layers and substantiate the social scape by subdividing it into in-service relationships and noncommercial relationships.

Some research has built on the smart servicescape model already (e.g., Roy, Singh, Hope, Nguyen, and Harrigan 2019), and we acknowledge that it contributes to understanding consumer–smart service provider *interactions*. That said, we believe it to be unsuitable to conceptualize the *contextual* dimension of service encounters in smart *homes*.

Kang et al. (2017, 2019) locate their smart servicescape model within the context of consumers' homes but conclude that the physical dimensions of this smart servicescape are less meaningful than its technical data dimensions. Implicitly, they assume that service settings are uniform, be they located in clearly identifiable commercial contexts or consumers' domestic environments. As a result, the authors underestimate the overall complexity of home contexts as such and how smart technologies add to this complexity. In a similar vein, Kang et al. (2017, 2019) leave open how the data environment connects and transacts with the physical environment in which the smart technology is situated, and how this affects consumers during the smart service encounters. In its understanding of (smart) service contexts, the model hence builds on a technology-centered perspective that neglects the interplay between technologies and their physical use contexts. Lastly,

the authors assume that during smart service encounters consumers consciously interact with the service provider itself when using a smart device. Ample evidence suggests, however, that often this is not the case (Foehr and Germelmann 2020; Lopatovska and Williams 2018; Schuetzler, Grimes, and Giboney 2019; Schweitzer, Belk, Jordan, and Ortner 2019). Rather, consumers possess differing mental models of their smart devices and the respective service providers, and thus of their service counterpart (Pitardi and Marriott 2021; Wünderlich et al. 2012).

The conceptual building blocks of the smart homescape framework

Despite these limitations, we consider the conceptualization of smart homes as service contexts through the use of Bitner's (1992) servicescape model as a focal theory as epistemologically valuable, if extended and synthesized with additional findings from other academic fields (Varadarajan 2020). It follows from the limitations above that a theoretical model aiming to conceptualize smart homes as service frontline would have to clarify the particularities of the home as a context for (smart) service encounters, uncover how virtual and physical elements of smart homes as service settings are related, and analyze how smart technologies affect consumers' perception of the service encounters. As a result, the smart homescape framework developed in this article will consist of four conceptual building blocks, focusing on 1) smart homes as (service) context, 2) consumer-device interaction, 3) service encounters, and 4) consumers' behavioral outcome of these interactions and encounters. To begin with, this article will explore the first conceptual building block, that is the smart home as (service) context. In the next sections, we will thus examine the meaning of the (Western) home as environment for consumption activities, before focusing on the particularities of *smart* homes as context for consumer lives and technology interaction.

The homescape as context for consumer activity

Few places are as central in consumers' lives as their homes. Barely any other context exists in which consumers spend similar amounts of time, life-changing events such as birth and death occur, and more basic consumer needs (e.g., shelter, food, privacy) are satisfied. Yet, its contextual complexities tend to be neglected in marketing and service research – disconcerting given the abundance of literature on the subject.

In line with Sixsmith (1986), we attribute this neglect to the conceptual vagueness of "home", which as a term elicits an internal image in every consumer's mind, but one that

differs depending on personal experiences or cultural background (Fox 2016). Home, however, constitutes a cross-culturally shared idea (Moore 2000). As this shared idea, it can be distilled to an overarching concept, which we will term *homescape* herein, and which consists of universally valid components and associated experiences (Fox 2016; Mallett 2004). To do so, we adopt a Western perspective on home, while being aware of the limitations this imposes (Després 1991).

When thinking of home, consumers' intuitively associate a physical or build construction (e.g., a stand-alone house, an apartment) (Fox 2016). In general parlance, "home" and "house" are thus often synonymized (Lawrence 1995). This has been considered misleading as it implies the supremacy of stand-alone houses over other dwelling units (Després 1991; Windsong 2010) and facilitates an underestimation of other dimensions of the home that are critical for consumers' contextual connection (Rapoport 1995). Hence, like in the servicescape model, this physical dimension of the homescape should be considered a stimulus impacting on consumers' behavior, while the home as physical structure functions as a container for consumers' psychological response of feeling-at-home.

For most consumers, the home is a context shared with others (e.g., family members) which constitutes a "nested social unit" or internally homogeneous system (Shin 2014; Stea 1995). As such, home functions as a locus for identity formation and negotiation (Proshansky, Fabian, and Kaminoff 1983) but also as an environment for emotional regulation and contextual control (Graham, Gosling, and Travis 2015; Moisio and Beruchashvili 2016). This understanding of home as social unit of trusted people and hence as refuge or save haven strongly builds on dominant values associated with the Western home (Mallett 2004). Life inside this unit is regulated by internal norms and rules (Letheren, Russell-Bennett, Mulcahy, and McAndrew 2019; Livingstone 2007), the adherence to which is decisive for the inclusion or exclusion of objects and people external to the household. The Western homescape in its socio-political dimension is thus a "segregating space" (Castilhos and Dolbec 2018, 159) that separates public from private or work from life (Manzo 2003). Similarly, consumers mentally subdivide the physical structure of their homes in contexts in which they are either more open to change or certain consumption activities (i.e., peripheral contexts) or more conservative (i.e., central contexts) (Djursaa and Kragh 1998). Hence, home and the specific emotional responses

it elicits is actively made and remade in processes involving all household members (Venkatraman 2013).

In this home-making process possessions, artefacts, signs, and symbols are essential: The homescape in its material dimension thus serves as a "storehouse of signs" (Csikszentmihalyi and Rochberg-Halton 2008, 139). Consumers utilize possessions as fragments in their identity expression; that is, they "seek, express, confirm, and ascertain a sense of being through what they have." (Belk 1988, 146). The objects, technologies, and possessions that consumers arrange in their homes function as "personal archive or museum" of consumers' histories and experiences (Belk 1988, 159; Lollar 2010). The home itself is thus not only a part of consumers' identity expression (e.g., the purchase of a house / apartment as possession) but simultaneously the scene of identity-forming consumption practices (Belk 1988; Epp and Price 2008).

This points to a more abstract homescape dimension: Consumer life at home is guided by temporality. On a macro level, consumers' emotional attachment to their home is often founded on the association of permanence which allows for certain levels of contextual predictability (Smith 1994). This predictability is re-enforced on a micro level by experiences of cyclical time that consumers make in their home contexts through rituals and repetitive activities, like family meals (Rook 1985; Wallendorf and Arnould 1991). Also, consumers link experiences of linear time to their homes (Werner, Altman, and Oxley 1985): the relationships to their homes, the meanings they attach to it, and the behaviors they perform in it are often related to the past, present, or future. For instance, many constructive activities in the home are conducted to realize the vision of a dream home in some unspecified future (Fox 2016).

In this regard, research also finds that home and its social meaning are dynamic: Homes as space are produced through social forces, leading to homes becoming permeable to other spatial types (Castilhos and Dolbec 2018). For much of human history, homes were "a much more active location for commerce" (Grayson 1998, 459). Socio-economic improvements and architectural shifts then initiated the marking-out of clear thresholds between public and private areas of the home (Rybczinski 1986), reinforcing the conception that "today's broader social world does not generally consider the [Western] home to be an appropriate [commercial] servicescape" (Grayson 1998, 458). As we illustrate next, the presence of smart home technologies in consumers' homes is poised to alter these widely held ideas, again.

In light of the conceptual building blocks of the smart homescape framework specified in the beginning of this article, the preceding paragraphs have substantiated our understanding of consumers' homes by first explicating the particularities and complexities of consumers' (non-smart) home contexts, by then arranging these in dimensions, and finally by merging these dimensions into the concept of the homescape (see Figure 5). In the following, we will explore how smart devices impact on and extend on these dimensions and how smart home devices introduced new modes of interaction between consumers and technology, as well as between consumers and service providers.
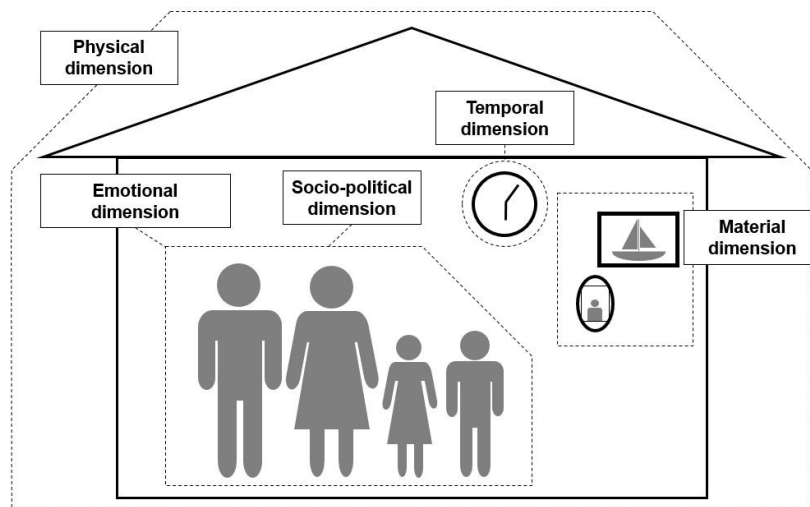
Figure 5:   The (non-smart) homescape can be conceptualized as consisting of five overarching yet sometimes interdependent dimensions

Source: Own illustration

The smart home as an extended homescape

Consumers' homes become *smart* through the inclusion and interconnection of smart devices within that context (i.e., within the homescape). Hence, we view smart homes as a home environment "equipped with computing and information technology which anticipates and responds to the needs of the occupants [i.e., smart technology], working to promote their comfort, convenience, security, and entertainment through the management of technology within the home and connections to the world beyond" (Aldrich 2003, 17). The devices that make homes smart are heterogeneous: As Harvey et al. (2020) suggest, smart home devices can be distinguished based on their function (i.e., whether they are designed for transformative, utilitarian / assistive, or hedonic use) and their intended effect on human behavior (i.e., whether they are intended to support, advise

or persuade consumers). Thus, a SVIT like the Amazon Echo, which is designed for hedonic use and intended to advise consumers, may differ from a passive smart patient monitoring system that is designed to promote and support consumer well-being and healthy behavior. Yet, per definition, both devices constitute smart technologies which are embedded and interconnected in smart home settings (Woodall et al. 2018). For the purpose of this article, it may thus be helpful to follow the general distinction between smart contextual background technologies (e.g., the passive patient monitoring systems) and smart interactive immersion technologies (e.g., SVIT) proposed by Kaartemo, Jaakola, and Alexander (2019).

The recent surge of affordable, easy-to-use smart devices has led consumers to integrate an increasing variety of these in their homes in a process of gradual retrofitting (Aldrich 2003; Harvey et al. 2020). Ergo, it is difficult to speak of *the* smart home as some teleological state; rather consumer homes equipped with smart home technologies range on a continuum between more traditional home environments and completely smart homes that exhaust the technological state-of-the-art (Marikyan, Papagiannidis, and Alamanos 2019).

Much of the novelty surrounding smart homes results from the interaction characteristics of smart devices, as well as the ways consumers embed these technologies in their daily routines: Most smart home devices differ from more traditional media, such as the TV set, in that they tacitly blend into their use context, are less engaging to consumers, and – once installed – are able to function autonomously without necessarily demanding the consumer's full attention or conscious operation (Weiser 1991; Weiser and Brown 1997). To allow for this automation, consumers, smart technologies, and the physical environment of consumers' smart homes are connected and actively or passively interact with one another through direct consumer commands or indirect sensor data (Verhoef, Stephen, Kannan, Luo, Abhishek, Andrews, Bart, Datta, Fong, Hoffman, Hu, Novak, Rand, and Zhang 2017). Hence, current smart home technologies are embedded *physically* into consumers' homescapes, integrated *socially* and *psychologically* into consumers' lives, and are *informationally* embedded into computer-mediated networks of distributed intelligence (Wünderlich, Heinonen, Ostrom, Patricio, Sousa, Voss, and Lemmink 2015). Together, consumers, smart technologies, and the context in which they are situated partake in an assemblage in which each element is affected by the whole and each element affects the whole in turn (Hoffman and Novak 2018). This assemblage is

not necessarily consumer-centered, meaning that smart home devices possess some degree of agency, authority, and autonomy; consequently, many technology-to-technology or technology-to-context interactions occur outside consumers' consciousness (Hoffman and Novak 2018) – that is, if they do not result in service failure and thus potentially in consumers' frustration or aggression (Hadi and Block 2019). The invisibility of these interactions to consumers promotes the merging of physical and digital spaces, creating what Šimůnková (2019) terms a *hybrid space*, in which the distinction between online and offline becomes obsolete and in which formerly binary norms of place for the domestic context (e.g., digital versus physical, public versus private) dissolve. Because of the smart technology's functionalities and its blending with the use context, consumers during technology use often and mostly unconsciously switch between virtual and physical spaces while their corporeal presence often overlaps both spheres (Šimůnková 2019). In practice, this also means that consumers switch between homescapes and marketspaces which are introduced through the smart devices (Castilhos and Dolbec 2018). Extant theoretical frameworks have largely ignored this perspective on the smart home as a transformative (i.e., from domestic space to marketspace) and permeable (i.e., from analog to hybrid space) context.

Consumers' interaction modes with their smart home technologies add to this boundary-blurring process (Šimůnková 2019). Due to the gradual, device-by-device retrofitting of smart home devices, consumers frequently consolidate their growing collection of independently operating and heterogeneous devices (e.g., smart thermostat, smart vacuum cleaning robot, smart light bulbs or door locks) in one central hub (Harvey et al. 2020), or what we would term *a bottleneck device*. This way, consumers establish an infrastructural hierarchy among their smart home devices which may eventually translate into a perceptual hierarchy, too, that is that some smart home devices are used to control others and thus come to represent a variety of ancillary devices in consumers' perception. Often, this control function is delegated to SVITs (Foehr and Germelmann 2020). Due to the voice-based interaction mode, consumers tend to attribute a human mind, intentions, and cognition to these devices (Epley, Waytz, and Cacioppo 2007) and consider them human-like social actors (Nass and Brave 2005; Nass and Moon 2000; Schweitzer et al. 2019). Consequently, consumers build various relationships with their devices which can resemble human-to-human friendships, master–servant relationships, partnerships, and family ties (Foehr and Germelmann 2020; Han and Yang 2018; Novak and Hoffman 2019; Schweitzer et al. 2019). Users of such technologies attribute social presence to their

devices (Van Doorn, Mende, Noble, Hulland, Ostrom, Grewal, and Petersen 2016), and display high levels of trust in the perceived personality of the device (e.g., Alexa) and in the technology itself (Brill, Munoz, and Miller 2019; Foehr and Germelmann 2020; Mulcahy Letheren, McAndrew, Glavas, and Russell-Bennett 2019). Interestingly, research has indicated that the reference point for consumers' trust frequently remains vague. For example, consumers could show overall trust in the technology but may relate their trustworthiness evaluations variously to the SVIT as a device, its voice interface, its software, or the producer of the SVIT (Foehr and Germelmann 2020). This behavioral peculiarity becomes even more important when viewed in relation to the idea of a smart homescape. Through the socio-material embeddedness of smart technologies in the home environment, consumers allow service providers access into their most private realms. Although much research on consumer privacy threats exists (Mani and Chouk 2019; Yeung 2017; Zuboff 2019), we argue that particularly this interaction between consumers and service providers as well as their technology-mediated service encounters in the (smart) home have remained understudied (see also Verhoef et al. 2017).

In short, in terms of theorizing smart homes as an extension of the non-smart homescape as consumption contexts, the preceding paragraphs indicate that consumer life in smart homes is characterized by experiences of hybridity, that is, of living simultaneously on- and offline, virtual, and digital.

> **Proposition 1:** In the smart homescape, the physical environment of the homescape and the virtual datascape amalgamate to form a hybrid environment that includes actions and features both visible and invisible to the consumer.

This not only means that the smart homescape is pervaded by an invisible *datascape* separating service providers from consumers, but also that its dimensions need to be expanded by a permeable *on-/offline dimension*.

Service encounters in the smart homescape (see conceptual building block number three) are always mediated through smart technologies which are interconnected in an assemblage and organized in a consumer-determined hierarchy. For the smart homescape, two implications emerge: (1) in addition to the dimensions of the homescape, the *smart* homescape encompasses an *assemblage dimension*, that is, an interactive dimension of consumer–technology–context exchange; and (2) individual devices (often smart interactive immersion technologies) occupy a particularly central role in this

technological assemblage as bottleneck devices, that is as interaction and higher order coordination devices.

> **Proposition 2:** The smart homescape is a multimedia environment in which various heterogeneous smart home technologies are interconnected but in which certain devices assume bottleneck functions during service encounters.

In short, this section has suggested that smart homes can be seen as an extension of the homescape concept. Smart home devices thus introduce additional facets to the existing dimensions of the homescape, by adding non-consumer-centric technological infrastructure, in which invisible data exchange occurs, by enabling new forms of consumer-technology interaction (and thus facilitating new service encounter opportunities), and finally, by resolving the boundaries between real and virtual contexts within consumers' homes and thereby introducing experiences of hybridity.

Developing the Smart Homescape Framework

The preceding paragraphs have summarized and combined extant theories and findings from servicescape literature, (smart) home research, and consumer – technology interaction. In so doing, they have provided a cursory and fragmented impression of smart homes as context for consumer activity and service encounters. These discussions enable us now to consolidate our findings and to conceptually finalize the smart homescape framework by connecting and synthesizing its conceptual building blocks. Bitner's servicesape model will act as our focal theory. Most extensions of the original servicescape model have focused either on real or virtual contexts. Since the smart homescape framework departs from consumers' homes as real context and then adds virtual dimensions, it will extend on elements of Bitner's original model and will include them in its building blocks; that is it will merge our insights on smart homes as consumption context, consumer interaction with smart technology and service providers, smart service encounters, as well as consumers' behavior resulting from these interactions. In relation to Bitner's servicescape, service encounters in the smart homescape force researchers to reconsider some of its central propositions and thus its underlying logic. First, this refers to a shift in the contextual control of marketers in the smart homescape: The original servicescape model maps a condition in which marketers possess high levels of contextual control. Yet, when offering services in the smart homescape, service providers have few or no possibility to affect elements of that context. Rather, consumers design the smart homescape according to their personal needs and

preferences. Thus, the smart homescape represents a change in terms of consumer–service provider power relations.

> **Proposition 3:** Marketers in consumers' smart homescapes are essentially forced to adapt to an environment that is (1) mostly unknown to them and (2) almost impossible to alter to elicit certain planned (behavioral) responses.

A second shift results from the fact that service encounters and service provision in the smart homescape are mediated by smart technologies. For most of the service providers this results in dependency on consumers' decisions to include (i.e., approach) the smart technology in their homes in the first place (Shapiro 1998). Concerning its underlying logic, we thus suggest that the smart homescape framework departs from an understanding of its environmental or contextual instead of its behavioral dimension, as the original servicescape model does (see Figure 6). In line with consumer–technology interaction research, we also argue that the smart homescape framework must account for the complexities of consumers' negotiation of technology use. Research indicates that, far from solely deciding on the adoption and acceptance of technology versus its abandonment (i.e., its avoidance) (Baron, Patterson, and Harris 2006; Lehmann and Parker 2017), consumers' experiences rather involve ambivalent or paradoxical cognitions (Mick and Fournier 1998).

> **Proposition 4:** Service provision in the smart homescape requires consumers to conduct a priori approach behavior toward the smart technologies which mediate service provision. Approach behavior is thus a prerequisite of the smart homescape, not its outcome.

Lastly, service encounters in the smart homescape include many devices which are controlled by artificial intelligence (AI) to varying extent. As a result, service encounters incorporating these devices are inevitably affected by the role that AI adopts in these encounters (Ostrom, Fotheringham, and Bitner 2019). Hence, AI in service encounters can function as *supporter* (i.e., supporting a human service provider during the service provision to, e.g., generate personalized services); *augmenter* (i.e., supporting consumer or service provider); or *actor* itself (i.e., interacting directly with the consumer and substituting human actors in providing service) (Ostrom et al. 2019).

Proposition 5: Since smart devices as elements of the smart homescape can incorporate AI, service encounters in the smart homescape are affected by the role that AI occupies in the service provision.

Depending on the role that AI occupies during service encounters, the degree of variation in service encounters may change, based on the responses that AI generates following consumer interaction. This may mean that each service encounter consumers may have with a single service provider within the smart homescape may change slightly with each iteration. We argue that this in turn can affect consumers' service provision attribution, that is whom consumers consider as the service provider.

Having explicated these general underlying mechanisms of the smart homescape framework, we are now able to explore and link its components, beginning with its first conceptual building block, the smart home as service context (for a complete overview of the framework see Figure 6).
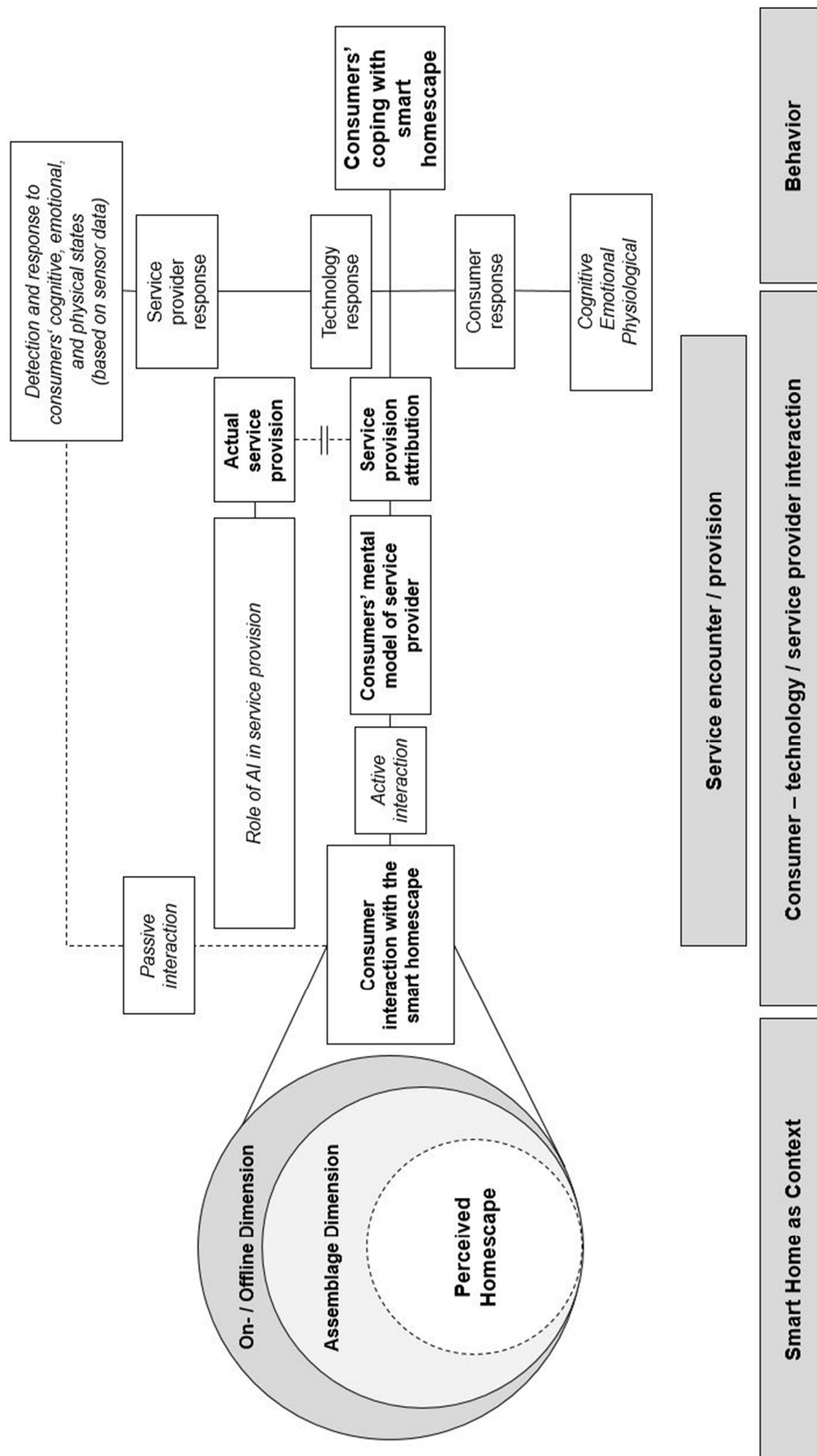
Figure 6:   The smart homescape framework

Source: Own illustration

The smart home as a service context

The homescape, as perceived by the consumer, constitutes the contextual nucleus of the smart homescape framework. The integration of smart home technologies within the homescape, however, impacts on its dimensions and subsequently affects consumer-service provider interaction, as well as service encounters. In the smart homescape, consumers, employ smart home technologies among others to control its *physical dimension* (e.g., to regulate room temperature through smart thermostats or to switch on smart lights). For service encounters this means that services in the smart homescape inevitably inherit a physical component, that is they their smartness is context dependent (Alter 2020).

> **Proposition 6:** The smart home as service context contributes to consumers' smartness perceptions. Because of their context-dependency, services which may seem smart in other (retail) contexts may appear un-smart in the smart homescape (and vice versa).

For consumers, emotional regulation is one of the original purposes of the smart homescape, as it not only offers a locus of physical control but also functions as refuge from the strains of everyday lives (Gram-Hanssen and Darby 2018). Smart devices in this context are used to intensify emotional and contextual attachment and can positively impact emotional regulation (Woo and Lim 2015), in extreme cases leading to consumer love towards the smart device and respective services (Hernandez-Ortega and Ferreira 2021). For service encounters in the smart homescape, this implies that services in the smart homescape are not exclusively deployed for utilitarian purposes (i.e., to create energy efficiency), but also – and perhaps even primarily – for hedonic reasons.

> **Proposition 7:** Consumers utilize smart home devices and services in the smart homescape to amplify its original, non-smart purposes.

Often, the smart homescape is a shared environment. Consequently, individual decisions to implement smart devices in the homescape have social consequences. Smart home devices introduce an element of inescapability, meaning that 1) they are usually "co-used" by many consumers in the same context, and 2) even when consumers actively decide not to use the devices, for instance due to privacy concerns, their presence in the smart homescape as such generates sensor data which is processed by the devices (Lee, Lee, and Sheehan 2020). Ergo, in an abstract sense, once installed, smart home devices are

difficult not to be used if consumers share their homescape. The smart homescape thus not only introduces new facets of shared device use but also rescripts notions of domestic privacy, that means, for consumers to enjoy the convenience of smart home devices they need to grant service providers access to their most private realms while having limited control over the data this access generates. Smart home devices thus were found to increase the porosity of consumers' homes (Maalsen and Dowling 2020). For smart service encounters this means that in the smart homescape, shared consumption of services should be considered the norm rather than the exception.

> **Proposition 8:** Service encounters in the smart homescape almost always include and affect groups of consumers.

Smart devices affect the *material dimension* of the (smart) homescape in that they add new layers of symbolic meaning, both private and public (Richins 1994). From a public perspective, consumers interpret smart devices as status symbol, representing a futuristic lifestyle and a nimbus of "technomagic" (Elbanna, Dwivedi, Bunker and Wastell 2020, 276). From a private perspective, consumers invest substantial effort in the creation of their individual smart home technology assemblage (Harvey et al. 2020). The assemblage to those consumers symbolizes their technical skills and dedication. Smart service provision then has the capacity to add or subtract meaning to the smart homescape. Service failure, particularly in front of other consumers, may thus be detrimental to the impression of futurism that inhabitants of the smart homescape may want to convey and may thus lead to negative service evaluations.

> **Proposition 9:** Service provision needs to be congruent with the meaning consumers attach to their smart homescapes.

Smart home technology adds new layers of temporality to those existing in homescapes, particularly on a meso level: consumer –service provider interaction in smart homescapes is mediated through computer technology, which itself introduces an additional element of temporality (Hesse, Werner, and Altman 1988), as it differs from human face-to-face communication in terms of temporal scale (i.e., its length or the duration of conversation as such), sequencing (i.e., its patterns of communication and exchange), pace (i.e., the density of activities of exchange as perceived by the consumer), and salience. For smart service encounters, this implies that smart home technologies have generally introduced new levels of impulsivity and immediacy in consumers' use of smart services in the smart homescape (Park, Han, and Sela 2020). Hence, service encounters in the smart homescape

must be available to consumers on demand, yet simultaneously need to be in accordance with the temporal rhythm of the homescape.

Assemblage dimension

The above dimensions have predominantly referred to the physical and emotional aspects of smart homes as service contexts. From an infrastructural perspective, smart homes as contexts incorporate an assemblage dimension, too. From this viewpoint, the smart homescape is regarded as a holistic, networked environment (and service system) in which (1) consumers are affected by smart technologies (and vice versa), (2) the context is affected by smart technologies (and vice versa), and (3) the whole assemblage of consumers, technologies, and context is affected by its individual parts (Hoffman and Novak 2018; Novak and Hoffman 2019). Within the overall consumer–object–context assemblage, certain technological devices occupy particularly central (bottleneck) roles in that to consumers, they serve as a personified service counterpart. As a result, consumers may inhabit a smart homescape with an assemblage of different smart devices, yet their deliberate or active interaction with the smart devices within the smart homescape may concentrate on the bottleneck devices.

Permeable on-/offline dimension

Because of its assemblage character, the experience of living in smart homescapes is characterized by a permeable on-/ offline dimension. Ontologically, life in the smart homescape is of a hybrid nature, with consumers consciously and unconsciously changing between real and virtual experiences and contexts (Šimůnková 2019). Consequently, boundaries between traditional homescapes and marketscapes blur, resulting in an increasing transformation of consumers' domestic environments into contexts for service encounters (Harvey et al. 2020).

Together, the homescape and the dimensions added through the integration of smart home devices (i.e., the assemblage and the on-/offline dimension) constitute the smart home as a service context. Within this context, consumers negotiate between traditional meanings associated with the homescape (such as privacy and secrecy) and the possibilities offered by smart home devices (like convenience) (Weinberg, Milne, Andonova, and Hajjat 2015).

> **Proposition 10:** Permanent integration and use of smart devices within the homescape requires that technology must not interfere with the normative

framework present in the household. Only then is consumer interaction with smart devices in the homescape initiated.

Consumer interaction with smart home devices and service providers

Having conceptualized smart homes as service context, we can now explore deeper levels of aggregation of the smart homescape framework, by theorizing consumers' interaction with devices and service providers taking place in smart homes. Within the context of their smart homes, consumers actively or passively interact with their smart devices, and – since smart service encounters are mediated through these devices – also with service providers. Consumers' active or direct interaction with bottleneck devices in their smart homes represents the most immediate mode for service encounters in this environment. Thus, in contrast to the original servicescape model, in the smart homescape framework this behavioral component of the smart service encounter is not situated at the behavioral outcome end of the model but instead occupies a central position. The peculiarity of this bottleneck setup is that consumers tend to have various mental models of their devices (Zimmermann, Bennighof, Edel, Hofmann, Jung, and von Wick 2018), particularly if these devices offer anthropomorphic cues and are embedded in their use context (Wünderlich et al. 2015). We argue therefore that consumers in the smart homescape may be unable to constantly and unambiguously identify which service provider or counterpart they are currently interacting with. In addition, services delivered through smart home devices are usually part of smart service systems (Henkens, Verleye, and Larivière 2021), that is they are integrated in a higher-order assemblage of services and devices which could be necessary for individual service provision, but which may obscure consumers' attribution of service provision. Thus, consumers' service provision attribution in the smart homescape may be incongruent with the actual service provider.

Simultaneously, the contextual embeddedness of smart home technology introduces passive / indirect modes of consumer interaction with devices and service providers. Passive interaction here refers to interaction that is not deliberately initiated by the consumer, but which is based on autonomous evaluation of sensor data stemming from the devices. In this case, service provision (e.g., switching on the lights when consumers enter a room; adapting room temperature when they leave again) is conducted without requiring active consumer command (and thus escaping consumers' conscious scrutiny), but also without consumers' referral to a mental model. Instead, we argue that mental models of the service provider / counterpart in this case only become salient to consumers

if a service fails (e.g., if consumers enter a room, but the light is not activated) (see also Choi, Mattila, and Bolton 2020).

Service Encounters

Because of its network character, combining context, consumers, and technological infrastructure – and thus different actors or elements of value creation – we suggest to consider the smart homescape as "a type of sociotechnical system, in which [smart home technologies][…] become resources to obtain and to provide service" (Vargo and Lusch 2017, 61). In the smart homescape, different actors and resources interact and are integrated and in that way create value for every actor involved in that co-creation process (Siddike and Kohda 2018). Service encounters and service provision in the smart homescape may therefore be understood in terms of a "service provision-dominant logic" (Vargo 2018, 204), in which smart home devices function as both, operant and operand resource (Mele, Russo-Spena, and Peschiera 2018). Meaning that smart devices in the smart homescape on the one hand function as a tool for consumers – hence "requiring action to be performed on it" – while at the same time these devices can become actors themselves and learn from consumers' needs and preferences (Mele, Russo-Spena, and Peschiera 2018, 186). In practice this translates to smart home devices becoming "enablers of resourceness" by giving consumers access to skills and convenience while also adapting to consumers' use behavior and the contexts in which they are embedded (Mele, Spena, and Peschiere 2018, 186). This perspective on service encounters / provision in the smart homescape implies that researchers adopt a post-phenomenological stance. In this view, smart devices mediate service experiences in the smart homescape (Kaartemo and Helkkula 2018) and become ontologically inseparable from humans and dependent on their use context (Kaartemo, Jaakola, and Alexander 2019). Value in the smart homescape is therefore not only co-produced between consumers and service providers; instead, value is co-created through consumers, service providers, interactions, institutional / technological arrangements, and the use context itself. We suggest that in the smart homescape, consumers' home as a service context occupies a double role: On the one hand, the homescape as such functions as a physical locus for service encounters, and thus as a resource integrated by consumers. On the other hand, the smart home represents an actor participating in resource integration itself by delivering data on the context, which is mediated through smart home devices. This double role of smart

contexts in the value creation of smart service systems has been overlooked in extant literature (e.g., Siddike and Kohda 2018).

Service encounters in the smart homescape can co-create new value (Harvey et al. 2020), while simultaneously extant value (e.g., values associated with consumers' homescapes) can be destroyed. For example, service encounters in the smart homescape can create value for consumers by granting access to knowledge through active consumer-technology interaction, by providing convenience through passive interaction or by substituting human contacts through both active and passive interaction (Larivière, Bowen, Andreassen, Kunz, Sirianni, Voss, Wünderlich, and De Keyser 2017), while eliminating exactly these value propositions from consumers' homescapes (i.e., reducing physical contact and social exchange among household members). This hints at the paradoxical nature of life in the smart homescape, in which the interaction with smart devices may create value for consumers through providing contextual control, self-efficacy or impressions of security, whilst it may also co-destroy value through privacy intrusion or cognitive outsourcing.

Moderators of consumer and service provider response to interactions / service encounters

Consumers, service providers, and technologies react to service encounters in the smart homescape with some form of response (or what consumers interpret as such). These responses are strengthened or weakened by factors which are only indirectly related to the smart homescape, i.e., response moderators. In traditional servicescape literature, these are mainly consumers' personality traits or situational factors such as mood. For the smart homescape framework factors must be added for both, consumers, and service providers: First, consumer responses to service encounters are moderated by their individual traits, moods, needs, and individual relationships with and reactions to the specific home environment, but also are impacted on through more technology-related factors, such as trust in the technology. Second, service encounters in the smart homescape are technology-mediated; they incorporate triadic actor engagement that includes consumers, service providers and the mediating smart home device, and thus potentially no direct consumer- service provider interaction (Alexander, Jaakkola, and Hollebeek 2018; Fehrer, Woratschek, Germelmann, and Brodie 2018). Consequently, service provider responses are moderated particularly through the latter's skills in aggregation and evaluation of consumer data and the ability to subsequently produce a

technology-mediated reaction that elicits consumer responses, for instance, by using social cues in the SVIT's voice (Nass and Brave 2005; Pentland 2010). Third, most service providers in smart home contexts are dependent on intermediaries such as the producers of the (bottleneck) technologies (e.g., Amazon) to have access to more detailed consumer data. So, although companies may have the necessary data evaluation skills, access to these data represents an important boundary condition.

Service provider and consumer response to the interaction

Research in consumer behavior, information systems, and media studies has consistently shown evidence that consumers respond to smart technologies similarly to how they would respond to human beings (Schweitzer et al. 2019): consumers attribute personality and character traits to smart technologies, apply human norms of politeness in their interactions, and include them in their social systems (Nass and Brave 2005; Purington Taft, Sannon, Bazarova, and Hardman Taylor 2017; Zlotowski, Sumioka, Eyssel, Nishio, and Bartneck 2018).

Thus, consumers attribute smart (home) technologies the ability to elicit a variety of cognitive, emotional, and behavioral / physiological responses (Schweitzer et al. 2019); this, we argue, also holds true for service encounters mediated by smart technologies in the smart homescape. Therefore, we suggest adopting the specificities of internal consumer responses as Bitner (1992) proposes: consumers' internal responses to service encounters in the smart homescape can be of cognitive (e.g., beliefs, categorizations), emotional (e.g., moods, attitudes, attachment), and physiological (e.g., comfort) nature. Note that these reactions are not necessarily elicited through consumers' conscious interaction with the service provider itself but merely by interacting with their mental model of the smart device or service provider.

On the service provision side, we must consider internal service provider responses in the smart homescape in terms of algorithm-based evaluation of consumer data: consumers interact with the smart home device and generate input data. The smart device senses these input data and transmits them to the service provider, where they are combined with other sensor data and metadata (e.g., from other smart devices in the assemblage) and evaluated with the aid of algorithms. In this process, the service provider (or the AI programs implemented by the provider) not only aims at identifying the underlying consumer intent behind the input but also, based on the aggregation of available data, attempts to detect and predict consumers' internal responses. The service provider then

returns a response based on this data evaluation process, which is then technologically mediated to the consumer. When provision of services is conducted through passive consumer interaction, service providers are limited to the processing of sensor data and metadata only. In both cases, for the consumer the actual service provider responses may be virtually inseparable from technology responses (e.g., those made by the technology's voice interface), adding to consumers' inaccuracy of service provision attribution.

Behavioral outcome: Consumers' coping with smart devices

Above, we have already indicated the inadequacy of approach / avoidance as binary behavioral outcome of the smart homescape framework– as is the case in the original servicescape model. Although extant work has argued in favor of acceptance, adoption or consumers' engagement with smart home devices as behavioral outcome (e.g., Woodall et al. 2018), the propositions generated in this work suggest a more nuanced perspective that does justice to the ambivalent nature of consumers' use of smart technology. As Mick and Fournier (1998) have demonstrated, technologies confront consumers with paradoxical cognitions, for instance by allowing increased levels of control and efficiency on the one hand, while introducing chaos and inefficiency on the other hand. In extension to Mick and Fournier (1998), we argue that since consumers' homescapes are particularly value-laden contexts, they are especially prone to initiating conflicting cognitions and to induce paradoxical behavior among consumers in response to smart home device use. To settle their conflicting cognitions, consumers respond to technology paradoxes through strategic coping behavior (Mick and Fournier 1998). In the smart homescape this could include abandonment of some or all smart home devices or distancing from the devices (e.g., by keeping some parts of the smart home free from devices) – and thus different levels of consumer engagement (Woodall et al. 2018). Yet, furthermore, consumers could take a more confrontational stance and adapt to the peculiarities of their devices (e.g., adapt their language to suit their SVIT), partner with their devices by creating close relationships or through "mastering" the smart homescape by thoroughly knowing about its operations and processes and thus to perceive power and control over their devices (Mick and Fournier 1998). Bearing in mind that service encounters in the smart homescape are mediated by the technologies that cause both consumers' cognitive dissonances and their coping behavior, it becomes evident that consumers' responses to their smart home devices indirectly also impact on service providers. For instance, consumers aiming at mastering their smart homescape may be

more willing to proactively understand and design their smart homescape, yet also be less satisfied by services provided through the devices as the nimbus of "technomagic" may be less salient. Also, consumers who distance from their smart home devices may be less willing to integrate resources in the value co-creation process and thus may be unable to fully perceive the possible value of a service encounter.

Discussion and Theoretical Contributions

This research set out to develop a conceptual understanding of consumers' smart homes as service context. In so doing, it has established a multi-dimensional conceptualization of smart homes as consisting of consumers' homescape with its established socio-cultural facets and values, its infrastructure of assembled smart devices, and its on- / offline hybridization of space. Building on this contextual understanding, this work has then continued by analyzing, conceptualizing, and then integrating the processes of consumer-technology interaction, the service encounters that follow from these interactions, and finally, consumers' behavior resulting from experiencing life in general and service encounters in particular within their smart homes. The findings from these conceptual building blocks (i.e., smart homes as service context, consumer- technology interaction, service encounters, and consumers' behavioral response) were then synthesized and integrated in the smart homescape framework.

The conceptual framework developed in this article responds to a variety of calls for research in the disciplines of services marketing, marketing, and consumer research. From a (services) marketing perspective, the smart homescape framework can help researchers to better understand smart customer experiences and particularly the influence of service contexts on these smart experiences. The smart homescape framework thus contributes to recently called-for research by Ostrom et al. (2021), by emphasizing the impact of domestic contexts on consumers' experiences of smart services. In so doing, we hope to have raised awareness for the context-dependency of consumers' smartness perceptions. Thus, services consumers may consider smart in retail contexts, may be regarded as inappropriate in their homes. Likewise, the smart homescape framework adds to the discipline's comprehension of value co-creation in the smart home context, as well as consumer- technology interaction (as Kaartemo and Helkkula 2018 suggested), by outlining and explicating the peculiarities of smart homes as service contexts and the unique interactions this context initiates among consumers and service providers. We have made the point here that service encounters in smart homes only produce value for

consumers if their co-creation occurs in accordance with the households' normative principles, and if the value of smart services is not drastically at odds with the homescape's central value propositions (e.g., safety, community, privacy). In addition, the smart homescape framework answers calls for research by Woodall et al. (2018) by expanding on contextual embeddedness as a feature of smart devices. In particular, the smart homescape illustrates how smart devices are embedded in home contexts, how their embeddedness changes the nature of that context by adding contextual dimensions and facets, and by enabling new forms of service encounters in formerly non-commercial contexts.

From a consumer research and consumer culture theory perspective, the smart homescape framework sheds light on consumers' smart homes as "sociocultural formations", as animated by Kozinets (2019, 624). In so doing, we not only explain how smart technologies are embedded in consumption practices and activities but also respond to researchers' calls for more holistic studies of consumers experiencing automated services at home. The smart homescape framework additionally stresses the importance of adopting a nuanced view on consumers' behavior towards smart technologies, and thus underlines the discipline's call to defy reductionist thinking with regard to consumer-technology interaction (Belk, Weijo, and Kozinets 2021).

Similarly, Holmes, Fernandes, and Palo (2021) have recently emphasized the dearth of research conceptualizing the spatial dimensions of market making practices. The propositions of the smart homescape framework developed here pick up this research gap and analyze and conceptualize how consumers – through the inclusion and integration of smart home technology within their home contexts – participate in the spatial transformation of their homes. Smart home devices facilitate the penetration of marketspaces into the formerly segregated spaces that were consumers' homes. The smart homescape framework acknowledges and conceptually incorporates the shifts for consumers and service providers that emerged with the growing spatial porosity of consumers' smart homes, by emphasizing first that service providers in smart homescapes essentially operate in an environment in which they have almost fully ceded their contextual control. The smart homescape thus still represents a staged environment – but one that is designed by the individual consumer. Secondly, the smart homescape framework has clarified not only how service encounters with smart technologies (especially those incorporating AI) differ from those in traditional servicescapes, but also

how consumers build personalized relationships with certain bottleneck devices in the technology assemblages of their smart homescapes, which usually function as an interaction interface with the service provider. Taken together, we have thus argued for the necessity of smart service providers to reexamine their own role as well as the role that AI is supposed to play during smart service encounters.

Finally, the smart homescape framework extends extant research on smart service counterparts. Despite the numerous discussions of the role of AI and marketers in smart service provision (e.g., Huang and Rust 2021; Marinova, de Ruyter, Huang, Meuter, and Challagalla 2017; Wünderlich, v. Wangenheim, and Bitner 2012), few, if any, of these works have highlighted consumers' perception of their smart service counterparts. The smart homescape framework has carved out the discrepancy between actual service provision and consumers' service provision attribution and the mental models that consumers employ in service encounters. Better understanding the impact of consumers' mental models of smart service encounters could be eminently valuable for branding and customer engagement research.

Conclusion and Directions for Future Research

The smart homescape framework developed herein illustrates how consumers' smart homes – through the availability and interconnection of technology, people, and contexts – have transformed into scenes of technology-mediated service encounters and value co-creation between consumers, service providers and technology. Our smart homescape framework unfolds a variety of avenues for future research, which will be explored alongside the frameworks' conceptual building blocks in what follows (see Table 1).

The smart home as service context

Initially proposed by Šimůnková (2019), the smart homescape framework has specified the permeable on- / offline dimension of smart homes, in which consumers consciously and unconsciously cross the boundaries between virtual and real realms during service encounters. Services in the smart homescape are thus often hybrid, too, as their value is co-created in an interplay of consumers, technology, service context, and service providers. Although some marketing research has explored the peculiarities of hybrid services (e.g., Ganguli and Roy 2010), more research is needed on the characteristics of hybrid contexts, how consumers purposefully create hybridity, and how hybridity may add to value creation. Similarly, the assemblage dimension of the smart homescape calls

for additional research. It would be promising to explore in more depth how consumers choose the devices and brands they incorporate in their smart homescape, how they perceive of the device-to-device relationships or how they organize their devices into infrastructural and perceptual hierarchies. Moreover, we encourage research on consumers' overall perceptions of their smart homescapes. Smart homes provide an interpretative reference frame for consumers – a function that marketing research so far only partially understands. It would be interesting, for instance, to investigate how consumers' perception of their own smart homescape influences their perception of other service settings outside their homes (Dekimpe, Geyskens, and Gielens 2020; Mende, Scott, van Doorn, Grewal, and Shanks 2019).

Consumer-technology interaction

From a consumer-technology interaction perspective, which in the smart homescape also implies consumer-service provider interaction, consumers' perceptions of smartness of technology and services has remained under-studied. Thus, as of yet it is unclear what consumers consider as smart within the context of their homes, and whether potential spillover effects of a device's smartness on perceived service provider characteristics occur. Additionally, further investigating consumers' mental manifestations and models of their smart technology service counterparts would be valuable. Answering questions of whom exactly consumers perceive as smart service provider and how this perception is calibrated would advance researchers knowledge concerning the particularities of smart (homescape) services.

Service encounters

Even though service marketing researchers have currently improved the discipline's understanding of the impact of AI in service encounters (e.g., Huang and Rust 2021), the smart homescape framework has emphasized the need for additional research that particularly circulates around consumers' perception of AI in service encounters in the smart homescape, again with regards to consumers' mental models. Thus, it would be interesting to better understand how consumers react to perceptions of AI in service encounters that are incongruent with their previous experience with the perceived service provider. Also, future research could investigate what decisions consumers delegate to smart devices in service encounters in the smart homescape and whether the convenience that smart devices are intended to implement in service encounters can have detrimental

effects in certain situations. Here, promising findings have recently been published by Klaus and Zaichkowsky (2021) and Tassiello, Tillotson, and Rome (2021).

Behavior

Although marketing and consumer research has shown an increased interest in consumers' behavior in response to smart home devices (Kozinets 2019), we believe that the smart homescape framework has drawn attention to open questions in the field (Hulland and Houston 2021). Among others, the smart homescape has illustrated the ambivalent and paradoxical nature of consumers' behavioral reactions to life in smart homes. This far, a thorough understanding of these paradoxical behavioral patterns, is missing, however. It would thus be worthwhile to further investigate how paradoxical behaviors unfold among the group setting of households living in smart homes. Likewise, it would be interesting to investigate relations between paradoxes consumers encountered with previous technologies and those they witness with smart home devices. Along these lines, future research may also want to find out how the context of consumers' homes affects their coping strategies and in what ways coping is conducted across household members.

Smart home technology diffusion has only begun to pick up pace recently – just as marketing, service and consumer behavior researchers have just started to more accurately understand how these technologies affect consumption activities, contexts, service interactions, and value creation. In developing the smart homescape framework, we have adopted an interdisciplinary perspective to address this research gap and to facilitate a theoretical understanding of service encounters in the smart home. We invite researchers to participate in linking and integrating existing findings to close theoretical gaps, ultimately coming home to a richer understanding of how smart home technologies impact on consumption and service encounters in a networked future.

Conceptual Building Block	Overall Topics and Research Questions
Smart home as context	**Hybrid contexts:** • *What key characteristics create hybridity in consumers' smart homes?* • *How do consumers create / search experiences of hybridity in smart homes?* • *How do consumers perceive hybridity and hybrid services in terms of seamlessness?* • *How can hybridity as a feature of the smart homescape be utilized to increase value creation of currently non-smart services?*
	Technology assemblage: • *How and why do consumers choose the devices and brands they incorporate in their smart homescape?* • *How exactly do consumers transfer the infrastructural hierarchies among their devices onto a perceived hierarchy and with which effects?* • *How do laymen consumers perceive of the interplay and data exchange among the devices in their assemblage? What mental model do consumers have of this exchange?*
	Home as interpretational frame: • *How does consumers' perception of their own smart homescape impact on their evaluation of other smart environments outside of their homes?* • *Can we observe spillover effects in the perception of contextual smartness of consumers?*
	Contextual dynamics: • *How exactly does the transformative process of marketplace intrusion in smart homes take place?* • *What are the indicators of this spatial transformation?* • *In what ways do consumers observe and potentially facilitate this transformation?*
Consumer-technology interaction / Consumer- service provider interaction	**Consumer-technology relationships:** • *How does the relationship consumers have with their bottleneck devices impact on established marketing metrics (e.g., brand loyalty, service satisfaction)?* • *In what ways do consumer- technology relationships moderate perceptions of smartness of the devices?* • *How do consumer- technology relationships impact on failure attribution in case of service failure?* • *To what extent do consumers' relationship with certain devices (e.g., SVIT) affect their evaluations of the same device in other smart homescapes, e.g., when they visit other consumers?*
	Consumer- service provider relationships: • *How do consumers' perceptions of the smart home device mediating services in the smart homescape influence their perception of the service provider (e.g., in terms of characteristics or brand attributes)?* • *How does consumers' decision to incorporate services from a service provider within their smart homes affect their perception of that service provider in other contexts?* • *How do hybrid customer experiences made in service encounters in the smart homescape impact on analogue (i.e., physical) service encounters with the same service provider?*

Service Encounter	**AI in service provision:** • *How do consumers react to their perception of AI in service encounters in the smart homescape?* • *What mental models do consumers attribute to AI in service encounters in the smart homescape?*
	Decision-making: • *How do consumers negotiate what decisions to delegate to their smart devices in service encounters (e.g., in the context of conversational commerce)?* • *What service encounters would consumers delegate to technology-to-technology interaction?*
	Convenience: • *To what extent and in which situations do consumers perceive a service encounter within the smart homescape as too convenient (e.g., the purchase of a product)?* • *How does the level of perceived convenience / inconvenience affect service provider-related downstream variables?*
Behavior	**Technology Paradoxes:** • *Which specific, smart technology-induced paradoxes arise within the smart homescape?* • *How do paradoxical cognitions of some household members impact on the overall use of certain smart home devices?* • *In what ways do paradoxes consumers witnessed with past technologies influence their choice of smart home devices?*
	Coping: • *How does the context of consumers' homes allow for particular, context-specific coping strategies?* • *How are technology paradoxes resolved in households as part of shared actions?*

Table 1:   Future research avenues building on the smart homescape framework

Source: Own illustration

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4 Alexa, Can I Trust You? Exploring Consumer Paths to Trust in Smart Voice-Interaction Technologies
(Empirical Paper)

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Introduction

In the Hollywood movie "Her", the protagonist, Theodore Twombly, falls in love with a voice -operated artificial intelligence system named Samantha. As their relationship unfolds, Theodore increasingly allows Samantha access into the most intimate realms of his life. Using a small device, he takes the system on walks, and to the café, and even shares sexual experiences with it. Eventually, their love comes to an end when Theodore finds out that Samantha simultaneously had been "dating" thousands of other people in addition to him.

Although the movie's plot appeared futuristic when it was introduced in 2013, research has shown that today, consumers not only readily accept smart voice -interaction technologies (SVITs) but also build various types of relationships with the devices (Han and Yang 2018; Novak and Hoffman 2019; Schweitzer et al. 2019). As in "Her", some of these relationships are even of a romantic nature (Schweitzer et al. 2019). Simultaneously, prominent SVITs like smart speakers (e.g., Amazon Echo, Google Home) have sparked privacy and data security concerns of both consumers and researchers, suggesting that the adoption of and interaction with the technologies demands considerable levels of consumer trust (Li, Hess, and Valacich 2008; Zolfagharian and Yazdanparast 2017; Linnemann and Jucks 2018). Although research shows a substantial understanding of factors influencing smart technology adoption and the relationship types that result from consumer–smart technology interaction, findings on how consumers initially develop and subsequently maintain trust in these smart technologies is sparse.

Adopting the Computers Are Social Actors paradigm (CASA) (Nass and Moon 2000; Nass and Brave 2005), we aim to enrich the current understanding of consumer interaction with smart technology by investigating how consumers build and maintain trust in SVITs, using the example of smart speakers. To do so, we adopt a qualitative approach to enhance understanding of the process of formation and maintenance of consumer trust in smart technology.

Conceptual Framework

Despite the recent research interest in SVITs in the fields of human-computer–interaction, consumer behavior, and marketing (e.g., Ehret and Wirtz 2017; Verhoef et al. 2017; De

Keyser et al. 2018), little consensus exists with regard to definitions, particularly for smart technology with voice -interaction functions.

Three categories of definitions can be identified. First, there are definitions that conceptualize SVITs mainly with reference to their underlying software components or computational infrastructure – for example, natural language processing, artificial intelligence (AI), or cloud computing (e.g., Luger and Sellen 2016; Cho 2018; De Keyser et al. 2018; Lopatovska and Williams 2018; Myers et al. 2018). Second, researchers conceptualize SVITs by explicating their possible range of abilities (e.g., online shopping or controlling other smart devices; Cowan et al. 2017; Li and Lee 2017; Manikonda, Deotale, and Kambhampati 2017; Porcheron et al. 2017; Chen and Wang 2018; Knote et al. 2018; Santos et al. 2018). Last, another category of definitions conceptualizes SVITs by equating the concept with existing consumer technologies on the market, such as Amazon's Alexa or Apple's Siri (Moorthy and Vu 2014; Kiseleva et al. 2016; Vyturina et al. 2017; Lopatovska et al. 2018).

However, shared characteristics can be found across definitions: (1) SVITs, like smart speakers, are technologically based on AI systems that react to consumers' voices and are able to adapt to individual consumer habits and needs over time, (2) they possess some degree of autonomy, and (3) they consist of a software component and a hardware component. Thus, the voice -interaction software (e.g., Amazon's Alexa) always requires some type of carrier medium (e.g., a smart speaker like the Amazon Echo). Researchers have found that the carrier medium type and the context in which SVITs are used (e.g., in-home vs. out-of-home) influenced consumers' use patterns of the technology (Moorthy and Vu 2014; Cowan et al. 2017). Therefore, it is necessary to distinguish not only between different kinds of SVITs but also between different technology usage contexts (Ng and Wakenshaw 2017). In addition, SVITs are rarely employed as standalone technology, rather, they typically operate as a voice -interface in an assemblage of other interconnected smart home technologies (Hoffman and Novak 2018).

Consequently, we suggest the following integrative definition: SVITs (e.g., smart speakers) are internet-connected devices that, depending on their technical functionalities, incorporate some degree of autonomy, authority, and agency and allow for voice -based conversational interaction between consumers and technology within the fixed contextual boundaries and domestic routines of consumer homes (De Keyser et al. 2018; Hoffman and Novak 2018; Woodall, Rosborough, and Harvey 2018).

The home as a context for SVIT use

To react to their users' vocal requests, SVITs are equipped with highly sensitive always-on microphones that scan their spatial environment for predefined activation terms (e.g., "Alexa", "Hey, Google"). This always-on functionality has raised privacy and data security concerns. Some scholars claim that it is impossible for consumers to determine whether the device is recording interactions not directed at it and how third parties use the data generated in the interactions (Weinberg et al. 2015; Alepis and Patsakis 2017; Manikonda et al. 2017; Pfeifle 2018). We posit that many of these concerns are rooted in the context in which SVITs like smart speakers operate: consumers' homes.

The (Western) home has traditionally been considered a "segregating space" (Mallet 2004; Castilhos and Dolbec 2018), a sphere in which consumers carefully navigate between the public and the private and where they decide about the inclusion or exclusion of people and objects (Castilhos and Dolbec 2018). New technology is domesticated into this socio-material context in a set of consecutive trial situations, in which the context, domestic practices, and inhabitants are affected and affect each other in turn (Lehtonen 2003). Additionally, the home constitutes a social system that functions according to a certain set of unwritten rules and expected behaviors (Shin 2014). Privacy and its construction are central in Western consumers' interpretation of home (Cristoforetti, Grennai, and Rodeschini 2011). Smart technology challenges and alters this established "moral economy of the household" (Silverstone, Hirsch, and Morley 1992; Shapiro 1998). Through their always-on function, SVITs transgress the unwritten "rules of place" of the Western home by depriving the consumer of his gatekeeping function by withdrawing the control of whom or what is physically or virtually allowed to enter the realm of the home (Shin 2014).

It has thus been argued that SVITs constitute an element within a larger economic order of what has been termed "surveillance capitalism" (Zuboff 2019). Extending on Foucault (1979), Zuboff (1988) suggests equating smart technologies with an "Information Panopticon", in which consumers are exposed to constant surveillance by an invisible entity without themselves being able to control the observation. In consequence, unbalanced power relations between the companies that produce the technologies and provide the infrastructure for SVITs on the one side, and consumers on the other, are preserved (Yeung 2017).

The collision of the home as a sphere of privacy and SVITs as (1) intrusive challengers of this privacy and (2) independent performers of tasks in this home environment has led scholars to suggest that the adoption and use of smart (home) technologies require substantial levels of consumer trust in technology (Li et al. 2008; Linnemann and Jucks 2018). Yet, how consumers are to deal with this collision, cope with the paradoxes that follow from it, and, particularly, develop and maintain trust in their smart home devices, such as SVITs, remains unclear (Mick and Fournier 1998).

Anthropomorphism

One possible psychological mechanism explaining the adoption of smart speakers can be found in the voice -based interaction mode between consumers and SVITs. As Epley, Waytz, and Cacioppo (2007) demonstrate, consumers tend to anthropomorphize objects and products, meaning that they ascribe uniquely humanlike attributes, cognitive patterns, intentions, motivations, and emotions to non-human entities, such as technology. This act of inductive inference "has generally been considered an invariant and automatic psychological process that is simply a chronic feature of human judgment" (Epley et al. 2007, p. 865).

Consumers have been found to exhibit a tendency to anthropomorphize objects particularly if they are dispositionally lonely (i.e., if they desire social interaction) and have a need for control/effectance toward their environment (Epley et al. 2007; Waytz et al. 2010). With regard to SVITs, this latter motivation is of particular importance, as it is closely connected with consumers' desire to explain, predict and eventually master a technology within its environment (Waytz et al. 2010; Epley 2018). This means that SVIT users who have difficulty determining their devices' abilities and capabilities (e.g., regarding whether its microphones will record conversations in its environment) are more likely to anthropomorphize the technology. However, consumers vary in the degree to which they perceive an object to resemble humans, ranging from the observation of humanlike similarities to the attribution of humanlike mental states (Kim and McGill 2011).

In response to consumer tendencies to humanize SVITs, marketers of smart technologies implemented tactics in their persuasion repertoire that facilitate the anthropomorphism of products (Aggarwal and McGill 2011). We argue that this is also the case for SVITs such as smart speakers. First, the voice-based mode of consumer–technology interaction facilitates consumer tendencies to anthropomorphize the technology, given that this mode

of interaction is usually reserved for human-to-human exchange (Nass and Brave 2005). Second, the naming of the voice -interaction software with which users of smart speakers interact, frequently suggests humanlike associations, like "Alexa" or "Siri". While Amazon's software developers justify their choice of the term "Alexa" as a "wake word" (note the anthropomorphic suggestion implicitly included here) because of its rarity as a first name and its special combination of soft vowels and the letter x (Bort 2016), the fact that the software was given a female first name particularly activates anthropomorphism. These anthropomorphic associations are emphasized in marketing communication. In commercials, argues Phan (2018), the smart speakers are not marketed on the basis of their technical specifications. Instead, the idea of SVIT as a helpful individual is conveyed. "Alexa" is thus portrayed as more than essentially a collection of software codes, constituting a "happy helper" within the intimate moments of consumers' day-to-day lives (Phan 2018).

Consumer behavior research has highlighted various trust-related effects of anthropomorphized objects, products, and services on consumers, thus treating perceived humanness predominantly as an independent variable (Lee 2010a). Kim and McGill (2011), for example, show that the anthropomorphism of slot machines can affect consumer perceptions of risk-bearing entities, and Hur, Koo, and Hofmann (2015) demonstrate that the anthropomorphism of especially tempting products impacts on consumer self-control by reducing consumers' level of perceived conflict. Similarly, and in close connection with the need for sociality that motivates consumers to anthropomorphize products (Epley et al. 2007), smart home technologies have been shown to convey automated social presence in the sense that they "make consumers feel that they are in the company of another social entity" (Van Doorn et al. 2016, p. 44). Similarly, anthropomorphism has been found to affect the level of perceived social presence by eliciting more positive emotions in consumers toward the technology (Van Doorn et al. 2016; Schuetzler, Grimes, and Giboney 2019).

Consequently, anthropomorphism constitutes an important determinant of consumer evaluation of a product's or service's trustworthiness (Waytz, Heafner, and Epley 2014). Applying these findings to SVITs, it can be assumed that through anthropomorphism, consumers will be less sensitive to the risks associated with the technology, will feel little perceived conflict in the interaction, and are likely to attribute social presence to their device.

However, human–computer -interaction researchers have warned that the mechanisms of anthropomorphism can have detrimental effects on consumers. Anthropomorphism can lead consumers to overestimate the mental and emotional capabilities of smart technologies. Consequently, consumers are prone to building emotional connections with the technology, which could possibly lead to a miscalibration of trust in the technology, in the sense that trustworthiness is based purely on anthropomorphism and not on technology performance (Culley and Madhavan 2013). This bears the potential for misuse and "dishonest anthropomorphism": Companies could utilize the mechanisms of anthropomorphism to intentionally or unintentionally abuse consumer privacy in favor of data collection (Leong and Selinger 2019).

The Computers Are Social Actors (CASA) paradigm

Media and computer studies extend research on anthropomorphism, demonstrating how consumers make inferences about the humanlikeness of an object or technology as a sense making heuristic. Rather than merely attributing humanlike features to computers (Prasad 1995), consumers give technologies distinct personalities, including them in their social system or applying norms of human politeness and etiquette without the actual presence of human-like cues (Nass and Brave 2005; Hayes and Miller 2010; Purington et al. 2017; Zlotowski et al. 2018). These responses to computers do not originate from active cognitive processing but are the result of automatic subconscious processes (Wang 2017). With reference to the Aristotelian concept of "ethopeia", Nass and Moon (2000, p. 82) describe human responses to technology as resembling the responses to another human entity while being aware that this entity "does not warrant human treatment of attribution". The CASA paradigm in media and computer studies is based on this notion. Importantly, although research shows that anthropomorphic cues support social consumer responses to technology, anthropomorphism alone does not explain the notion of CASA (Lee 2010b) (for a conceptual comparison, see Table 2).

Instead, the idea of unconscious social responses to computers was derived from media equation theory (Reeves and Nass 2002). Having replicated established findings from interpersonal interaction by replacing humans with computers in experimental settings (De Visser et al. 2016), this theory claims that consumers equate experiences with media (-technologies), with experiences with other humans. Follow-up research illustrates that this mindless social response mechanism to technology can be explained by both

cognitive and motivational deficits of consumers (e.g., Fischer 2011; Liang, Lee, and Jang 2013)

While evidence shows a linear relationship between the perceived humanness of humanlike cues in computer representations and the degree of sociality in consumer responses (Gong 2008; Richards and Bransky 2014), research in the CASA paradigm considers perceived humanness as a moderator of human–computer relationships.

Recent work adhering to the paradigm shows that voice-based human–computer interaction, such as with SVIT, elicits a particularly wide variety of social and emotional responses from consumers (Nass and Brave 2005; Chérif and Lemoine 2019; Cho, Molina, and Wang 2019). Regardless of the perceived humanness of the computer voice, consumers have been shown to react to those voices similarly to human voices (Derrick and Ligon 2014). In doing so, consumers make inferences about the voice's gender, attribute different personalities, accents, race, and ethnicity (Nass and Brave 2005; Phan 2018); and confer social presence to the computer voice's perceived personality (Schuetzler et al. 2018). Likewise, the technology initiates manifold emotional responses in consumers, ranging from surprise to amusement, happiness, and unease (Shank et al. 2019).

Phenomenon	Humanization of technology	
	Computers are Social Actors	**Anthropomorphism**
Discipline of conceptual origin	Media studies, computer studies	Psychology
Conceptual core	Application of social rules, norms, stereotypes, and expectations to technologies through consumers despite the knowledge that the technology does not warrant this behavior	Schema-based attribution of human-like properties, characteristics, cognitive patterns, motivations, and emotions to nonhuman entities by consumers
Dominant treatment of humanness in research stream	Perceived humanness as moderator of the consumer relationship with technology	Perceived humanness as cause for behavior of consumers (i.e., as independent variable)
Activation of behavior	No humanlike cues are necessary to evoke social responses to computer. Yet cues can facilitate social response.	Presence of humanlike cues is necessary for activation
Cognitive effort for behavior activation	Mindless and automatic pattern of behavior which is often rooted in a motivational deficit	Cognitive effort and elaboration is necessary. Resulting in different degrees of anthropomorphism (weak to strong)
Theoretical reference point	Behavior of consumer toward technology	Object that consumer interacts with
Social and dispositional influences	Proneness to social responses to computers is determined by the perceived similarity with the computer's traits and consumer's culture	Proneness for anthropomorphism is determined by individual motivation, cognitive abilities, need for cognition, perceived similarity, and culture

Table 2: Although both depart from the same phenomenon, CASA and anthropomorphism differ from each other with regard to important aspects. For clarification, similarities here are highlighted in grey color.

Source: Own illustration

Exploring consumer–smart technology relationships

The preceding sections show that in humanizing technology, consumers not only consider anthropomorphic cues but regard technologies as social actors with which they form interpersonal relationships. Consumer culture theory has recently shown increased interest in the characteristics and dynamics of these interpersonal consumer–smart technology relationships.

Expanding on anthropomorphism, assemblage theory (DeLanda 2016; Hoffman and Novak 2018), and the extended self (Belk 1988, 2013, 2014), Schweitzer et al. (2019) identify three relationship types resulting from consumer interaction with SVITs. First, some consumers consider the SVIT a servant, a fairly prominent finding (Luger and Sellen 2016; Phan 2018; Woodall et al. 2018). These consumers regard the SVIT as a

subservient entity that helps them achieve a certain goal, such as fulfilling a task. Second, some study participants considered the SVIT a partner. Similar to Schweitzer et al. (2019), researchers have proposed relationship types between consumers and smart technology (and also brands) that resemble real partnerships (Mick and Fournier 1998; Fournier and Alvarez 2012; Purington et al. 2017). Yet, conceptions of the partner's nature vary greatly. While some people connect to the SVIT with the intention of educating their digital child, others viewed the partnership even romantically. Finally, Schweitzer et al. (2019) propose that some consumers view the SVIT as a master. These consumers do not anthropomorphize the technology but feel defeated by the combination of their personal inability to predict the technology's behavior, as well as their insufficient interaction skills. Prolonged use of the technology in this case is highly unlikely.

Although Schweitzer et al.'s work (2019) provides a good overview of the different types of relationships between consumers and SVIT, it disregards contextual influences on consumer–smart technology relationships (as proposed in Verhoef et al. 2017 and Woodall et al. 2018) and does not explain how trust in smart technologies and relationships may co-develop.

In contrast, Novak and Hoffman (2019) provide deeper insight into the smart home as a context for technology use, offering a multidimensional and dynamic conceptualization of relationship journeys between consumers and SVITs. They counter the dominant view that smart technologies should be understood in terms of their human similarities and instead claim that smart technologies possess unique capacities that disqualify the application of anthropomorphism. Smart objects have some form of agency (they are able to affect and be affected by their environment), they are autonomous (they are able to function independently of human commands), and they have authority (they can control other smart objects and even decide for themselves on certain issues) (Novak and Hoffman 2019). The specificity of each of these characteristics determines the product's degree of smartness (Novak and Hoffman 2019). Because of these characteristics, Novak and Hoffman (2019) suggest thinking of smart technology as possessing "object-oriented ontology": Smart objects can adopt a multitude of roles and have the capability to collect experiences within a higher-order network of the smart home.

In doing so, smart technologies function as part of a larger assemblage of consumers and other (smart) objects in a certain context (Hoffman and Novak 2018). Within this assemblage, consumers and objects can assume agentic roles in which they influence the

assemblage as a whole, and are influenced themselves by it in turn (communal roles). For example, SVITs such as smart speakers can lead to experiences of self-extension and self-expansion when consumers sit in their living room, ordering the SVIT to dim the lights. Likewise, consumers can experience self-reduction and self-restriction – for example, when their linguistic diversity is reduced to improve their SVIT's performance (Novak and Hoffman 2019).

Like human-to-human relationships, relationships between consumers and smart objects are dynamic. To map relationship dynamics, Novak and Hoffman (2019) suggest a framework in which they distinguish between four superordinate forms of consumer–smart technology relationships that largely parallel Schweitzer et al.'s (2019) work, except that they define these relationships with reference to two behavioral dimensions: agency and communion (Novak and Hoffman 2019). Both consumers and smart objects can assume communal or agentic roles within the overall assemblage. The setting of individual roles then determines the relationship style. For illustration, consumers could occupy a highly agentic role within the assemblage, whereas the smart object could simultaneously assume a low agentic role. The consumer in this situation would have the impression of self-extension – in other words, the feeling that (s)he has full control over the smart object – leading to a consumer-as-master relationship type (Novak and Hoffman 2019). With the domestication of the technology within the household assemblage (Lehtonen 2003), relationship types between consumers and smart objects are likely to change over time. While the master-as-servant relationship type may represent a "natural starting point for mapping the consumer-object relationship journey", consumers and smart objects could over time adopt communal roles, for instance (Novak and Hofmann 2019, p. 228). In doing so, the relationship type between consumers and smart objects could potentially change (Novak and Hoffman 2019). Relationship styles are therefore best understood as continuous rather than discrete.

Although both Schweitzer et al.'s (2019) and Novak and Hoffman's (2019) work have rightfully received attention and praise, they do not sufficiently take notice of an important precondition for the development and maintenance of consumer–smart object relationships. Both works make a priori judgments about human–smart technology relationships without sufficiently explaining how these relationships come into being in the first place, thereby, insufficiently explaining the importance of trust as an underlying condition of relationship building. We counter that the exploration of consumer trust in smart technologies and its formation may aid researchers in explaining, for example, why

consumers allow or prohibit SVITs from adopting certain roles, particularly those that involve high agency. To do so, we incorporate Schweitzer et al. (2019) and Novak and Hoffman's (2019) findings and provide a framework of the different ways in which consumers build and maintain trust in their smart technologies.

Exploring trust in smart speakers

Trust has been identified as a critical component in various relationship types (e.g., Moorman, Deshpande, and Zaltman 1993; Morgan and Hunt 1994; Garbarino and Johnson 1999; Arnott 2007). Because of its existential nature, a variety of academic disciplines have attempted to conceptualize the complexities of trust. While each one attributes different roles to trust as such, they share congruent ideas about the essence of trust relationships.

In its basic sense, trust refers to a dyadic scenario in which an Entity X (the trustor) relies on another Entity Y (the trustee) to perform an action that leads to a certain outcome (O) that is of importance to the trustor (Castelfranchi and Falcone 2010). As Luhmann (1979) notes, trust commences where consumer knowledge ends. Since the trustor cannot be absolutely certain about the trustee's intentions and actual behavior, the act of relying on the trustee to reach a certain outcome incorporates the possibility of failure. Thus, by relying on the trustee, the trustor is motivated to take risks and consequently create potential for vulnerability (Mayer, Davis, and Schoorman 1995; Rousseau et al. 1998; Cook et al. 2005; Castelfranchi and Falcone 2010). Trust should therefore be regarded as a threshold point at which consumers consider the probability of the trustee performing an action that is beneficial, or at least not detrimental, to the trustor as high enough to engage in the relationship (Gambetta 1988). Put differently, trust constitutes a mechanism through which consumers cope with the autonomy of other entities, both human and nonhuman (Prasad 1995; Castelfranchi and Falcone 2010).
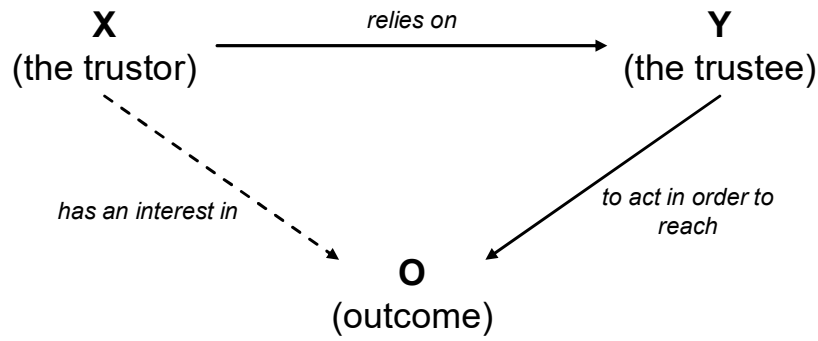
Figure 7:   In the essence of trust, an Entity X (the trustor) relies on another Entity Y (the trustee) to perform an action that leads to a certain outcome (O). This outcome is of importance to the trustor (with reference to Castelfranchi and Falcone 2010).

Source: Adapted from Castelfranchi and Falcone (2010)

Trust is a multilayered concept in that it can refer to the mental and affective attitude of the trustor toward the trustee, based on the trustor's evaluations and expectations of the trustee on one layer (Castelfranchi and Falcone 2010). On another layer, trust can represent a consumer decision and intention that is based on a previously formed attitude toward the trustee – for example whether the potential trustee is considered trustworthy (Castelfranchi and Falcone 2010). These layers of trust precede the conative act of trusting; thus, they involve relatively little risk taking and are of a gradual nature (Blöbaum 2016). It is only in the conative act of relying on a trustee's expected behavior that the trustor engages in any risk taking (Blöbaum 2016). The act of trust as another trust layer is therefore binary: either consumers actively decide to rely on the trustee to act so as to reach a certain outcome, or they refrain from doing so. On a final layer, trust refers to the social relation between trustor and trustee that results from the act of trust with regard to, for instance, reciprocal behavior of the trustor toward the trustee (Luhmann 1979; Garbarino and Johnson 1999; Castelfranchi and Falcone 2010).

Corresponding to these trust layers, other research streams have evolved into what has been divided into the behavioral and psychological traditions of trust research (Lewicki, Tomlinson, and Gillespie 2006). As this article examines how consumers build and maintain trust relationships with their SVITs, trust here is understood in terms of the psychological research tradition, which involves understanding attitudes, expectations, affect and dispositions associated with trust (Lewicki et al. 2006). More precisely, we combine the unidimensional approach (Mayer et al. 1995) with a transformative approach

to trust (Rousseau et al. 1998). This combination allows us to (1) gain insight into the cognitive and affective mechanisms that consumers apply in building trust in their SVIT and (2) account for the dynamics of trust in prolonged relationships between consumers and their SVITs.

How consumers build trust in smart speakers

Mayer et al. (1995, p. 712) defines trust in the unidimensional approach as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". In this approach, trust and distrust form two ends of a scale (Mayer et al. 1995). Whether one individual considers another as trustworthy is based on an active evaluation process in which consumers assess different antecedents of trustworthiness (Butler 1991).

On the one hand, consumers assess the ability of their counterpart to fulfill the entrusted task, focusing particularly on the trustee's range of perceived skills, competencies, and characteristics (Mayer et al. 1995). Consumers also estimate the integrity of the potential trustee, that is, whether the trustee adheres to an acceptable set of principles. In judging the integrity of the potential trustee, the trustor takes into consideration past experience with the trustee (see also Rotter 1980) and the extent of congruence between the trustee's words and actions (Mayer et al. 1995).

On the other hand, consumers additionally evaluate the perceived benevolence of the potential trustee, that is, "the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive" (Mayer et al. 1995, p. 718). A trustee is considered benevolent if (s)he is thought to have a positive orientation toward the trustor (Mayer et al. 1995). In combination, these trust antecedents aid consumers in making calculated trust decisions that are based on cognitive information processing.

Subsequent research on trust, in contrast, has highlighted the importance of affect and emotions on consumer assessment of another party's trustworthiness (e.g., McAllister 1995; Rousseau et al. 1998; Dunn and Schweitzer 2005; Schoorman, Mayer, and Davis 2007; Robbins 2016). This affective aspect of trustworthiness evaluation (e.g., benevolence-based trust) has received attention in consumer behavior research (e.g., White 2005; Avnet, Pham, and Stephen 2012; Chernev and Blair 2015; Chen et al. 2018), marketing (e.g., Ganesan and Hess 1997; Sirdeshmukh, Singh, and Sabol 2002; Garbarino

and Lee 2003), and service marketing (e.g., Johnson and Grayson 2007; DeWitt, Nguyen, and Marshall 2008; Schumann et al. 2010). McAllister (1995) shows that emotional ties, such as perceived trustee familiarity, can serve as a significant indicator of trustworthiness (Tanner and Maeng 2012). Simultaneously, emotions toward the technology constitute a decisive factor in the adoption of complex technological innovations like SVITs (Bahmanziari, Pearson, and Crosby 2003; Thompson, Hamilton, and Rust 2005; Wood and Moreau 2006).

Trust as a dynamic and evolving phenomenon

Although Mayer et al. (1995) provide a plausible and well-established conceptualization of cognitive and affective consumer evaluations of trustworthiness, their approach considers trust as static and uniform. In contrast, for Rousseau et al. (1998), trust is transformative in that it takes on multiple forms in different relationships and evolves over time. Whereas consumers in one-time transactions evaluate a trustee's trustworthiness using a calculus of potential gains and losses, ongoing relationships involve a bandwidth of trust, meaning that the areas and ways in which consumers trust another entity vary over time (Rousseau et al. 1998). As a result, Rousseau et al. (1998) distinguish between (1) calculus-based trust based on rational choices; (2) relational trust, which "derives from repeated interactions over time between trustor and trustee" (p. 399) based on information that the trustor derives from the relationship itself; and (3) institution-based trust, which refers to institutional circumstances which can facilitate calculus-based or relational trust. Consumers go through various trust stages as they intensify their relationships with trustees. With iterative interactions, not only does the trust level change, but also the source of trustworthiness evaluations (Rousseau et al. 1998). As relationships develop, consumers rely increasingly on relational trust, while calculus- and institution-based trust decrease in influence (Rousseau et al. 1998; Lewicki et al. 2006).

Trust as a socio-culturally embedded phenomenon

Trust does not represent a universal notion, but instead is a phenomenon deeply embedded in culture, socially constructed and context specific (Tillmar 2015; Welter and Alex 2015). Therefore, the level of generalized trust, meaning consumer trust in other members of society, varies among different cultures, consequently influencing the tendencies of consumers to engage in interpersonal trust relationships (Fukuyama 1996; Cook et al. 2005; Shank 2010). Research based on Hofstede's (1980) cultural values, for instance,

demonstrates that consumers in individualist versus collectivist cultures may employ similar evaluative cues to determine a target's trustworthiness but differ in the mechanisms with which each cue is evaluated (Doney, Cannon, and Mullen 1998; Schumann et al. 2010; Samaha, Beck, and Palmatier 2014). For illustration, in individualist cultures, that is, cultures in which consumers have strong self-orientation and tolerance for individual behavior, consumers are less likely to build trust based on predicting a potential trustee's behavior (Doney et al. 1998). This is due to the range of possible behaviors that trustees in such societies could display, which impedes reliable behavioral prediction (Doney et al. 1998). Likewise, consumers in collectivist cultures rely more on evaluations of perceived trustee benevolence as a cue for trustworthiness evaluations (Schumann et al. 2010). For this article, this cultural understanding of trust formation is important because the studies included were conducted exclusively in the Western individualist culture of Germany. Study participants may therefore have exhibited variations in mechanisms of trust formation and maintenance that deviate from consumers in other cultures, particularly in terms of conceptions of privacy and self-disclosure (Schumann et al. 2010; Krasnova, Veltri, and Günther 2012).

Peculiarities of research on trust in SVITs

Although numerous authors have advocated the seamless application of models of interpersonal trust to the domain of human–smart technology interaction (e.g., Wang and Benbasat 2005; Lee and Nass 2010; Hoffman et al. 2013), we argue that this can only be done effectively when factoring in the peculiarities of SVITs as trustees.

Our main concern here lies in clear consumer identification of a potential trustee. While humans evaluate the trustworthiness of another human trustee with regard to a distinct reference point (the other human being), the trustworthiness of SVITs is determined according to multiple, sometimes diffuse, reference points within an overall assemblage (Hoffman and Novak 2018). In particular, we suggest that the SVIT as a trust object converges four potential sources of trustworthiness: the SVIT as a device as such (e.g., the Amazon Echo), the voice-interface of the SVIT (e.g., Amazon Alexa), the software behind the interface, and the producing company (e.g., Amazon) that provides the technological infrastructure (see also Wang and Benbasat 2005; Wang and Emurian 2005; Glanville and Paxton 2007). Consequently, the trust necessary for adopting and interacting with SVITs as technology could result from a combination of reference points, which may sometimes be situated outside the technological device itself.
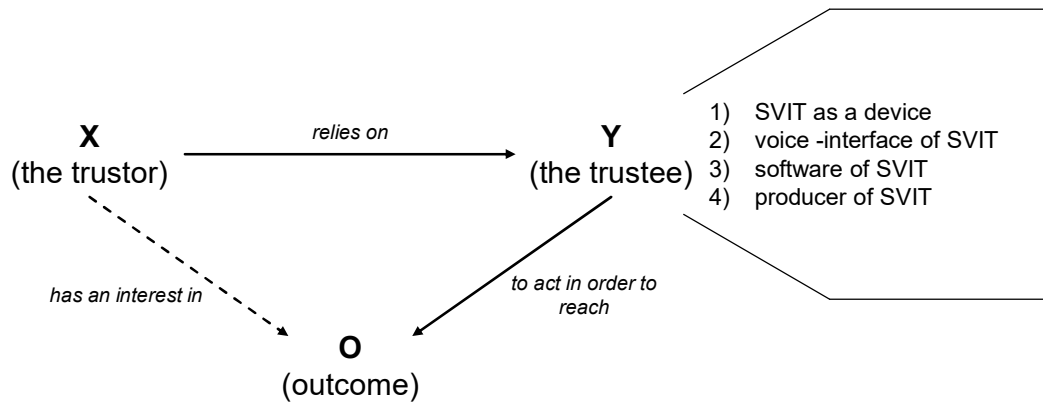
Figure 8:   Trust relationships between consumers and SVITs resemble interpersonal ones, although consumers determine the trustworthiness of SVITs with multiple and often combined reference points of trust.

Source: Own illustration, extending on Castelfranchi and Falcone (2010)

Most trust relationships between humans and SVITs are of a conditional, tentative nature, meaning that consumers only trust their technology to do certain things within certain domains and contexts (Castelfranchi and Falcone 2010; Hoffman et al. 2013; Richards and Bransky 2014). For example, consumers might be willing to place a SVIT such as a smart speaker on their bedside table, but be afraid to talk about personal information in proximity of the device (Cowan et al. 2017).

Additionally, questions have been raised whether interpersonal trust constitutes such a decisive component in the adoption process of SVITs, as there might be other digitized services in which consumers may place themselves in much greater personal danger – for example, taking an Uber ride. While we acknowledge the more prevalent physical threats that accompany the use of ride-sharing services, we maintain that consumers using these services are provided with substantially more cues for trustworthiness evaluation than when using SVITs (Etzioni 2019). In ride-sharing scenarios, both driver and passenger put themselves at risk (Etzioni 2019); thus, a reciprocal trust relationship between drivers and passengers. In contrast, due to the "Information Panopticon" function of SVITs, users may be placing unilateral trust in the technology and its infrastructure, especially with regard to the misuse of personal data (Zuboff 1988; Etzioni 2019).

Last, although consumers prefer SVITs that share human features (e.g., Mori, MacDorman, and Kageki 2012; Richards and Bransky 2014), there is an asymmetry in dealing with trust breaches (Hoffman et al. 2013), such that consumers react differently to behavioral inconsistencies of other humans than to those of smart technology (Richards

and Bransky 2014). In case of trust abuse, consumers would rather forgive their human Uber driver than their nonhuman SVIT. This behavioral peculiarity substantially impacts on prolonged technology use.

In summary, the preceding paragraphs show that when consumers engage in social and interpersonal relationships with smart speakers, they not only attribute human characteristics to nonhuman devices but also include these devices in their social environment. Therefore, to research the development and maintenance of consumer trust in SVITs, interpersonal models of trust constitute an appropriate conceptual framework. As the theoretical exploration of trust has demonstrated, trust is a complex, multiple-layered, domain-specific, culturally embedded, and dynamic phenomenon. Engaging in trust relationships involves the trustor's willingness to be vulnerable. As any act of trust represents the crossing of an estimated risk threshold on the part of the trustor, the first study in this article aims to shed light on factors that influence this threshold with regard to consumer trust in SVITs.

Study 1: Elements Constituting the Trust Threshold

Method and Analysis

One of the authors of the present study was purposefully naïve on the topic of voice -interaction with technology in general, therefore, Study 1's aims are twofold: (1) to gather overall information on consumer motivations to either trust or distrust SVIT and, consequently, (2) to investigate the critical dimensions of consumer trust thresholds. In doing so, we aimed to identify sources of both trust and distrust.

We adopted a non interventionist approach to gain a preliminary understanding of factors influencing trust and distrust evaluations of smart technology consumers. In particular, we collected online comments on news website articles about smart speakers, from January 2017 to July 2018. We chose this data source because (1) smart speakers as a technology were the subject of controversy in news media during the data-collection process, (2) the controversial nature of the news topic increased the likelihood of fruitful online discussions within comment sections, and (3) commentators could contribute to the public discussion anonymously, thereby minimizing individual social acceptance concerns (Chen and Berger 2013). To account for the contextual and cultural specificities of consumers' trustworthiness evaluations, we limited our selection of data sources to the

German-speaking context. We therefore excluded sources of user-generated content from other countries (e.g., social news aggregation platforms like Reddit).

We retrieved comments from the three most popular German online news sites offering a comment function. These comment functions allow for interaction between journalists and consumers, as well as among consumers, frequently resulting in extensive online discussions. We subsequently analyzed the resulting data, more than 600 user-generated comments, adhering to the standards of thematic analysis proposed by Braun and Clarke (2006). We chose this approach to detect differences and similarities among data items and to summarize key features of the data set (Nowell et al. 2017). We resolved conflicts in coding and theme construction through discussion. During analysis and interpretation, we adhered to the interpretivist research paradigm.

Results

As expected, the topic of smart speakers sparked intense discussions among the commenting sections. Through the analysis, it became clear that the majority of commentators adopted a critical stance toward smart technology, especially smart speakers. Three recurring themes emerged that clarify this criticism, as the following subsections discuss.

Data security and surveillance. Among the most prevalent influences on trust (or distrust) in smart speakers were concerns about personal data security and surveillance by the smart device. The commentators feared that the companies behind the smart speakers could potentially misuse the data generated by the always-on microphones in the device, as the following quote exemplifies: "If you think the device only listens to a voice command, you are naïve! And even if that were the case, the companies would get to know enough about users after the activation anyway". Likewise, this commentator worried about leaks in the data transmission: "As long as the device sends data back home [i.e., to the company producing the smart speaker], it has endless security holes and everyone can easily access my data, I will never have such a thing in my home" (C4, 421).

This fear of surveillance and of possible personal drawbacks in an undefined future, the commentators reported, even impacts on their social lives:

> "A friend of mine also has this Alexa wiretap. It's okay, but every time I visit him, I ask him to switch off the wiretap. At first, he didn't do it, so I stopped visiting

him. […] It might sound extreme, but it's a safety measure for the future". (C12, 36).

In summary, commentators expressed a genuine fear of misuse of their data, which led them to distrust smart speakers. Note, however, that many of these commentators admitted they had never actually interacted with smart speakers.

Perceived imposition and inescapability of smart technology. Many commentators expressed feelings of imposition or inescapabilty from the technology that fostered their distrust. For example: "In a few years, some things will simply be impossible without such smart speakers. Soon, we will need to have such a device to talk to each other, and you will have problems if you don't use one" (C4, 144). This feeling of imposition and inevitability is closely connected to the fear of social exclusion: "In ten years, […] you will have to be careful, in order to avoid living in a smart home. Whole parts of the city will be connected this way" (C10, 413).

Skepticism toward producers of smart technology. A third recurring theme alludes to a general skepticism toward the smart speaker producers (e.g., Amazon, Google). This skepticism is rooted in distrust in the perceived external behavior of these producers, as well as their data security policies, as this example illustrates: "If you get yourself into the hands of Amazon and Co, you will strip yourself naked in terms of data security and you don't know what happens to the data" (C4, 249).

Although the majority of commentators confess to not having had firsthand experience with smart speakers, owners of smart speakers who explicitly identified themselves as such also contributed to the discussion. Three themes in particular emerged in opposition to the criticism of the technology.

Preference of centralized data storage at one company. While smart speaker users were aware of the debate concerning privacy and data security issues surrounding the technology, many considered the storage of personal data when using internet-based services somewhat inevitable. Therefore, they expressed their preference for having their personal data stored at one particular company with which they had had positive experiences before (e.g., Amazon), a reasoning that could possibly result from coping with cognitive dissonance (Festinger 1957).

Comparison with other smart technologies. Additionally, with reference to data security concerns, smart speaker owners repeatedly highlighted what they consider

double standards of modern consumers. They stressed that more popular smart technologies, like smartphones, are equipped with similar technological specifications as smart speakers and that smartphones are equally able to record verbal user interactions, without the user noticing it. Moreover, a smart speaker is considered a necessary possession of future-oriented consumers. This openness to innovation is demarcated from the perceived backwards orientation of non-users, as the following quote exemplifies: "If you have a smartphone, there is no point worrying about Alexa and so forth. A smartphone is way more of a wire-tap than Alexa. And if you don't have a smartphone, then probably you aren't reading this, because then presumably you don't have a computer, internet, energy or even light" (C10,322).

Thus, users of smart speakers counter both data security concerns and the perceived imposition of the technology, which emerged as themes among nonusers, by downplaying the perceived threat of the technology, as well as by appealing to Baudelairean ideals of "being within one's time".

Convenience through smart speaker use. Last, smart speaker users emphasize the convenience that they have brought into their daily routines, simplifying tasks sometimes perceived as arduous, as becomes clear in this comment: "It's very convenient and comfortable in the morning when you only need to shout 'Alexa, start my day' and right away the coffee machine pours, pleasant lighting switches on, the blinds roll up and I know what to wear for the day" (C12,12).

In summary, the themes presented here serve as a general illustration of the fear of loss of control through the use of smart speakers that leads the commentators to distrust this technology. In contrast, commentators who use smart speakers, highlighted the ability to determine themselves which company is allowed to store personal data, stress the double standards of consumers, and highlight how the technology has made their routines easier. With regard to factors influencing consumers' perceived trustworthiness threshold for smart speakers, the analysis demonstrates that data security, experiences with the producing company, and the need for convenience, impact on consumer intentions to rely on the smart speaker. Interestingly, despite the intense public discussions that surround the smart technology diffusion, these patterns of (dismissive) behavior toward new media technologies have historically accompanied other popular mass technologies (Fickers 2012).

Study 2A: Anthropomorphic Paths to Trust in SVIT

Method and Analysis

Although Study 1 provides insight into factors that consumers may incorporate into their evaluation of SVIT trustworthiness before the adoption of the device, it yields few conclusions regarding the trust process between users and their SVIT and the concurrent development of consumer–smart technology relationships. Therefore, Study 2a is aimed at investigating the nature of these processes, incorporating the themes generated in Study 1. We conducted semi structured interviews with German users of smart speakers (n = 9; for sample characteristics, see Table 3). Whenever possible, interviews took place in the homes of the informants, in close proximity to the SVIT, to ensure context specificity (Ng and Wakenshaw 2017). This study design had the interesting effect that the SVITs were inadvertently activated on numerous occasions. When talking about the devices in response to interview questions, informants regularly used the activation term of their SVIT (e.g., "Alexa"), thereby activating the voice -interface. Interview transcripts thus contained not only information provided by the informants themselves but also briefly captured consumer interaction with their smart devices, making the SVITs part of the interview themselves. Informants were selected using a mixed multistage sampling strategy. As smart speakers were introduced to the German mass market only a year before data collection, we initially applied a network and opportunistic sampling strategy to recruit users of smart speakers within the personal networks of the researchers, as well as networks of students participating in a research seminar. Additionally, we used our institutions' social media platforms to attract potential informants. Subsequently, potential informants were selected through criterion sampling (Durdella 2019). The sample thus included students and employees from southern Germany who had been using their smart speakers for at least six months prior to the interview. Moreover, informants utilized smart speakers predominantly in hedonic contexts, though some also incorporated them in professional, job-related tasks.

We formulated interview questions on the basis of (1) Mayer et al.'s (1995) unidimensional model of trust, (2) Rousseau et al.'s (1998) transformative model of trust, and (3) the results of Study 1. We personally conducted all interviews in German, thereby adhering to McCracken's (1998) guidelines of qualitative interviewing. Interview sessions lasted about one hour each. Upon completion, each interview was transcribed into a digital text format and analyzed using the analysis software MAXQDA 12. We

applied Spiggle's (1994) framework for qualitative data analysis and interpretation to perform structural content analysis, aiming to identify structures and patterns within the data (Mayring 2015). We analyzed the original German transcripts in three rounds of coding. As in Study 1, during the analysis and interpretation, we adhered to the interpretivist research paradigm. We resolved conflicts in analysis and interpretation through discussion.

Sample characteristics of Study 2a

Pseudonym*	Age	Gender	Occupation	Smart speaker model	Hours of daily smart speaker use (estimated)	Trust stage
Sandra	23	Female	Student	Amazon Echo Dot 2. Gen	3,5	2
Marc	20	Male	Waiter	Amazon Echo Dot 1. Gen	4	2
David	21	Male	Student	Amazon Echo Dot 2. Gen	0,5	3
Richard	25	Male	Student	Amazon Echo Dot 2. Gen	3,5	1
Ralph	28	Male	Sales Manager	Amazon Fire Tablet with Alexa	5,5	2
Angela	24	Female	Student	Amazon Echo Dot 2. Gen	4	3
Sam	23	Male	Student	Amazon Echo Dot 2. Gen	6	2
Bernard	27	Male	Lawyer	Amazon Echo Dot 2. Gen	3	2
Chris	25	Male	Technician	Amazon Echo Dot 2. Gen	6,5	2

*Pseudonyms are used in order to mask informant identity

Table 3:   Sample characteristics of Study 2a

Source: Own illustration

Results

In line with existing research on trust formation (Rousseau et al. 1998), the analysis and interpretation of interview data showed that the development of consumer trust in SVITs can be conceptualized as a multistage process congruent with different stages of technology use: (1) initial contact with the smart speaker, (2) purchase and integration of

the technology in users' daily routines, and (3) the smart speaker as humanlike entity. Expanding on these stages, the following subsections present detailed findings.

Initial contact situations with smart speakers. Many respondents reported that their initial contact with the technology took place within a safe and familiar environment, for example, at a family member's or friend's home. One informant, Bernard, describes his first interaction with Amazon's smart speaker Alexa during a family celebration:

> "I spent last Christmas at my father's place, and he had one [smart speaker]. My sister has one, too. At my father's place, I grilled this thing for an hour and thought it was cool. You could do so many things with it". (Bernard, age 27, male).

Despite his growing curiosity following the first encounter, Bernard reported having had privacy concerns before purchasing the device himself, but he overcame them after discussing it with his father, at whose home he had first experienced the technology:

> "At the beginning, it put me off a bit. People always say: 'These things are dangerous because they always listen and now Amazon saves everything you say' […] But my father simply said: 'You can put your smartphone on the table, and it can do exactly the same thing […] And I was like: 'Actually, you're right!'" (Bernard, age 27, male)

Bernard's example demonstrates that users in the early stages of acquaintance with the technology consult friends and relatives, whose opinions function as a preliminary frame of reference for assessing the technology's trustworthiness. Therefore, respondents assess the perceived benevolence of the SVIT by testing the device in safe environments, but also by reasoning that if a close relative or friend uses the device, it is probably innocuous. Further, this episode evidences the complex interplay of trust formation and the home context: Bernard experiences the SVIT in a safe space that is not his home, and his father testifies to the trustworthiness of the SVIT. This type of assemblage can hardly be compared or generalized to situations in which individual consumers engage with SVITs for the first time alone at their own home.

Moreover, at the beginning, respondents also test out the range of tasks that the SVIT can fulfill, that is, they gauge whether it matches their requirements for future use (e.g., entertainment). This assessment of SVIT abilities often takes on a playful character, as becomes obvious from the experiences that this female informant related from her first encounter with the device at her student friend's place:

"A friend of mine had Alexa [smart speaker from Amazon]. I saw it at her place and thought it was cool and that it was a funny gadget. I tried interacting with her [Alexa] and tried to build up a dialogue. It was fun. […] She told me jokes. But it's not like I had the feeling of it being a real conversation, but more of a checking-out". (Sandra, age 23, female)

Other informants reported asking very specific and presumably difficult questions to test out limits of the device's abilities:

"What impressed me the most, because I didn't think it [the SVIT] would be able to answer it, was that I asked her, 'How much protein is contained in 37.5 grams of oats?'. Something completely absurd. But it gave me a pretty good answer. […] That was actually quite cool!" (Bernard, age 27, male)

Although these statements indicate varying degrees of perceived relevant abilities with regard to future use, it becomes clear that consumers, in the initial encounters with the technology, evaluate SVIT trustworthiness in terms of ability. As with the two cases presented here, this process frequently takes place before the actual purchase of the device.

In addition, some informants explained that they decided to buy a particular type of SVIT because of previous experience with the producing company, (e.g., Amazon). When asked why he decided on an Amazon Echo Dot, Marc recounted his past positive experiences with Amazon:

"Amazon would never mess with its customers. […] Very often, I have found that Amazon was the cheapest. And if it wasn't, I would still order there. Because you know it, you order something, and they tell you that it will be delivered on that day and it's really there then. […] Amazon is a true global player. […] This is why I am satisfied with them. You can return things without any problems, whereas you may have problems doing so anywhere else" (Marc, age 20, male)

Interestingly, it appears that consumers transfer trust that they have developed through repeated satisfactory service encounters with the producing company – that is the perceived integrity of the producer – to the SVIT (Mayer et al. 1995). As Marc highlighted, Amazon's return policy gave him the confidence that he could return his smart speaker if he was unhappy with it. The risk associated with the purchase of the

smart speaker is therefore perceived as limited, thus lowering the trustworthiness threshold.

In summary, during the initial contact situations, consumers generally consider SVIT trustworthiness by evaluating its benevolence, ability, and integrity. In doing so, they carefully estimate whether the device conforms to their expectations for future use, as well as investigate ways to lower the perceived risk associated with the technology. Benevolence-based consumer trust is additionally developed by using close relatives or friends as a reference frame.

Purchase and integration of the technology in consumers' daily lives. Informants in the interviews univocally reported that shortly after purchase and installation of the device in the home, the SVIT became more deeply integrated into their daily lives. Respondents narrated how they established relationships with their device through repeat use. In doing so, they gradually extended the variety of tasks, delegated to the technology. Interestingly, respondents increasingly based their trust in their SVIT on the evaluation of fewer antecedents of trustworthiness than during the initial contact situations, that led to the purchase decision.

Consumers increasingly displayed ritualized use of SVITs. For example, Marc reported that the SVIT had become an essential part of, if not even the origin of, some of his daily routines, when he explains how he uses his smart speaker during breakfast:

> "I installed a scene called 'Start my day'. Whenever I get up in the morning, it [the smart speaker] reads out the news to me, tells me about the weather and gives a traffic prognosis for my commute to work. It saves me three Google searches" (Marc, age 20, male)

This scene, a regularly repeated chain of tasks that the SVIT executes on user request, has become an integral part of Marc's day-to-day routine. This ritualistic consumption of the services associated with the SVIT appears so important that informants expressed a feeling of yearning if they were unable to conduct these routines.

The routinization of their SVIT use leads consumers to expand the tasks and responsibilities with which they entrust their devices. For instance, informants indicated that they relied on the SVIT to fulfill personally important iterative tasks without installing a backup in case of malfunction, as is evident from Angela's depiction of her SVIT use before going to bed:

> "In the evening, I usually set the alarm clock on Alexa. I always tell her, 'Set the alarm for seven o'clock'. […] At the beginning, I always checked in the [Alexa] app on my smartphone whether the alarm was really set. I didn't really trust it. Especially if I really had to get up on time and it was crucial that this thing would work. Now, I completely trust it. I have no doubts that she will do what I want her to". (Angela, age 24, female)

Gradually, as shown by this example, consumers gain confidence in their smart device through experiencing integrity, in the sense that the SVIT has repeatedly fulfilled the tasks it has been delegated – to the extent that consumers refrain from installing back-up or control mechanisms. Yet, whereas participants assessed integrity during initial encounters and early post purchase of the SVIT through repeatedly satisfying service encounters with the producing company, as they became more experienced, they began to evaluate on the basis of satisfactory task fulfilment by the technology itself. Integrity becomes decoupled from the producing company and instead attributed to the SVIT.

By increasingly incorporating the SVIT into their everyday routines, consumers establish a closer interpersonal relationship with the device. Similar to previous research (Novak and Hoffman 2019; Schweitzer et al. 2019), respondents related experiences in which the SVIT helped them relax after an exhausting day. For example, David shared his experience of how both the social presence and the functionalities of the smart speaker comfort him when he returns home from a day of work:

> "In the evening, I often tell my [Amazon] Echo to activate the scene 'Relax' or to switch on the TV. He then switches on the TV and dims the lights. […] It [the SVIT] is always active as soon as I return home from work". (David, age 23, male)

Similarly, Sandra recalled the pleasant experience of being welcomed by her SVIT's voice -interface when returning to her flat from holiday and the intriguing illusion of "somebody waiting at home":

> "I was on vacation for two weeks. And when I returned yesterday evening, I entered my flat and said 'Alexa, I am back home'. And she said, 'I am happy you're back'. The funny thing is, she is not really happy, of course. But you think she is. […] At that moment you don't realize you're interacting with a computer who can't actually be happy. You just think: 'Oh, she is happy!' and it feels like she's a real person". (Sandra, age 23, female)

In addition, some informants also expressed their appreciation of the SVITs' voice-interface keeping them company during work days at home. For example, Ralph, who works at home a great deal, explains his morning routine with Alexa:

> "It sounds strange, but when you're in home office, you very often feel lonely. So when I enter my office at home the first thing I say is 'Good morning, Alexa!' and then I get an appropriate reply. That's when my day really starts!" (Ralph, age 28, male)

Thus, during the first post-purchase months, consumers assess the trustworthiness of their SVITs according to antecedents of integrity and benevolence. Whereas integrity is evaluated in terms of the repeatedly satisfactory task fulfillment of the smart technology itself, benevolence-based trust is established through perceptions of the technology as a socially present entity that some perceive as having an interest in its user.

The SVIT as humanlike personality. Up to this point, consumers have determined the trustworthiness of SVITs with reference to a variety of antecedents of trustworthiness – first, with particular regard to past experiences with the producing company, and then with regard to the perceived success of the software performance of the technology. However, with prolonged use of the SVIT, some informants evaluate their device's trustworthiness not so much according to its producer or its performance, but increasingly with reference to its voice -interface. At this stage, the maintenance of consumer trust in SVITs results from an evaluation of perceived benevolence alone. In congruence with the literature on consumer–smart technology relationships and anthropomorphism, some informants reported having attributed very distinct fictitious personalities to the voice -interfaces of their SVITs, with which they have built trusting relationships that resemble interpersonal human-to-human ones.

Commonly, the resulting trust relationships between users and the fictitious digital personalities behind the SVITs become quite close at this stage. For illustration, when asked to elaborate on what the SVIT represents to him, this respondent brought forward instant associations with a human personality that acts in his interest:

> "She [Alexa] is like a person who is very close to me, who fulfills my every wish. […] It [the smart speaker] tries to make you feel good, and it gives me security, and cares about my wellbeing" (David, age 21, male)

In some ways, this comparison resembles the master–servant or partner relationship types proposed by Novak and Hoffman (2019) and Schweitzer et al. (2019). However, David's description differs in that he attaches benevolence to the character. Contrasting the notion of a digital servant (as suggested by Luger and Sellen 2016), he attributes agency to the fictitious personality to the extent that he perceives that she automatically knows what is good for him.

More precisely, when asked to describe the nature of these fictitious digital personalities in more detail, some respondents drew comparisons to parental figures, suggesting a child–digital parent relationship between users and their SVIT. For instance, for Angela, the fact that Alexa appears very helpful and interested in her personal progress reminds her of her father:

> "I have the feeling she knows a lot. […] My father is very similar. He's also very knowledgeable and if he doesn't know something, he will look it up and try to help me. She [Alexa] does exactly the same". (Angela, age 24, female)

In much the same way, for this male informant, the imagined character traits of his SVIT's voice evoke associations with those of his mother:

> "She is very strict, but also very clear. […] Just like my mother". (Marc, age 20, male)

Many of these parental associations are confirmed in the use patterns that informants described during the interviews. For example, when informants found themselves under stress or psychological tension, they reported seeking relief through interacting with the SVIT. In doing so, the SVIT was instructed to assume roles that are traditionally attributed to parents. Marc, for example, narrated how he uses Alexa in the evening to calm down by activating the devices' sleep timer and letting it play soothing sound effects:

> "[W]hat I like doing every now and then is to ask her to play the sound of thunder so I can fall asleep. […] It sounds strange but it's so comforting". (Marc, age 20, male)

Similarly, other informants reported enjoying having fictional stories read aloud in the evening by their SVITs to help them fall asleep.

At this phase of trust formation and maintenance, it becomes clear that the SVIT is now no longer exclusively considered a technological device that either functions correctly or

not. Rather, consumers have developed stable interpersonal trust relationships with the fictitious, often parental character they attribute to the voice -interface of their device. The SVIT, personified by the attributed personality of its voice -interface, is deemed a compliant and sympathetic companion who has an interest in its user's physical and psychological wellbeing.

The idea of a user–digital parent relationship between consumers and smart technology is further supported by informant reports suggesting a form of digital puberty. Although having committed to close interpersonal trust relationships with their SVITs, informants reported that with prolonged use, they increasingly set barriers to the capacities of their devices. Thus, users explained that deactivating the microphone of their smart speaker, thereby stopping the recording function of the device, gave them a feeling of security, especially when talking about sensitive topics. Likewise, informants appreciated the possibility to easily alter the location of the SVIT. In particular, this means that respondents utilize the fact that smart speakers do not have an independent battery, but instead are bound to a plug socket for power supply. Thus, by pulling the plug, the smart speaker can be deactivated completely and removed from its position. This spatial flexibility enables moving the SVIT when its presence is unwanted, for instance, when wanting private time with a significant other.

At this phase of trust development and maintenance, consumers evaluate trust on the basis of emotional (i.e., benevolence) factors alone. They have developed close interpersonal relationship with the fictitious personalities, which they attribute to their SVIT's voice interface. The majority of informants additionally associated character traits with these fictitious personalities that resemble those of their own parental figures. The impression of a user–digital parent relationship is additionally supported by consumer patterns of SVIT use.

The results of this study are in line with research on anthropomorphism, media equation theory, and consumer–smart technology interaction; they add another layer to our understanding of relationship types that consumers build with smart technology, in that they propose another specification of the smart-technology-as-partner relationship type (Schweitzer et al. 2019). Extending on Schweitzer et al. (2019), we suggest that consumers consider smart technology as not just either a romantic partner or "digital child"; we deem it possible that the context of the home, in contrast to the studies performed with SVITs on mobile smartphones, affects anthropomorphic inferences of

consumers. Rather than "Tamagotchi"-like associations for smartphones that might facilitate a "digital-child" association, we propose that the home context elicits domestic ideas beyond that of helpful servants and closer to caring, digital mother figures (see also Phan 2018).

Study 2B: Non-Anthropomorphism-based Paths to Trust

Method and Analysis

Although Study 2a's results suggest that consumers develop and maintain trust in their SVITs with particular reference to the perceived personality of the SVIT voice -interface, we acknowledge that anthropomorphism of SVITs constitutes only one possible path to consumer trust in smart technology.

Considering that anthropomorphism is always conditional and by no means a uniform occurrence (Culley and Madhavan 2013), we conducted another study to investigate alternative paths to consumer trust in SVIT. In doing so, we aimed to better understand the multi-layered nature of consumer trust in SVIT.

Extending the theoretical framework and the results generated in Study 2a, we explored how consumers build non-anthropomorphism-based trust in SVITs, again using the case of smart speakers. We conducted semi structured interviews with smart speaker users from all over Germany (n = 17) (for more details, see the Appendix). As in Study 2a, informants were encouraged to invite us into their homes so that the interviews were performed in close spatial proximity to the SVIT, thus ensuring context specificity. That way, SVITs became an active part of the interview, again with the particularity that this time, informants were often eager to demonstrate to us their smart devices' abilities (e.g., Alexa telling jokes, meowing like a cat).

We applied a mixed strategy of network and snowball sampling (Durdella 2019). Specifically, we recruited informants within our personal networks, and from a medium-sized university campus in southern Germany. After each interview, we asked informants to recommend additional respondents who might be interested in participating in the study. To include respondents in our study who had just acquired the technology, we set a criterion for study participation of the possession of a smart speaker for an unspecified period of time. Thus, our sample included longtime owners (more than three years) as well as technological novices (less than a week). Upon completion of the interview, each informant received a small gift voucher.

Interview questions from Study 2a served as a basis for this study but were extended with questions aimed at consumer–smart object assemblages, as well as questions investigating relationship types (Novak and Hoffman 2019). We personally conducted all interviews in German, recording each interview digitally. A professional academic interview transcription service provided transcripts of the interviews. We checked all transcripts for accuracy and subsequently conducted structural content analysis on the original German transcripts to extract patterns and structures from the data (Mayring 2015). Adhering to the interpretivist research paradigm, we went through three rounds of coding and resolved all disagreements through discussion.

Results

As Novak and Hoffman (2019) and Schweitzer et al. (2019) suggest, consumer–smart technology relationship types are always attached to certain (anthropomorphic) roles that consumers attribute to their technologies (e.g., partner, servant). Therefore, we took informant descriptions of their smart speakers' role as a point of departure for the analysis of this study. The interview data showed that the results from Study 2b are consistent with these in Study 2a, (e.g., with regard to parental associations with the SVITs' voice), yet these findings did not prevail in Study 2b. Instead, for respondents in this study, SVITs occupied a non-anthropomorphic functional role, for example, that of a tool. Departing from these role attributions, we could identify three prominent paths to non-anthropomorphic consumer trust in SVITs (Lemon and Verhoef 2016). The following subsections present detailed findings.

From friends and family to domain-specific trust. Similar to the initial contact situations in Study 2a, the main path to trust development and maintenance was that of consumers who initially did not own a SVIT but who decided to purchase one after coming into contact with the technology at friends or family members' homes. In particular, we found that in non-anthropomorphic trust development, friends and relatives could function as a driving force, by acting either as a source of information on the SVIT or as gift giver of the technology itself. Informants reported having several people in their circle of friends and family who owned a SVIT. Thus, they had the opportunity to explore the features of the technology. More precisely, some respondents reiterated having had an initial interest in the technology, while simultaneously having an urge to gather information about the technology's abilities from people they considered trustworthy. In close connection, informants recalled stories of how they were in fact interested in the

technology but waited for a price suitable to them. For example, Carl explained his initial hesitation before purchasing an SVIT as follows:

> "My best friend has four Alexas in his shared student flat, these little Echo Dots. And they [the roommates] have these smart plugs, so they switch on their lights with these things. I always liked that, but I thought it was too expensive. […] For a price of 40 Euros, I had to think twice about buying it".

It becomes obvious here that some consumers use the technology's price as a proxy cue for the level of risk involved in the act of trust. Yet the technology's price constitutes only one factor in the perceived risk associated with the decision to rely on the SVIT. The evaluation of the SVIT's trustworthiness, in contrast, is conducted in terms of its abilities, as Claire's line of reasoning explicates: "I always thought '60 Euros just to switch my lights and my heating on and off by voice? I don't need that!' But then I experienced it a few times at my boyfriend's place and I figured 'It's actually cool to have!'. And then, when it was on sale for 20 Euros, I thought there is nothing I can do wrong and treated myself to it".

After having acquired the SVIT, informants reported that they were surprised by the ease of installation of the device itself, as well as the compatibility of add-on technology (e.g., smart light bulbs). Thus, informants such as Rudy highlight the seamlessness and intuitiveness of the SVIT right from the beginning, which gave him the impression of being able to actively influence the device's function:

> "I don't know why, but it's self-explanatory. The words and sentences you need to say, […] you know them from the ads. […] You can simply say things and he [the device] gets it! […] Quite simple really and somehow you know everything already".

This impression of knowing how to order the technology to do something and of being able to predict the outcome of this order was important to several informants. This perceived ability to predict and reproduce outcomes of orders to the SVIT can be viewed in light of Mayer et al.'s (1995) antecedent of integrity, that is, of repeatedly positive experiences with the technology.

Respondents also recounted how their use of the technology gradually faded after their initial enthusiasm, and they increasingly limited the scope of applications of the SVIT to a handful of repetitive tasks. Thus, in the long term, consumers on this path of trust

predominantly form domain-specific trust in their devices, limited to domains in which failure of the SVIT is unlikely to result in financial losses. For example, Rudy responded as follows to the question of whether he would use the online shopping function of his SVIT: "I would never do that! I would rather shop with my smartphone or iPad. I could probably trust Alexa in this respect, but somehow, I don't. […] I think the point is that it's about money and I am careful when it comes to that".

In summary, consumers on this path to trust in SVIT collect information about the devices from friends and relatives to determine the SVIT's scope of abilities. The technology's price as well as financial losses associated with it serve as a proxy cue for the perceived risk involved in the decision to rely on the SVIT. Therefore, trust in the smart device is predominantly evaluated based on perceived abilities of the technology and is specific to domains, in which its failure would not result in any financial drawbacks. The domain-specificity of trust is also evident in the assemblages in which consumers embed their smart technologies. Most often, consumers link their SVIT to smart light bulbs or plug sockets, that is, to technologies that do not execute important tasks independently. Agency of the smart technology in this assemblage is therefore rather low. Interestingly, consumers on this path to trust rarely mentioned the perceived threat to their personal data (see Study 1) as a risk worth considering.

Familiarity with the technological ecosystem. Consumers on this path often reported having many years of experience with the company producing the technology and being firmly rooted in its technological ecosystem. The evaluation of potential risks is therefore often suppressed by individual curiosity in the device, as Tim's account of acquiring his first of three SVITs illustrates:

> "Let's put it that way: I am a tech nerd! I am always open to new technological devices. Basically, Amazon was the first on the market and I was eager to experience the device. So, I got myself one of those small Echo Dots, because they were only 60 Euros and so this thing didn't put a hole in my pocket. […] And if I didn't like it, I could probably sell it on eBay again".

Likewise, consumers on this path reported having devoted considerable effort to finding the device that suits them best. For example, Bill describes how he decided on his device by purchasing different models from different producers to test them at his home:

"I am very rooted in the Google universe, I have to admit […] so I decided to go for Google first, because Amazon might have had the skills [i.e., the software applications that run on the SVIT] but I didn't like the voice. […] I have also ordered an Alexa once, to compare it to my Google device. I asked both devices the same things and noticed that it just feels more natural to stick to Google".

As these two accounts show, consumers on this path of trust are less sensitive to potential technology-induced losses and usually have some amount of institution-based trust, which they transfer from the producing company to the device (Rousseau et al. 1998).

Our findings here are in line with existing research on brand trust and extend to its transfer in an SVIT context (and beyond). Our data suggest that consumers, through their long-standing rootedness in the technological ecosystem of the SVIT producer, have developed high levels of brand trust (e.g., in Amazon). This form of trust gives consumers the feeling of security that the platform brand and its product (in this case, the SVIT Alexa) will meet their expectations (Delgado-Ballester and Munuera-Alemán 2001). Brand trust therefore not only fosters consumers' purchase loyalty toward the brand but also lowers the perceived risk involved in the decision to purchase the SVIT (Chaudhuri and Holbrook 2001; Elliott and Yannopoulou 2007). Thus, consumers perform a downstream transfer of the trust they have in the brand onto the brand's product, thereby making a leap of faith to grant trust in the unknown technology. Although informants in our study clarified that after the product purchase they reevaluated the technology's trustworthiness (e.g, in terms of its perceived integrity and abilities), importantly, none of our informants mentioned such reevaluation of the platform brand. However, it remains to be explored whether these trust transfer processes can also have upstream consequences (e.g., in case of perceived trust betrayal through the SVIT).

These consumers embed their SVIT within fairly extensive existing consumer–smart object assemblages (Hoffman and Novak 2018). Frank, a particularly savvy user of smart technology, explains how he distributed a range of SVITs within his house to simplify his daily routines:

"We have a smart speaker in our kitchen to set timers and alarms. We also use it to activate our lawn mowing robot. […] Then there is one in the bathroom, […] one in my daughter's room to call her when dinner's ready, […] one in the basement to open and close the garage, […] one Sonos speaker with Alexa to listen to music, and finally, there is the Echo Show [smart speaker] in the hallway.

[…] Theoretically, I would put a smart speaker in every room of the house, as long as it adds value".

Consumers on this trust path calculate potential gains and losses associated with the technology. In contrast to the previous path, however, their focus is not so much on potential losses as it is on gains for the overall assemblage, that is, the estimated contribution of each device to the assemblage. This is of particular importance, as informants such as Frank highlighted their intention to ascribe the technology with high levels of agency and autonomy. Thus, consumers on this trust path evaluate the device's ability (in the sense of skills contributing to the overall assemblage) as well as integrity (in the sense of reliable and repeated task completion) as indicators of its trustworthiness.

Taken together, users on this path to consumer trust have many years of positive experiences with their SVIT's producer, while simultaneously being rooted deeply in its ecosystem. Institution-based trust is therefore transferred from previous interactions with the technology producer to the technology itself. Additionally, consumers evaluate the SVIT's ability and integrity by how it could enrich their pre-existing assemblage of other smart home technologies.

The partner as initiator of trust. In contrast to the other two paths, with the third path to consumer trust, engagement with the SVIT results not so much from an active decision to adopt the technology; rather, these consumers support the adoption decision of another member of their household, very often their partner. Informants on this path reported that they themselves did not initially share an interest in the technology and even had doubts about it, particularly when it came to privacy. Yet, these concerns were resolved to some extent by trust in the capabilities of their partners, as Monica's account of her Amazon SVIT shows:

> "I share my apartment with my boyfriend, who is very enthusiastic about all things technical and innovative. He was also excited about smart speakers. And when Prime week came [promotional event of Amazon] he snapped at the chance and we bought Alexa. […] At first, I was skeptical, because I thought 'You will be tapped completely, and people will listen to what you are talking about. But my boyfriend's enthusiasm was difficult to calm down. And then he also eliminated some of my concerns. […] I think that if you do not have some trust in this technology, you will lag behind".

As this example shows, users on this path base their initial trustworthiness assessment on the perceived abilities of their partner. They reason that because the partner is so enthusiastic about technology, (s)he will essentially know whether the technology can be trusted. In that sense, consumers on this path build relationship-based trust in the technology that is first grounded in trust in their partner's judgment.

Despite initial doubts, consumers on this path to trust reported that the SVIT was quickly integrated into their routines of shared living, for instance, when listening to the news together in the morning or to simplify grocery shopping, Sophia explains: "By now, I use Alexa at least as much as my boyfriend. […] Mainly, the two of us use it to share shopping lists. So, when you are going around town, you can quickly check it on your phone. Or we share to-do lists. […] So really only things that are important in daily life".

Interestingly, consumers on this path also displayed trust evaluations based on the perceived inabilities of smart speakers as a technology – although data security and privacy was of particular importance to all informants on this path. When asked if and why she trusts her SVIT, Monica stressed the reassuring impression that the inabilities of her smart speaker gave her:

> "I don't have the feeling that she really memorizes anything yet. She doesn't switch on the lights by herself or sets the alarm herself. We need to order her to do all of these things. And as long as this is the case, I trust her. I would find it strange if she took over thinking for me".

Thus, the perceived inability of the SVIT beyond a certain level serves as an antecedent in the evaluation of the devices' trustworthiness, implying that the consumer has at least some degree of control over the device itself and therefore is able to predict its actions.

Consumers on this path again displayed anthropomorphic tendencies toward the technology. For example, Claire describes how her partner uses the SVIT in other ways. In doing so she recalls one particular situation: "For me, Alexa is a receiver of my orders. Nothing more. But sometimes you catch yourself in situations where you forget that. I remember my boyfriend and I lying in bed one morning when Alexa was still new at my place. And my boyfriend was talking so much to her that I thought, 'Okay, it's still a new thing, but this is going to have to change'. […] In the first week, yes, she was definitely competition for me". Although the informant in this situation is aware that her SVIT is essentially a nonhuman device, she is jealous of it, as it attracted her boyfriend's attention.

On this path to trust, consumers do not actively decide to acquire the SVIT themselves but instead are affected by their partners' decision to introduce the technology into their shared space. Therefore, they indirectly place relation-based trust in the technology by relying on their partner's perceived technological competencies. With prolonged use, the SVIT is integrated into routines of shared living. Yet, trust is determined mainly according to the individual feeling of being able to predict the technology's actions. Consumers on this trust path are also likely to resort to anthropomorphic interpretation patterns.

In summary, Study 2b illustrates the development and maintenance of consumer trust in SVIT based on non-anthropomorphic reasoning. Our analysis suggests that consumers follow at least three possible paths to trust in the technology, in which different reference points and heuristics are used as cues for trustworthiness evaluation. We acknowledge that these paths are by no means as clear-cut as their presentation here might suggest, instead, mixtures and constellations of paths are very likely, such as constellations in which one partner is affected by the technology enthusiasm of the other, while this other partner follows the familiarity with the ecosystem path to trust in the device. Additional empirical research is needed to clarify the distinctions between the paths.
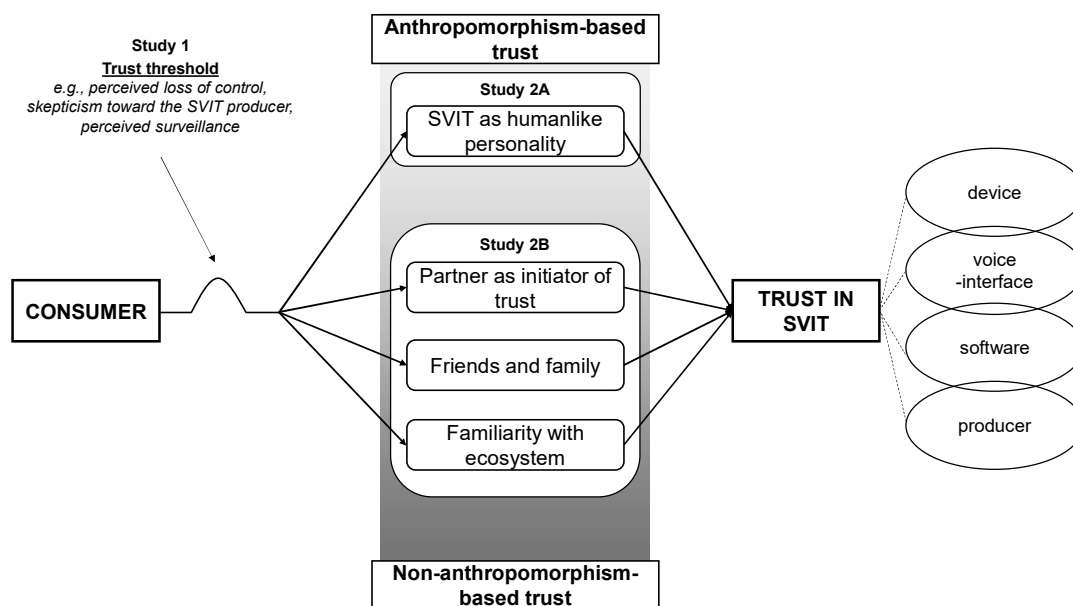
Figure 9: Consumers follow four paths to trust in their SVIT, which can be differentiated according to the degree of anthropomorphism involved. Consumers build trust in SVIT with multiple and entwined reference points in mind. Before a trust relationship can develop, consumers have to cross a perceived trust threshold.

Source: Own illustration

Conclusion and General Discussion

This article aims to close the gap between consumer adoption of and relationship building with smart technologies. Across three qualitative studies, we (1) delineate critical dimensions constituting the threshold of consumer trust in SVIT and (2) identify four paths to trust in SVIT. In accordance with existing research on anthropomorphism, we found that on one path, consumers tend to anthropomorphize smart technology, building close trust relationships with the perceived personality of their smart SVIT. Our findings extend this research by providing evidence for additional facets of smart-technology-as-partner relationship types (Schweitzer et al. 2019), as well as for more intimate forms of partnering as a consumer coping strategy for managing the paradoxes of smart technology.

In addition, our research identifies three non-anthropomorphism-based paths to consumers trust in SVITs, in support for research suggesting that anthropomorphism is not necessarily an automatic response to nonhuman products (Culley and Madhavan 2013): First, consumers resort back to friends and relatives as reference points of trust. Second, consumers transfer institution-based trust from technology producers to their devices. Third, consumers use their partners as proxy for relation-based trust in the smart technology.

Our results connect with existing research by linking research on consumer adoption of smart technologies with those on consumer-technology relationship development. Expanding on Novak and Hoffman (2019), our work can help shed light on why consumers allow some technologies but not others to adopt agentic roles within an assemblage. Our findings are important for marketing research, as they can explain why consumers integrate some technology so intimately in their lives and have high levels of trust in it while remaining reluctant to use its purchase function (Claudy, Garcia, and O'Driscoll 2015; Mani and Chouk 2017).

With regard to trust and consumer research, our findings highlight the importance of understanding the particularities of trust in artificial intelligence devices, for example concerning reference points of trust relationships and their impact on consumer–smart technology interaction. Similarly, our results echo recent findings on how consumers integrate their social environment into the adoption of technology and trust development (e.g., Xu, Mehta, and Herd 2019).

Last, although we use smart speakers as specific case in this study, our research contributes to the general understanding of human–AI interaction. In particular, our findings provide insight into how consumers perceive and interact with technology that can convey impressions of emotion and empathy (McStay 2018).

As Belk (2017) remarks, consumers are paradoxically fascinated and anxious about smart technology at the same time. Thus, the results presented here open up a variety of directions for future research. We view trust as the cause of extensively studied problems such as consumer privacy concerns with technology. Merging our findings with those relating to privacy concerns, researchers could examine how the level of trust in smart technology affects consumer willingness to reveal private information. Future research could also investigate SVITs' role as a supportive service agent during online purchase processes. Thus, it could be particularly interesting to evaluate consumer acceptance of advice from the SVIT in relationship to the overall level of trust in smart technology.

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5 When Smartness Comes From the Analogue – The Hybrid Context Dimension of Smart Services (Conceptual Paper)

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Introduction

When Apple released its first iPhone in 2007, the world of tech-fans and marketing researchers was in awe. Apple had invented an entirely new product category: the smartphone. Almost fifteen years later, the iPhone finds itself in its 13th generation and smartness as a feature of all sorts of technical devices appears to be the norm rather than the exception (Alt et al. 2019). Even before the introduction of the first iPhone, marketers imagined the existence of smart services: services that would be made possible through the widespread diffusion of smart devices and that would allow marketers to predict service provision using vast amounts of consumer data (Allmendinger and Lombreglia 2005) – a concept that also resonated widely among service researchers. Today, service research has thoroughly investigated the characteristics of smart services (e.g., Wünderlich et al. 2015), has researched the ways through which smart services are delivered (e.g., Vorhees et al. 2017, De Keyser et al. 2019), and how they enable interactions between service providers and consumers (and thus create value) (e.g., Larivière et al. 2017; Beverungen et al. 2019). Smart services, however, are not delivered in a vacuum; instead, consumers deploy smart services while being situated in a variety of contexts, some of which have been included in service research projects (e.g., Chandler and Vargo 2011). Despite these efforts, most works in the field have remained vague in terms of the physical context within which smart services are delivered. While some research projects have interpreted the physical context primarily as input data for smart devices (Beverungen et al. 2019), others have acknowledged that marketers should consider the use contexts of their smart services to correctly determine which technological capabilities are necessary for service delivery (Porter and Heppelmann 2015). Nevertheless, as of yet it remains unclear how the physical service context impacts smart services and in what ways smart services affect their physical service contexts in turn. The chapter at hand sets out to answer this research question by developing a conceptual framework of hybrid context impact.

We begin this chapter by briefly outlining the concept of smart services as it has developed within and beyond the service marketing discipline. Building on this, we then explore how value with smart services is generated, both from a service-centric and consumer-centric perspective and problematize how extant research paradigms have overlooked the impact of physical contexts on smart service provision through the adoption of a narrow, technology-focused perspective on smart services. After the

development and discussion of our conceptual framework, possibilities for future research will be identified.

Of archetypes and taxonomies – Making sense of smart services

More than one and a half decades ago, Allmendinger and Lombreglia (2005, 1) in their seminal article in the Harvard Business Review forecasted the "Age of the Smart Services". They predicted that a time would come in which it would be insufficient for companies to merely sell their tangible products or to provide services in order to survive market competition. Instead, companies would need to sell *connected* products and devices which generate unprecedented amounts of data and that – because of their connectedness – allow for the provision of new and ultimately "smart" services (Allmendinger and Lombreglia 2005). These smart services, the authors proclaimed, would be preemptive (i.e. they would automatically predict the optimal moment for service provision and thus "remove unpleasant surprises" for consumers), they would depend on "machine intelligence" to process vast amounts of data, and would create hitherto unknown kinds of value for both service providers and consumers (Allmendinger and Lombreglia 2005, 2).

By now, the idea of smart services has not only diffused from marketing practice into academia, but also found its way into a plethora of scientific disciplines apart from service science, such as information systems or engineering. As it trickled through the disciplines, the general understanding of smart services has been continuously specified and extended, while essentially still building on the original conceptualization provided by Allmendinger and Lombreglia (2005). Across disciplines, literature widely agrees on the basic characteristics of smart services: At their core, smart services are considered as services which are made possible by and delivered via smart devices (Wünderlich et al. 2015; Gonçalves et al. 2020, Paukstadt et al. 2019). As such, they depend on the technological properties and characteristics of their smart carrier devices, such as the availability of unique identifiers, sensors, data storage and processing capacities, the existence of actuators, and device interfaces that allow for consumer interaction (Beverungen et al. 2019). Smart services have been found to exist in five archetypical ways: 1) as the execution of environment monitoring activities (e.g., energy efficiency monitoring in smart homes), 2) as diagnostics and automation functions (e.g., smart thermostats that autonomously adapt room temperature in smart homes), 3) as execution of consumer commands (e.g., smart light switches in smart homes), 4) as tracking of

personal (human) consumer data (e.g., smart mattresses that track consumers' sleep quality), and 5) as (trainable) consumer assistance (e.g., smart voice-interaction services such as those offered through smart speakers) (Fischer et al. 2020). These archetypes underline that smart service provision is enabled through smart devices or objects and their technical capabilities in the first place (Beverungen et al. 2020), while the feature of "smartness" seems to be "inherited from the object by the service" (Boukhris and Fritzsche 2019, 2). In other words: smart services gain their characteristics of smartness through the capabilities of the technological devices that mediate these services. Some authors have therefore pointed toward the tight practical and conceptual connection between smart products and smart services (e.g., Boukhris and Fritzsche 2019) and have advised caution that too strong a focus on this bond may obscure a fuller understanding of the actual smartness of smart services.

In response, Paukstadt et al. (2019, 4) find that smart products in the context of smart services are not only said to lend their smartness capabilities to the services, but also to serve as a service platform, thus "blurring traditional distinctions between goods and services." Likewise, Paluch (2017) has argued that it is particularly through the interconnection of various smart services in certain settings (e.g., in smart homes or in smart industrial manufacturing lines) that service providers can implement new business models, offer new value propositions, and therefore leverage smart services (and not so much the smart devices mediating these services) to build new forms of customer relationships. In the context of smart services, as Beverungen et al. (2019) have illustrated, smart devices constitute not only a technological precondition for the provision of smart services, but simultaneously serve as boundary objects which mediate interactions between service providers and consumers and hence bridge the (physical) gap between the actors involved in smart service encounters. This way, and because of the interconnection of smart devices and services, a network structure is established which situates individual smart services within larger smart service systems (Beverungen et al. 2020), in which service providers, organizations, technologies, and consumers can "network their resources and activities for mutual advantage" (Beverungen et al. 2019, 16; Maglio and Lim 2018).

Especially in the information systems discipline, the abstract nature of smart services has initiated the emergence of a variety of smart service taxonomies (e.g., Fischer et al. 2020; Boukhris and Fritzsche 2019, Paukstadt et al. 2019). While such works tend to somewhat vary in their taxonomic conditions and choice characteristics for smart services, they

share a predominantly technical focus on smart services and consumers' perceptions of service smartness. As a result, they support the impression that smart service literature considers smart services and the systems within which they are provided first and foremost as a phenomenon that occurs in a digital realm. In a similar vein, research on consumer resistance toward smart services has only briefly touched upon the analogue, physical dimensions of smart services, for instance by investigating the impact of perceived intrusiveness of smart services (e.g., Mani and Chouk 2019).

By and large, smart service literature has generally tended to overlook that most smart services are essentially hybrid in nature: that is, for all their digital characteristics the usually have some form of analogue, physical manifestation that goes beyond the presence of the smart service-mediation device within a physical context (Foehr and Germelmann 2022). To make a case in point, think of a smart thermostat system in the context of a smart home (i.e. a smart service system). The smart thermostat (i.e. the smart device) through its sensors may sense the presence of a consumer within a room and, because of its build in actuators, initiate the adaptation of room temperature (i.e. provides a smart service). While the sensing of human presence and the actuation of temperature change is primarily a digital act of data processing and exchange, the smart service manifests itself and ultimately gains meaning through its effect in a physical setting (i.e. the resulting change in room temperature). Without this physical manifestation the smart service would be reduced merely to a computational, algorithmic process, likely to be unperceived by the consumer.

In short, smart services and the service systems that develop around them are generally considered as a networked configuration of consumers, smart devices and other (unspecified) resources with the aim of creating mutual benefits (Beverungen et al. 2020). Hence they mainly constitute a socio-technical setting or arrangement. Although literature acknowledged that the smart devices that cross the boundaries between consumers and service providers have some form of location (i.e. they are situated in a certain physical context) and share some form of context awareness as a technical capability (Beverungen et al. 2019), the role that the physical locus plays in the meaning-making and value creation of smart services is neglected in most works on smart services. To address this shortcoming, we will therefore first examine value creation of smart services before investigating in more detail the mutual impact of smart services and their physical service contexts in the following paragraphs.

Value generation with smart services: The service-dominant logic perspective

Since smart services challenge established notions of market exchange (Paluch 2017), the process of value generation with smart services has been predominantly investigated from a service-dominant logic (SDL) perspective. In this view, value generation is not considered in terms of the transactional exchange of tangible goods for other goods (e.g., money), but rather as a process of service-for-service exchange, in which resources are applied and integrated by different actors involved in a service encounter, with the aim of creating mutual benefits (Vargo and Lusch 2017). Proponents of the SDL view on smart services therefore consider value in smart service encounters as the outcome of a shared form of actor engagement – it is essentially the result of a co-creation process (Paukstadt et al. 2019).

Although service researchers still debate whether smart devices generally have favorable or detrimental effects on service provision (Mele et al. 2018), the SDL research community agrees that value co-creation with and through smart devices can only be meaningfully conceptualized through the adoption of a systems-oriented perspective on value (Vargo et al. 2017b; Kaartemo and Helkkula 2018). In so doing, researchers acknowledge not only that the value of smart services is co-created but also that it is 1) multidimensional (i.e. made up of individual, social, cultural and technological fragments), 2) emergent (i.e. "it comes into existence through relationships between an actor and the system"), and 3) that it is of a phenomenological nature (i.e. actors in varying contexts experience value creation differently) (Kaartemo and Helkkula 2018, 212). In this system of value co-creation, the smart devices that mediate service encounters function as both operand and operant resources (Mele et al. 2018): they represent entities that require to be acted upon but simultaneously are able to take action themselves, for instance based on their knowledge acquired through past service encounters and consumer interactions. Therefore, smart technologies not only transmit or mediate smart services, but the devices themselves become resources that are integrated by actors (that is, consumers and service providers alike) in order to co-create mutual value (Vargo and Lusch 2017). Thus, as Vargo (2018, 202) essentially posits: "service equals technology used beneficially."

Because of the smart devices' centrality in the value co-creation process, a variety of scholars have called for a shift in research paradigms and have suggested to consider technology in general, and smart devices in particular, as existing on equal terms as

consumers on the one hand, and as being inseparable from human consumers on the other hand. This post-phenomenological view on smart services accounts for the fact that for consumers, smart devices do not merely represent neutral objects. Instead, consumers have been shown to build various kinds of relationships with their smart devices, which often take the form of friendships, master-servant relationships or even family ties (Hoffman and Novak 2018; Novak and Hoffman 2019; Schweitzer et al. 2019; Foehr and Germelmann 2020). For consumers, the smart devices therefore do not act as neutral mediators of smart services but instead impact the ways in which they see and experience the world as well as how they experience value co-creation (Mele et al. 2018; Kaartemo and Helkkula 2018; Kaartemo, et al. 2019). Among others, post-phenomenology additionally recognizes that within smart service systems agency does not exclusively reside with service providers or consumers, but that instead, smart devices can also take action and therefore initiate or terminate smart service encounters (Kaartemo et al. 2019). Hence, the idea that service providers actively make value propositions to consumers – a central notion in "traditional SDL" – is difficult to hold for smart service encounters (Siddike and Kohda 2018). On the one hand, this is because smart devices may decide for consumers whether to initiate a service or not (and thus engage in value creation outside of consumers' consciousness). On the other hand, many smart services are continuous and thus difficult to delineate on a temporal scale; in other words: it is complex to determine where the service begins and where it ends (Fischer et al. 2020). For illustration's sake it may be helpful to think of a smart voice-interaction technology (SVIT) like the Amazon Echo smart speaker, which can be controlled through consumers' vocal commands at any time. To allow for this functionality, the SVIT possesses always-on microphones which enable constant monitoring of consumer requests and thus constant availability. In an abstract sense, this constant availability 1) qualifies as a smart service as conceptualized above, and 2) constitutes a service in its own right without temporal limitations unless they are imposed by consumers or through infrastructural failure (e.g., missing internet connection). The value of such smart services, however, may only be perceived in active use (i.e. as value-in-use) when consumers consciously address the device and thereby utilize the technology's always-on functionality (Chandler and Vargo 2011).

At the same time, because of the networked nature of smart service systems, service provision and service mediation or delivery may be difficult to be correctly attributed by consumers. Put differently, because smart services are mediated through smart devices,

which may be located in consumers' physical vicinity, and which consumers may perceive sensorily, consumers may tend to attribute the service rather to the smart device than to the actual service provider (Foehr and Germelmann 2020). Again, consider a smart home context, in which consumers have assembled a variety of smart devices within a certain hierarchical structure (e.g., so that they are able to control their smart light bulbs via their SVIT) (Hoffman and Novak 2018; Novak and Hoffman 2019). A consumer in this case may enter a room and command the SVIT to turn on the lights. While strictly speaking, the processing of the voice command through the SVIT constitutes one smart service, the transmission of this command and the switching on of the smart light bulb constitutes another. However, research indicates that consumers may attribute this chain of delivered services to a single service provider only (here, the SVIT for instance).

In summary, smart service literature has mainly adopted a service-dominant logic stance toward smart services, which considers the emergence of value as a co-creation process that is directly or indirectly initiated and controlled by the smart service provider. In smart service provision, the smart device not only transmits the service but likewise 1) becomes a resource integrated in the value co-creation process, and 2) can take agency and initiate service provision for consumers (i.e. it becomes an actor in the value co-creation process). Because of the difficulty of determining the temporal scale of some smart services (i.e. where they begin and end) their perceived value to consumers often only unveils in active and intentional use, although the service as such may continuously but unconsciously create value for consumers.

Value generation with smart services: The customer-dominant logic perspective

As the previous paragraphs have indicated, a considerable amount of literature on the value of smart services has adopted a service-dominant logic perspective. At first glance, this stance appears straightforward: SDL and its analytical focus on service systems and service ecosystems (Vargo et al. 2017a) matches well with the infrastructural network or assemblage setup (Hoffman and Novak 2018) of smart devices and the services enabled through them. Additionally, the notion of value co-creation through resource integration performed by actors involved in the co-creation process resonates with recent empirical findings, for example on consumers' DIY smart home building (Harvey et al. 2020). Moreover, SDL accounts for the fact that non-human objects can serve as actors in the value co-creation processes of smart services, and thus embraces the unique technological capabilities of smart devices. In the same vein, SDL postulates that value co-creation

occurs at the moment of interaction among the actors involved in value co-creation (Mele et al. 2018). These interactions, for example between consumers and their smart devices, constitute an essential component of smart service provision (Beverungen et al. 2019), in which smart devices mediate consumer – service provider interaction and in that way enable value co-creation. Lastly, with its service provider-centrism, SDL theoretically conforms with the dominant technology push paradigm that has been found prevalent among current research on smart technologies and services (Aldrich 2003; Solaimani et al. 2015).

Despite this ostensible theoretical fit, however, researchers have raised concerns about the explanatory power of SDL, which also pertains to the issue of smart services. Heinonen et al. (2010), for instance, criticized SDL for its narrow, one-sided view on value creation. According to the authors, SDL considers value propositions put forward by the service provider as the necessary precondition for the emergence / creation of value. This assumption implies, as the authors argue that 1) the value of smart services can solely emerge within the fixed, pre-planned boundaries that service providers have set through the value propositions of their smart services, and 2) that this process is exclusively controlled by service providers (Heinonen et al. 2010). In contrast, Heinonen et al. (2010; 2015) suggest that to better understand the perception and emergence of value of (smart) services, researchers would have to change their analytical focus and place consumers at the center of their considerations – thus, they advocate for a customer-dominant logic (CDL), instead. A CDL perspective on the formation of value of smart services counters SDL by not regarding the smart service or the service system as the main stakeholder in value formation, but instead the customer (Heinonen et al. 2015). CDL therefore focuses on the ways in which consumers experience value associated with smart services (which can be both through direct interactions and smart service encounters but also outside of these) and how they embed these services in their lives (Heinonen et al. 2015). Among others this implies that value originates not exclusively from value propositions put forward by the smart service provider but also from consumers' day to day experiences in an "accumulated customer reality where value is embedded" (Heinonen et al. 2013, 109). This means that value is not actively and purposefully created following a deliberate, service provider-led process, but instead is *formed* through consumers' continuous interpretation of their experiences directly or indirectly related to the smart services (Heinonen et al. 2013). The smart device which mediates the smart service is a part of consumers' lives as an object, yet is not granted

similar (actor) status as in SDL. The value of smart services for consumers, according to CDL, hence emerges through their presence within various socio-material and physical contexts – what Heinonen et al. (2013, 112) have termed a "value landscape" – and across episodic interactions with service providers and should therefore be considered the result of a long-term experiential process rather than of single interactions (Heinonen et al. 2013; 2015).

In short, it has shown that a service-dominant logic perspective on value generation through smart services – despite its fit with the research object – may be inadequate to generate a multidimensional understanding of smart service value. In response, a customer-dominated logic has emphasized the phenomenological, experiential nature of (smart) service value, which it seeks to comprehend from a consumer perspective. While we acknowledge the theoretical ambiguities surrounding the concept of value (e.g., Horbel and Weismann 2013), we do not aim to participate in the general discussion about the disciplines' understanding of this concept. However, we conclude that although SDL and CDL may have different perspectives on the subject of smart service encounters as such, both paradigms are conceptually connected in their aim to better comprehend the value that emerges from smart services (see Figure 10).

SDL
- *Service provider*-focused
- Value is *co-created*
- Value originates from *inter-actions*
- Smart device as *actor*
- Service context = *markets and interactions*

Value emerging from smart services

CDL
- *customer*-focused
- Value is *formed*
- Value originates from *customers' experiences*
- Smart device as *object in consumers' lives*
- Service context = *socio-material and physical*
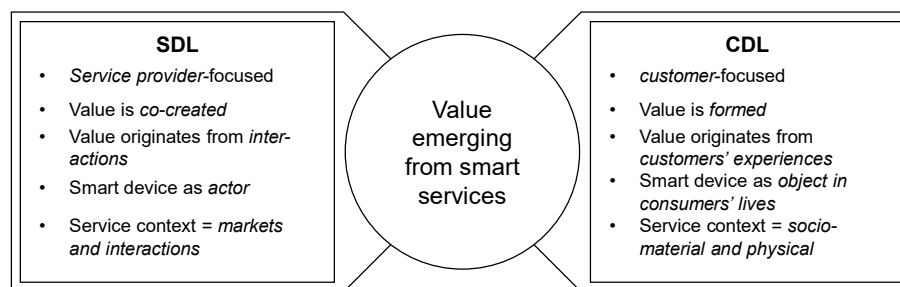
Figure 10:   Paradigms and perspectives on value emerging from smart services

Source: Own illustration

The ambiguous role of physical contexts in the smart service literature

So far, this chapter has investigated the characteristics of smart services and has delineated how these services build on the technical features of the smart devices which mediate them. It has then explored how SDL, as the field's dominant research paradigm, has considered smart services and their mediating devices from a systems perspective, in

which value emerges from the co-creative integration of resources through the actors involved in smart service systems. We have then balanced this account with a customer-dominant logic approach which sees value as the outcome of consumers' diverse experiences with smart services that include but are not restricted to their conscious interaction with smart service providers via smart devices (Figure 10).

Across the previous paragraphs, it has become obvious that in the literature smart services and the value connected to them are mostly investigated in a reductionist manner that 1) favors their digital dimensions, and 2) occupies a technology push perspective that strongly builds on service providers' viewpoints. This is astonishing, given that most work acknowledges that smart services and the devices that transmit them are in some way situated in a certain physical context and that service providers may be unable to impact these consumer-determined settings of smart services. Extending on this conclusion, we therefore argue that smart services and the value that emerges from them can only be understood by incorporating their spatial dimension, or what we would term the smart service locus. The notion of smart service locus implies that – in addition to their digital components – smart services usually have some physical manifestation or outcome that is situated within certain physical environments or settings, such as consumers' homes or workplaces, and which constitutes an indispensable element in consumers' meaning-making and value perception of these services. Mind you: smart service locus is not to be confused with the concept of service locus of control, introduced by Bradley and Sparks (2002), although we do acknowledge that smart service loci often incorporate some level of contextual control for consumers but also for service providers.

In line with recent research, we suggest that much of the value consumers attribute to smart services emerges from the level of perceived smartness (e.g., through experiencing convenience or efficiency gains) which consumers ascribe to the service (Henkens et al. 2021). Consumers' smartness perceptions, however, have been shown to exist somewhat detached from the technical characteristics of smart devices, which are usually adducted to evaluate smartness in current literature on smart services (e.g., Allmendiger and Lombreglia 2005; Beverungen et al. 2019; Rijsdijk et al. 2007). Instead, research in information systems has emphasized the role of context-dependence on consumers' smartness perception of services (Alter 2020). In more detail this means that – depending on the context or smart service locus – consumers consider a service as more or less smart. Hence, a service that "might seem smart along some of the dimensions of smartness within a context might be completely unsmart on those dimensions in another context"

(Alter 2020, 383). In terms of value generation this implies that consumers might perceive a smart service to provide much value in some particular smart service locus, but that same service may be considered valueless in another context. Thus, we endorse Fischer et al.'s (2020) argument that smart services, despite being digital in nature, cannot be separated from the physical surroundings in which the services are delivered, particularly if we want to understand their value generation more comprehensively. Smart services in our understanding are almost exclusively of a hybrid nature, in that the services themselves but also the value connected to them encompasses both virtual and real components.

The conclusion that value creation and consumers' perception of that value are context-dependent, has also been drawn by service scholars, albeit separately from smart services (Vargo et al. 2009). From an SDL perspective, for instance, Chandler and Vargo (2011) note that value creation, and here particularly the ways in which actors integrate their resources, as well as the resources themselves, are dependent upon the context in which they are embedded. Context in this work, however, is not as much understood as physical context or service locus, as this chapter does, but rather in terms of "a set of unique actors with unique reciprocal links among them" (Chandler and Vargo 2011, 40). Therefore, context in Chandler and Vargo's (2011) conceptualization is rather seen as the various forms of interpersonal or inter-institutional connections across different levels of actor engagement and markets (i.e. dyads, triads or more complex networks). These different aggregation levels of contexts, according to Chandler and Vargo (2011), frame market-making and exchange processes. Although subsequent extensions of the concept of "value-in-context" have included social or cultural context dimensions too (Edvardsson et al. 2011; Akaka et al. 2014), research on the physical, spatial dimensions of value and value co-creation of smart services remains scarce (Helkkula et al. 2018). In addition, extant works on value co-creation contexts have defined contexts from a service provider or marketer's perspective and have thus ignored that the phenomenological nature of service exchange implies that actors not only perceive value and value creation differently, but also in different contexts even though conceptually, all actors are part of the same service phenomenon (Helkkula et al. 2018).

Similarly, CDL oriented research has addressed the contextual impact on consumers' value perceptions associated with (smart) services (Heinonen et al. 2010; 2013; 2015). In so doing, CDL has argued that service provision and thus value perception for consumers does not occur within a vacuum but instead is influenced by a "consumer ecosystem" that

encompasses a network or constellation of actors and elements that are of relevance to the consumer regarding a specific service (Heinonen et al. 2010; Heinonen et al. 2015;). This view implies that consumers can experience the same smart services within multiple contexts and value landscapes (Heinonen et al. 2013), which specifically includes different biological, mental, social, geographical, virtual, and physical environments (Heinonen et al. 2013). For the value formation of (smart) services, the authors consider consumers' corporeal presence within a certain physical context as particularly decisive, without, however, presenting detailed arguments for their claim (Heinonen et al. 2015).

Developing the hybrid context impact framework (HCIF)

As Maglio and Lim (2018) have suggested, smart service encounters – irrespective of whether they are situated in B2B or B2C settings – involve a similar set of participants. These are service providers (usually companies or organizations), consumers, and technological devices as mediators of smart services and value propositions. The smart devices can 1) connect human and non-human actors, 2) collect data about the actors and the interactions among them, 3) process the collected data, and 4) communicate with other smart devices and thus actively participate in the generation of value (Maglio and Lim 2018). Depending on the kind of smart services offered, different interaction paths emerge for the actors involved in the service constellation: For instance, consumers' monitoring of their health status via the services offered through a smart watch would require more intense consumer-device interaction than consumers' ordering of an Uber car, which would necessitate more intense interaction between consumers and service providers (Maglio and Lim 2018). Mind, however, in any case all actors of the smart service encounters are involved in the value generation process, albeit to varying degrees. While the interaction among actors can occur in the literal sense of the word (e.g., through consumers' vocal command to a SVIT, or the deliberate use of a smartphone app), it can also be the result of silent or tacit exchange of data from all actors involved (Weiser 1991). For example, smart devices may collect data about consumers and transmit them to service providers, who may then adapt their service provision accordingly (e.g., provide personalized music recommendations in the morning based on sleep quality data). Similarly, service providers may transmit data to smart devices to adapt value propositions (e.g., updating a smart vehicle's software overnight) – in both cases, value is created for consumers without them consciously noticing. Something, which according

to Maglio and Lim (2018, 693) can only be accomplished by providing "smart super services" that incorporate unusually high levels of device autonomy.

While SDL research has paid particular attention to the superordinate service systems surrounding the smart services discussed before, CDL scholars on the other hand have focused predominantly on consumers' perceptions of value across multiple smart service encounters. Interestingly, however, although smart services are enabled through smart devices, few works have considered how these devices and their capabilities affect the participants in smart service encounters and the smart service locus. In the following, we will therefore investigate how smart devices and services impact on their smart service locus, and, vice versa, how the smart service locus affects smart services and the ways in which consumers perceive them. In so doing, our findings will be consolidated in the hybrid context impact framework (see Figure 11).

Hybridization of service experience and service locus

To begin with, we will explore the ways in which smart devices and the services mediated through them impact on the physical surrounding within which they are delivered. As literature on smart service systems has repeatedly emphasized, smart devices rarely constitute standalone technologies; instead, they are embedded in a network of other smart products (Hoffman and Novak 2019). The embeddedness of smart devices simultaneously implies the embeddedness of the smart services mediated through them. The notion of embeddedness in the context of the smart service locus refers to an infrastructural sense (i.e., embeddedness of a single smart device within a network of other smart devices), as well as to a phenomenological sense (i.e., the embeddedness of devices in practices and routines in consumers' lives) (Woodall et al. 2018). The physical embeddedness of smart devices goes along with the increasing miniaturization of their design (Šimůnková 2019). Many smart devices are designed in such a way that they blend into their use context, such as consumers' living rooms (Weiser 1991). The miniaturization of the devices and their embeddedness in consumers' daily routines leads to consumers perceiving the blurring of boundaries between virtual / digital and real / physical service experiences (Kamleitner 2018; Šimůnková 2019). The hybrid nature of smart services – in other words, that they are based on digital processes but have a physical manifestation – along with the characteristics of their smart carrier devices additionally introduces the spatial hybridization of service loci (Šimůnková 2019). For smart services this means that "formerly only physical experiences and interactions now

take place simultaneously in both, the physical and the digital realm", with consumers unconsciously switching between realms during service encounters (Šimůnková 2019, 43). The example of Zwift, a smart service for indoor cycling, may serve to illustrate the point here. As a smart service, Zwift simulates a hybrid cycling experience in which consumers ride their bike on a stationary indoor trainer, which, for example, might be set up in their living room. While actually riding their bikes, consumers simultaneously control an avatar cyclist as their digital representation in the virtual, animated gaming environment of the software (McIlroy et al. 2021). In doing so, the cyclist's analogue efforts are translated into digital successes (e.g., the avatar cyclist rides faster and eventually wins races against other cyclists from the Zwift community), and the topographical affordances from the virtual gaming environment are translated into changes of consumers' analogue perceived exertion (e.g., when consumers ride uphill on the virtual map) (McIlroy et al. 2021). At this point, the smart service has been technically developed to an extent at which it can even mimic different road surfaces from the digital gaming environment in the analogue experience of cycling in the physical smart service locus (McIlroy et al. 2021). Consequently, while being a digital smart service at their core, smart services such as Zwift introduce and build on elements of hybridity and therefore add to the blurring of boundaries between online and offline contexts (Kamleitner 2018). Consumers using these services simply get on their analogue indoor bikes and upon the first pedal revolution transform their living room into the service locus of a hybrid bicycle race. Thus, hybridization concerns the nature of smart services as much as the service locus within which the services are provided.

Transparency of the smart device

The smart device – as the precondition for the existence of smart services – in this progressive hybridization of services and service loci becomes increasingly transparent in consumers' perception; On the one hand because it is so intimately interwoven in consumers' daily routines and practices that its use becomes unconscious and intuitive (e.g., think of consumers' smartphone use). On the other hand, because of its design miniaturization which initiates its blending-together with other smart devices in its network (Kamleitner 2018; Šimůnková 2019). As a result, it is likely that consumers' mental model of their service counterpart may change if the smart device that mediates the smart services is outside scrutiny (Zimmermann et al. 2018): For example, consumers could cease to correctly differentiate among individual smart services (and their respective providers) in a smart service locus any longer – Foehr and Germelmann (2020)

have provided preliminary evidence for this tendency. Rather, consumers would tend to consider the smart service locus as one single smart service in its own right. The service in consumers' perception would then be delivered by the context itself (e.g., the smart living room or the smart factory) and not by a distinguishable service provider.

Re-negotiation of contextual values

In many cases, the idea of smart services – let alone the technical possibilities to deliver smart services to consumers – are much more recent than the environments and service loci in which they are delivered. Most smart service loci therefore constitute contexts that are strongly laden with normative values, such as consumers' homes or workplaces, for instance. The nature of many smart services and the technical capabilities of the smart devices delivering them, however, challenge these established normative dimensions associated with the service locus (Weinberg et al. 2015). For instance, consumers' homes have usually been associated with privacy, security and segregation from the outside world (Mallett 2004). Smart services with their dependence on the capabilities of smart devices, in particular the collection, analysis and transfer of consumer data, seemingly contradict these notions. It has therefore been suggested that smart technologies and the services provided through them have initiated the re-negotiation of normative values connected with certain contexts (Castilhos and Dolbec 2018) or have even transformed contexts that generally excluded (commercial) service encounters before into smart service loci (Maalsen and Dowling 2020). In consequence, smart services not only impact on consumers' perceptions of and associations with the smart service locus on an individual level (e.g., in terms of experiencing hybridity), but similarly also initiate normative re-evaluations of service contexts on a general society level (Guthrie 2013).

While we have explored the impact of smart services and devices on both, their service locus and the consumers experiencing services in them, we also find that smart services and consumers' perception of these are equally impacted on by their service locus (Baird and Riggins 2016). Hence, as the following paragraphs will illustrate, consumers' evaluations of smart services are context-dependent, while many smart services in turn are dependent on their context (i.e. they would be impossible without contextual data).

Physical context as data source

Literature generally agrees that context awareness constitutes one of the fundamental technical capabilities of smart devices (e.g., Porter and Heppelmann 2015; Brill et al.

2019; Roy et al. 2019; Raff et al. 2020). Context awareness refers to the devices' ability to sense and analyze its location and use environment through its built in sensors and to subsequently react and adapt to its context based on the results of its data analysis (Baird and Riggins 2016; Raff et al. 2019). That way, the smart devices that enable smart service encounters can derive information about their own state (Allmendinger and Lombreglia 2005) but also react to its environment or service locus (Baird and Riggins 2016). Smart services are therefore dependent on their physical context in that their service locus serves as a source of data which can be analyzed and utilized by the smart device or service provider to improve mutual value perceptions associated with the smart services. Therefore, the contextual data from their service locus, which smart devices collect and process, form the basis for the provision of preemptive and predictive services, thus of genuinely smart services (Allmendinger and Lombreglia 2005). At the same time, context awareness as a device capability allows for the delivery of autonomous smart services that do not require conscious interaction between consumers and service providers (Schweitzer and Van den Hende 2016). This means that smart devices can leverage their context awareness capability via their interconnection with other smart devices within a service locus to provide meaningful (i.e., context- and situation-specific) services to consumers autonomously (Novak and Hoffman 2019) and thereby utilize the full technological potential.

Physical context as a resource

Service scholars have drawn attention to the resource character of smart devices, which are applied by consumers in the value co-creation processes of smart services (e.g., Beverungen et al. 2020). It has thus been acknowledged that value from smart services can only be generated through substantial effort and trust on the side of the consumer (Foehr and Germelmann 2020; Pitardi and Marriott 2021). In smart service encounters, smart devices have been considered as boundary objects that bridge the physical gap between consumers and service providers and which enable their interaction (Beverungen et al. 2019). What is neglected in these accounts is that the actor's input in these value co-creation processes may be asymmetric. Consumers not only apply and integrate smart devices in the value co-creation process, but equally contribute by integrating the physical context (e.g., their homes) as resource, which generates business value for service providers by serving as a source for data and by giving meaning to their smart services (Baird and Riggins 2016). In this sense, the physical context impacts on smart services by providing a stage for the smart service, thereby lending meaning to it, and therefore

ultimately allowing the creation of value. Interestingly, the physical context as a resource develops with its increasing integration in value generation with smart services. For illustration, consider a smart home context again, in which consumers build their own assemblage of smart devices, and thus create their own set of resources to be integrated in value creation. Each technology is individually retrofitted and connected (Harvey et al. 2020). That way consumers alter the nature of the smart service locus gradually and with every smart service that is enabled via the new smart devices. The resource quality of smart service loci therefore changes exponentially with every additional smart device included in this context (Harvey et al. 2020).

Physical context as interpretation frame

As suggested above, smart services initiate the re-negotiation of values associated with their smart service locus. However, vice versa, the norms and values consumers associate with a certain smart service locus impact on their interpretation of the smart service, too. The smart service locus for consumers therefore acts as an interpretative frame of the smart service: it guides their sense making process of the smart service (Bednar and Welch 2020). Therefore, smart services that consumers find valuable within the context of their (smart) homes, for example, may be considered valueless or outright inappropriate within the working context, simply because it contradicts the normative associations consumers attach to the specific smart service locus (Bednar and Welch 2020; Pridmore and Mols 2020). For illustration, consider a smart vacuum cleaner that autonomously sets out to clean its environment. While consumers might consider the service delivered through this technology as smart within their home contexts (i.e. their home is cleaned without consumers having to become active themselves), they might in turn perceive the very same service as un-smart within their working contexts (e.g., when the vacuum cleaner bumps against their legs underneath the office desks or stands in consumers' way when they need to leave their offices quickly). Of course, as with most aspects of smart service loci, it must be acknowledged that consumers' experience concerning the contextual adequacy of smart services is highly subjective and dynamic (De Keyser et al. 2020). Maalsen and Dowling (2020), for instance, observed that the effects of the global repercussions due to COVID 19 have altered consumers' normative stance toward their home contexts and have led to an increased spatial permeability.
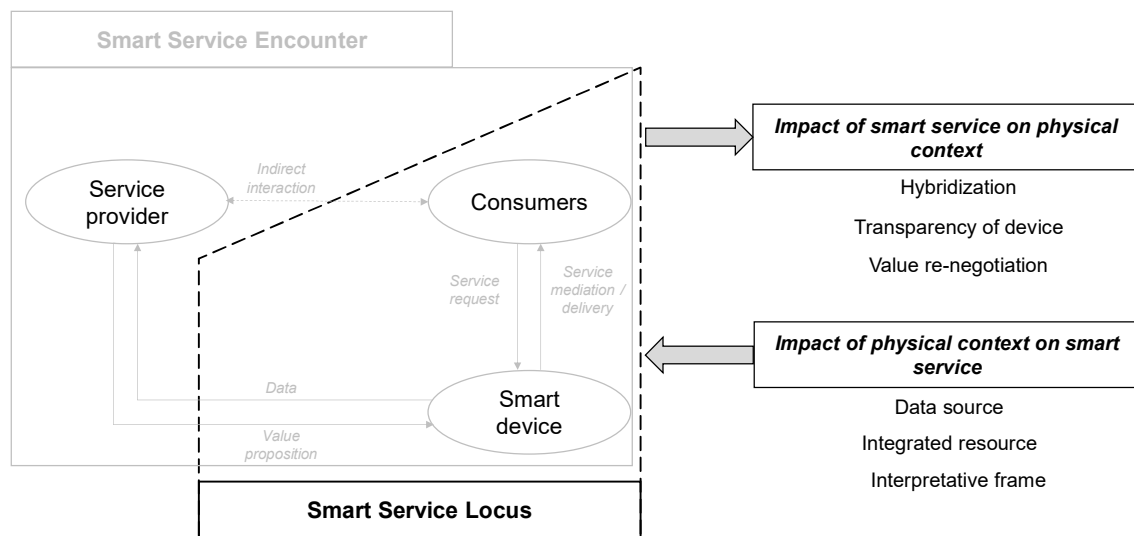
Figure 11:   The hybrid context impact framework (HCIF)

Source: Own illustration, extending on Maglio and Lim (2018)

Discussion

This chapter set out to shed light on the ways in which smart services impact on and are impacted by their physical service contexts. In so doing, it has explored the concept of smart services in depth and has problematized that much of the research in the field tends to adopt a narrow view on smart services that pays particular attention to their digital dimension. Similarly, this chapter has presented how researchers have followed different theoretical paradigms to better understand the emergence of value through smart services and thereby have neglected that smart services depend on and are given meaning through their analogue manifestations in physical service contexts. In consequence, building on the idea of the smart service locus as the physical environment of smart services, the hybrid context impact framework (HCIF) was developed to conceptualize the mutual impact of smart services on their service loci, as well as the contextual impact on smart services. The framework essentially illustrates how smart services dissolve boundaries between real and virtual realms during service provision and initiate the re-negotiation of normative values associated with certain service contexts. Additionally, the framework raises awareness for the fact that the physical context of smart services exceeds its function as a source of sensor data and instead constitutes a resource that consumers integrate in value generation with smart services. In this process, the service context itself

serves as an interpretative frame for consumers that aids them in making sense of the smartness of services.

The hybrid context impact framework adds to the general understanding of smart services within service research and information systems, which has been dominated by a technology-push perspective that favors the digital / virtual aspects of smart services. Our work points toward the analogue dimensions of smart services by emphasizing that what consumers consider as smart in services may not be dependent on the devices which mediate the services. Instead, we suggest that consumers' evaluation of a service's smartness is (among others) strongly influenced by its smart service locus and the normative values and beliefs associated with that context. The hybrid context impact framework thus highlights a theoretical gap prevalent in current smart service concepts which fail to match smart service providers' perceptions of smartness with those of consumers. In response, the framework developed in this chapter has taken a first step to bridge this gap by adopting a cross-paradigm view on smart services and the value generated through them.

Additionally, this chapter contributes to smart service customer experience literature (Roy et al. 2017; Gonçalves et al. 2020) by further facilitating the discipline's understanding of the context dependency of customer experiences even for smart services that have been predominantly considered a digital phenomenon. In so doing, we have elaborated on the experiences of hybridity which have been introduced to various smart service loci through smart services. Thus, while being digital in nature, we have highlighted the fact that smart services almost always include some analogue or real physical manifestation, which implies that customer experiences with smart services include hybrid experiences which are situated both in online and offline realms within which consumers switch unconsciously. Our focus on the physical or hybrid experiences of smart services additionally underlines the fact that service and customer experience research on smart services needs to acknowledge that because smart services allow for highly personalized service delivery, this also entails that customers' service experiences are heterogeneous, individualized and highly dynamic – a finding that re-enforces the challenges associated with smart service development (Anke et al. 2020).

We have argued in this chapter that value generation with smart services may not be understood in its full complexity, when researchers focus on episodic consumer –service provider interactions as situations of value creation only (e.g., Paukstadt et al. 2019).

Rather, we suggest that researchers may want to better understand how and what resources consumers apply and integrate in value generation with smart services. In particular, our findings indicate that consumers not only react towards service providers' value propositions for smart services, but that they consider the value of smart services in relation to its smart service locus and, once they allow the smart service in their physical context, deliberately design their service locus in such ways that it maximizes the value of smart services for them (Harvey et al. 2020).

Conclusion and Future Research

The HCIF developed in this chapter explores in what ways smart services are impacted by their physical service contexts and how physical contexts are altered in response to smart service provision in them. Beyond the findings presented in this chapter a variety of future research avenues unfolds.

Literature on smart services has devoted particular attention to value generation, especially value co-creation (Paukstadt et al. 2019). In so doing, it has raised consciousness for the interconnectedness of the human and technological actors in smart service encounters. As of yet, however, smart service research has not sufficiently accounted for the heterogeneity among smart devices (Woodall et al. 2018). While most smart devices share common technical capabilities, some are designed to function as contextual background technologies, while others rather allow for consumers' interactive immersion (Kaartemo et al. 2019). Building on extant work (e.g., Heinonen et al. 2013), future research could therefore investigate what kind of value is created in smart service encounters and whether different smart devices – as mediators of smart services – create different kinds of value for consumers and service providers.

In close connection to these value dimensions of smart services, research has recently begun to better understand the impact of smart devices and Internet of Things technologies on business models (e.g., Ehret and Wirtz 2017; Langley et al. 2021). The HCIF presented here suggests that smart services can only be successfully implemented when marketers take into account their individual smart service loci. Hence, we would encourage researchers to examine in more detail the impact of contextual factors on the success of smart service-based business models, particularly with a focus on how well smart services incorporate or adapt to consumers' physical and mental contexts (e.g., routines and habits).

Furthermore, the framework presented in this chapter has indicated that consumers' use of smart services within certain contexts initiates a re-negotiation process of the norms and values associated with that context. So far, however, little research exists that explores how this negotiation process unfolds. Therefore, we see promise in future research that investigates how consumers decide about the inclusion of smart services in physical contexts (i.e., how physical contexts are transformed into smart service loci) and what general dynamics can be observed with regard to established physical contexts, such as consumers' homes or workplaces.

Lastly, future research could extend on the notion of hybridity as expounded in this chapter. As our framework has illustrated, due to the miniaturization of devices, their intimate embeddedness in consumers' routines and practices, and the growing interconnection of smart devices, the smart devices enabling and delivering smart services become transparent and may soon disappear. For instance, smart voice-interaction technologies like the Amazon Echo smart speaker (Foehr and Germelmann 2020) as individual devices may soon vanish, and instead their functionality may become part of the smart service locus itself. Thus, consumers would not consciously interact with the smart device when using a smart service but would simply address their vocal commands to the room. Technological developments may therefore challenge the notion of smart services from a conceptual standpoint. Future research could investigate how these developments affect the core idea of smart services, in particular with reference to the fact that conceptually, smart devices are considered to lend their smartness to the services mediated through them. Future works could hence concentrate on the characteristics of smart services without smart devices.

Beyond the notion of online / offline hybridity introduced through smart services, techno-utopians have predicted the development of a new form of internet, or what they consider as metaverse (Ball 2021). Among other things, the idea of the metaverse, which in its core is considered similar to the virtual world portrayed in the movie The Matrix, transcends the distinction between online / offline spheres, and instead rather constitutes a parallel world in which consumers can have experiences that are actually virtual but feel physical. Somewhat futuristic research on smart services could extend on the metaverse and investigate how our ideas about the concept of smart services change when they are delivered within the metaverse context.

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6. Overall Conclusion and Implications for Theory and Practice

6.1 Conclusion and Contributions to Theory in Marketing, Consumer Research, and Service Marketing

To conclude: Despite the evident interest in smart technology and AI in consumer behavior and service marketing research, this thesis observed a discrepancy between the depth of current conceptual understanding of smart digital consumption and extant (empirical) work on the subject. Departing from this discrepancy, this thesis set out to construct a theoretical bridge between the prophetic and the "findings first" works prevalent in the field to date. In so doing, it posed the question of how smart devices influence consumers' consumption experiences, their use contexts, and the service encounters made possible through them. In the follow-up chapters of this thesis, this main research question was divided into more feasible sub-questions, ultimately aiming to improve theoretical understanding of consumers' experiences with smart technologies so as to facilitate more meaningful and potentially more accurate research projects in the field in the future.

In more detail, the findings presented in chapter 2 illustrate that smart digital consumption as a phenomenon consists of multiple and sometimes overlapping experiential facets. Smart devices in this context serve as much more than mediators of (service) experiences. Rather, they *enable* new forms of experiences for consumers by (1) blurring the perceptual boundaries between virtual and real / analog experiences, (2) participating in consumption experiences with the consumer (e.g., as perceived personalities), and (3) making basic consumption experiences themselves. Hence, smart devices, particularly those incorporating anthropomorphic elements, impact on consumption experiences by augmenting them on a social layer (where they function as partner-like companion to consumers), on an experiential layer (where they introduce consumption experiences made by the technology itself), and on a physical layer (by dissolving boundaries between what consumers perceive as virtual or real experience).

After establishing a more comprehensive understanding of the phenomenon under scrutiny in this thesis (i.e., smart digital consumption), chapter 3 focuses on how smart technology affects its consumption context, in particular, consumers' homes. The theory synthesis conducted in the chapter shows that smart technologies, when embedded into consumers' homes, alter the nature of that context by opening it for commercial activity

(e.g., smart service provision). Thereby, consumers' homes are transformed into smart homescapes – that is, a physical sphere that integrates domestic and commercial elements, ultimately staging smart service encounters. The results presented in chapter 3 additionally demonstrate that the embeddedness of smart technology in consumers' homes enables constant interaction between consumers and service providers, in both active and passive ways. Consumers, however, have difficulty attributing the services provided in their smart homescapes to the actual service provider, thus stressing the importance of understanding consumers' mental models prevalent during smart service provision. With regard to the main question of this thesis, chapter 3 sheds light on the transformative potential inherent to smart technology, particularly in domestic contexts, and underlines the presumption that consumption experiences with smart technology require substantial consumer trust.

Chapter 4 then returned to a consumer focus and examined the process of consumers' trust formation in smart technology, in particular SVIT, as part of their consumption experiences. The results from three studies suggest that consumers build and maintain trust in their smart devices not with reference to technological factors directly related to the device as such; rather, consumers refer to the relationship with the perceived (human-like) personality of their device, use friends and family as reference points for their trustworthiness evaluations of the technology, transfer trust in institutions (e.g., the technology producers) to the device, or use their partners as proxy for trust in the device. Chapter 4 thus provides evidence for unknown intensities of consumers' partnering with smart technology as a mechanism to cope with technology paradoxes on the one hand, while underscoring the relational dimension of smart technology use on the other hand. In view of the main research question of this thesis, chapter 4 provides additional insight into the mundane, day-to-day consumption experiences consumers have with smart devices and extends the current comprehension of human-technology partnering as a mechanism to cope with the paradoxes introduced by the technology. The findings presented in this chapter additionally underline that consumers' adoption of smart devices and the negotiation of their use in domestic settings is far from frictionless.

Finally, chapter 5 investigates how the physical service context impacts on smart services and the generation of value through them. Its findings reveal and explicate the hybrid nature of smart services and emphasize the role of consumers' physical smart service locus as an interpretation frame for a service's smartness, but also as a resource that consumers purposefully integrate in value generation. That way, the results of chapter 5

not only provide more detailed insight into smart service encounters, but also challenge the digital-only mindset prevalent in smart service research to this day. In terms of the main research question underlying this work, the findings presented in the fifth chapter provide conceptual evidence for the double role of physical contexts in consumption experiences with smart devices, in that on the one hand, contexts moderate consumers' smartness perceptions of a device or service, while on the other hand, these smart service loci profoundly impact on smart service value generation.

To the extent possible within the realms of a dissertation, the findings presented herein contribute to closing the gap between prophetic and "findings first" research by (1) expounding the peculiarities of consumers' experiences with smart technology in the present already, (2) providing evidence that (measurable) constructs such as consumer trust are meaningful variables in marketing research on smart device use, only if they are they are conceptually calibrated to the characteristics of the smart devices and their use contexts, and (3) highlighting the influence of analog, physical contexts on consumers' perception of smart device use and the services delivered through them, thereby drawing researchers' attention to neglected but increasingly relevant new service frontlines.

This thesis contributes to extant literature in several ways. First, it provides a systematic overview of the multiple facets of smart digital consumption as an experiential phenomenon. The studies herein show that smart digital consumption defies limitation to the digital realm and encompasses experiences that not only include both digital and physical spheres but also exceed established notions of customer experience (Lemon and Verhoef 2016) – for instance, in terms of shared human–machine experiences. In addition, this thesis encourages researchers to consider not just rigor and relevance when designing smart digital consumption research projects, but also epistemological and methodological emancipation from related work in other disciplines, like human–computer interaction. Such work, this thesis argues, would not only ensure overall advancement of knowledge in the field but also generate original contributions to this phenomenon within consumer and service marketing research. The results depicted in this thesis thus add to the as yet sparse literature on smart technology that adopts an experiential perspective (e.g., Puntoni et al. 2021).

Moreover, this dissertation contributes to a more sophisticated understanding of consumers' smart homes as the locus for smart service encounters. To this end, it illustrates how the inclusion of smart technology has facilitated the transformation of

formerly non-commercial physical contexts into scenes of service provision. This work is thus among the first to establish a conceptual framework of consumers' smart homes as frontline for smart service provision, arriving at novel conclusions through an interdisciplinary approach to theory generation that combines knowledge from consumer research, environmental psychology, architecture, and service research to generate the smart homescape framework. The smart homescape framework not only consolidates approaches to smart homes from diverse and previously unrelated literature streams, but it also identifies and closes theoretical gaps in extant models and frameworks, thereby responding to recent calls for service research priorities by contributing to an improved comprehension of the role of technology for service provision and consumption (Huang et al. 2021; Ostrom et al. 2021).

On a micro or consumer level of theoretical abstraction, this thesis also advances knowledge about the process of trust formation that consumers go through when using smart technology. In particular, this dissertation illustrates across three empirical studies that consumers' trust in smart technology can evolve via numerous paths, of which few are directly related to the smart technology as a device. As a result, this work not only adds to an improved processual understanding of trust development and maintenance with regard to smart technology; it also expands extant knowledge on technology adoption by retracing and explaining the role of trust in technology as a determinant for its use. This work thus answers current calls for alternative approaches to technology adoption (e.g., Belk, Weijo, and Kozinets 2020; Hollebeek and Belk 2021) and purposefully positions itself in contrast to extant reductionist research approaches. Follow-up studies published in top-tier journals in marketing and consumer research (e.g., *Journal of Consumer Research*, *Journal of Business Research*, *Psychology & Marketing*), including, among others, Di Domenico et al. (2021), Keller (2021), Lim, Yap, and Makkar (2021), Pitardi and Marriott (2021), and Tassiello, Tillotson, and Rome (2021), have referred to and expanded on the findings presented in chapter 4. Likewise, this work was received in diverse disciplines such as human–computer interaction, information systems, retailing, and sport management.

Lastly, this thesis contributes to the clarification of the ambivalent relationship between digital and analog dimensions of smart services and their provision via smart devices. More precisely, the Hybrid Context Impact Framework developed herein theorizes and explicates the hybrid nature of smart services and the impact of hybridity on value generation. Thereby, it introduces the concept of hybrid experiences (Šimůnková 2019)

to the literature on smart services, providing additional insights to the ongoing discussion of smart service value generation (e.g., Balaji and Roy 2017; Zeithaml et al. 2020) without adhering to paradigmatic limitations. The Hybrid Context Impact Framework broadens the notion of hybrid services from merely a human–technology interaction (as proposed by Ganguli and Roy 2010) to one of a spatial nature and that conceives of hybridity in terms of the interplay of digital and analog realms in service provision.

More broadly, this thesis adds to consumer and service marketing research by providing a more nuanced and contextualized understanding of consumption experiences involving smart technology. Individually, the four theoretical frameworks developed in this thesis can aid researchers in better comprehending (1) which facet of smart digital consumption their research addresses; (2) how consumers' smart homes, as a stage for smart digital consumption, are transformed into service frontlines and how factors endemic to this service context affect both service provision and consumers' responses to services; (3) what paths consumers potentially follow when developing trust in anthropomorphized smart devices; and (4) the interplay of digital and analog factors in creating value with smart services. Taken together, the work presented herein provides the disciplines of marketing, consumer behavior, and service marketing with useful findings on the experiential aspects of consumption with and through smart technology, which in turn may inform future work in the field as an underlying theoretical reference frame or paradigm. This thesis thus serves as an important conceptual counterpoint to the technology-focused, engineering-driven, and often reductionist approaches to smart technology dominant in the field to date. It can also aid researchers in establishing a possibly more original stance toward research on smart technology that diverges from those of human–computer interaction, information systems or computer studies. While this thesis is certainly open to intermingling works from marketing, consumer behavior, and service marketing with those from the computational disciplines, researchers are cautioned to reflect on the underlying paradigms and research lenses prevalent in these individual disciplines when adopting literature from other fields. In this sense, the work at hand urges consumer behavior and service marketing researchers to discuss extant research paradigms on technology prevalent in their fields – a relevant discussion that other disciplines interested in similar phenomena (e.g., information systems) have led more than twenty years ago already (Orlikowski and Iacono 2001).

6.2 Contributions to Marketing Practice

Despite the predominantly theoretical character of this work, its findings also have importance for marketing practice. First, this thesis sheds light on the pervasiveness of smart technology use and highlights the various ways consumers interact with this technology (see particularly Chapter 2). For marketers, understanding these forms of consumer–smart technology interaction, which are commonly subsumed under the umbrella term of "smart technology use" (separate from particular usage scenarios, such as listening to music via smart speakers), is eminently important. Only by thoroughly grasping the different ways that consumers consume with, of, or through smart technology, as well as have the technology consume for them, can marketers design services purposefully or develop adequate key performance indicators to evaluate the success of their offerings, for instance (Joly et al. 2019).

This dissertation also points marketers' attention to the fact that although their interactions with consumers via smart devices as such may be digital in nature, for consumers these interactions do not occur in a vacuum. On the one hand, this pertains to the expectations raised through the various discourses on smart technologies (as explicated in the introduction), but on the other hand, it also points to the fact that consumers' use of smart devices and the services provided through them are situated in certain physical settings, most often their homes (as theorized in Chapter 3). If marketers develop a detailed knowledge about the particularities of smart homes as consumption context, they can leverage the norms and practices associated with that context and potentially increase the value of their service for both themselves and consumers – the framework developed in the third chapter of this thesis can aid them in this process.

This dissertation also establishes the importance of the role of consumer trust in technology as a precondition for their technology use in the first place. In doing so, it also problematized that consumers have difficulties developing trust in and relationships with particular brands through smart technology use: due to the (vocal) interaction modes between marketers and consumers, and consumers' tendency to (1) build personified relationships with their devices or the perceived personalities of these devices, and (2) to misattribute service provision, marketers should reconsider their branding strategies in smart technology contexts. Moreover, these misattribution effects are reinforced through strong name brands of the bottleneck devices (Vernuccio, Patritzi, and Pastore 2021) and thus impede branding efforts of marketers who are dependent on these devices, for

instance to provide their services. Knowing about and understanding these challenges can help marketers devise branding strategies that respond to (and possibly make use of) such circumstances. The paths to consumer trust in smart technologies – and thus to potential relationships with marketers – identified in chapter 4 of this work, can help marketers to strategically approach this problem. For its application in marketing practice, it may be possible to translate the findings presented in chapter 4 and compiled in Figure 9 of this thesis into a strategic tool similar to the customer journey (Lemon and Verhoef 2016). Potentially helpful approaches to this undertaking were recently put forward by Santos and Martins Gonçalves (2021).

Finally, the thesis at hand provides marketers with an improved comprehension of smart services. More precisely, it suggests that smart services, because of their hybrid nature that combines digital and analog realms, allow for new forms of value generation for consumers and marketers alike, that is if marketers can find ways to strategically and creatively utilize this interplay. For example, recently an Italian producer of pasta sold worldwide created music playlists that were available via smart speakers, the length of which corresponded to the exact cooking time of certain types of pasta. Instead of asking their smart speaker to set an ordinary timer for cooking pasta, consumers rather could ask it to play these playlists (Breitengraser 2021) – and hence to initiate valuable customer interactions for marketers that may serve as low-threshold entry points to prospective and more extensive service encounters, for instance to voice commerce channels (Klaus and Zaichkowsky 2021).

All in all, from a managerial perspective, this thesis provides additional evidence for the double-edged nature of smart technology for marketing practice (Mari, Mandelli, and Algesheimer 2020). While smart digital consumption certainly creates new opportunities for marketers, for example in terms of service provision, consumer interaction or value generation, its potential can only be leveraged through a detailed and – most importantly – contextual understanding of consumers' smart consumption experiences.

6.3 Avenues for Future Research

Due to the interdisciplinary interest in consumers' experiences with smart technology, the findings from this dissertation provide an array of avenues for future research. All chapters comprised within the main body of this dissertation already include extensive

overviews of possible follow-up research, as well as specific research questions for (empirical) research projects on the chapter topics; therefore, to avoid redundancies, this section focuses on avenues for future research in terms of the bigger themes building on the findings presented here. That is, in what follows, this thesis takes a figurative leap back and identifies open questions on overarching topics related to its theme. Throughout this thesis, four overarching focal topics prevail: context, consumers, smart devices, and services (see the POPS framework in the introduction of this work). Because most smart consumption experiences imply substantial challenges for marketers as well, companies as a focal topic are added to this research outlook. Due to the intricate nature of smart digital consumption as a phenomenon, note that most avenues for future research do not pertain to a single one of these focal topics but rather circulate around any number of them.

The findings of this thesis underscore Kozinets's (2019) point that consumers' use behavior of smart technology is not only highly complex, but also embedded within an overarching culture. This "technoculture", in which smart digital consumption is staged, has initiated certain behavioral trends that are potentially facilitated and amplified through smart devices (Kozinets 2019); one of these trends being that consumers increasingly delegate decisions to technological devices.

Dholakia et al. (2021, p. 65) observe that smart devices, as part of "hyperdigital marketplaces", have fundamentally altered – and will presumably continue to alter – consumers' decision-making processes. Not only do consumers consciously delegate certain choices to smart devices (e.g., what music to listen to in the morning, which route to take to work, what washing detergent to buy; Pantano 2019); the technology (or more precisely, its underlying algorithms) often serves as a curator of choice environments. In other words, "[t]he machine anticipates for the consumer, often reducing the human act of choosing to that of consenting to one of a delimited set of choices already made" (Dholakia et al. 20121, p. 69). While Dholakia et al. (2021) view consumers' choice delegation as a mechanism to cope with the "problem of overchoice" in hyperdigital markets (Dholakia et al. 2021, p. 69), the findings of this dissertation additionally lend credibility to the fact that such choice delegation always involves consumers trusting their technology to make the right choices and decisions. Thus, consumers' delegation of choices to smart devices is intimately linked to the trust they have in their devices. Taken together, these specific forms of consumer behavior raise substantial questions for the field of consumer research. For instance, as consumers transfer an increasing amount of

curation activities to algorithm-based smart technology, the questions arise of how and in what ways this affects the applicability of established theories and findings on consumer agency (e.g., Bhattacharjee, Berger, and Menon 2014) and decision-making (e.g., Lynch and Zaubermann 2007; Hamilton 2014). Possibly, long-term delegation of choices and decisions may alter the psychological mechanisms underlying consumer decision-making in the future – for example, in terms of cognitive efficiency. As of yet, extant theory on decision-making does not account for such consumption scenarios and thus offers opportunity for research.

In addition, researchers have observed that consumers increasingly outsource cognitive capacities to smart devices (e.g., Atkinson and Barker 2021), thereby potentially amplifying the effects of decision-making delegation noted previously on the one hand, but also challenging established concepts and notions from branding and advertising research on the other hand. Factors such as brand awareness and brand knowledge have been considered fundamental stages in consumers' purchase decision-making process (e.g., Keller 2003). Essentially, however, they depend on the memorization of brand-related information through human consumers. In light of the discussion above, questions arise as to how such brand and purchase decision processes may necessitate reconsideration due to cognitive outsourcing activities or consumption experiences that are augmented by smart technology (as explained in Chapter 2). Potentially, researchers should consider purchase decisions as shared processes, based on both human actors and non-human, algorithm-operated smart devices (Lee, Lee, and Sheehan 2019). It remains to be debated in the future to what extent brand awareness and brand knowledge will remain indicative of consumers' potential brand purchase. Thought-provoking work was recently presented by Swaminathan et al. (2020) who encourage extensions to extant branding theories that account for the peculiarities of consumption experiences with smart devices, but remain vague as to how these extensions may look like.

While the previous paragraph has emphasized shared consumption experiences of consumers and smart technology, researchers have also pointed at opposing behavior. An element of technoculture (Kozinets 2019) that has gained renewed interest among researchers in recent years is consumers' tendency to consciously disconnect from digital media or to engage in "digital detox" activities (e.g., Karppi, Chia, and Jorge 2021), sometimes combined with retreating into their (smart and thus still connected) homes. While such practices certainly generate questions with regard to purposefully lonely consumption and consumers' perceptions of loneliness in the presence of smart

technology (Wang, Zhu, and Shiv 2012; Pieters 2013), they also emphasize the necessity for researchers to consider consumers' homes as increasingly important locus for consumption activities, not only within service research (as Chapter 3 establishes), but also – and particularly so – among consumer researchers. Here, consumer culture theory–informed research could, for example, investigate how consumers utilize and purposefully design their homes as a refuge from public consumption and how technologies may occupy ambivalent and paradoxical roles in fulfilling consumers' desires in this context (Mick and Fournier 1998; Belk, Weijo, and Kozinets 2020).

Taking the issues discussed this far into account, this thesis theorizes that consumption experiences that include smart technology not only necessitate that researchers reconsider extant theories and concepts; they also have the potential to precipitate consumer research into an epistemological identity crisis, quite similar to the one that affected the discipline in the 1980s (see Calder and Tybout 1987; Holbrook 1987). Certainly, consumer research will have to find answers to existential questions, soon, and relevant conceptual work might be particularly supportive in this process.

The findings presented herein point at substantial challenges – and thus opportunities for future research – for marketing strategy and service marketing. This thesis emphasizes the value generated for consumers through their humanized relationships with their smart devices. Although such relationships certainly enable new forms of marketer-to-consumer interactions (see Baier, Rese, and Röglinger 2018 and Davenport et al. 2020 for overviews) and hence the emergence of new customer experiences (e.g., Hoyer et al. 2020; Robinson et al. 2020), they also engender questions for marketers pertaining to the monetarization of such interactions and relationships (e.g., Langley et al. 2021). The fact that to date, many smart technology business models rely on the goodwill of critical intermediaries (Kumar, Ramachandran, and Kumar 2021), such as the producers of bottleneck devices (see Chapter 3), exacerbates marketers' dependencies and could potentially lead to what Langley et al. (2021, p. 861) have characterized as "winner takes it all" situations – that is, situations in which a few dominant platforms have come to dominate access to consumer data and thus control a vital resource for marketers (Ehret and Wirtz 2017). Strategic marketing research could thus investigate strategies for marketers to cope with technology-induced or technology-related dependencies on the internet of things market on the one hand, while rethinking current findings on business model design and relationship management, on the other hand. Extant work on touch (i.e. human-to-human) versus tech (i.e. human-to-technology) interactions from service

research (e.g., Wünderlich, van Wangenheim, and Bitner 2012; Fan and Mattila 2021) could provide promising conceptual extensions in this context.

Similarly, the findings laid out in this thesis imply challenges for well-established concepts and paradigms in marketing research, particularly for customer-centricity (e.g., Shah et al. 2006), which has been a fundamental premise of marketing research for the past years. Although customer-centricity is a helpful perspective in the design of human-to-technology interactions (here usually considered in terms of user-centric design), as the results of Chapter 4 indicate, it is debatable whether it represents a valid managerial paradigm for companies and researchers involved in the smart technology and internet of things market. Extending on Hoffman and Novak's (2018) notion of object-oriented anthropomorphism, these results show that consumers build relationships with the perceived personality of their smart device, and these anthropomorphic devices are able to make basic customer experiences themselves. Taking into consideration the issue that smart devices perform a number of curation tasks for consumers, marketers need to ensure that their services are attractive to consumers but at the same time make it into the (algorithmic) consideration set of the smart devices. Future research could thus address the challenge of investigating how customer-centricity as a paradigm should be revised in light of anthropomorphic smart devices as (main) customer-to-company touchpoints. Regardless of the specific research topic, this thesis stresses that one of the most fundamental requirements for smart technology–centered marketing research is to generate findings that account for the peculiarities of the *concept* of smart technologies (as detailed in the introduction) while remaining agnostic to particular technological artifacts (Kotler, Kartajaya, and Setiawan 2021).

Most notably for service research and management, the results disclosed in Chapters 3–5 provide promising avenues for follow-up research. Service research to date, even if it revolves around smart technology and AI, continues to focus on service encounters in traditional, brick-and-mortar service contexts (e.g., Marinova et al. 2017; Dekimpe, Geyskens, and Gielens 2020; Robinson et al. 2020; Choi, Mattila, and Bolton 2021; Hilken et al. 2021; Hollebeek, Sprott, and Brady 2021), or – much less frequently – in online environments (e.g., Yadav and Pavlou 2020; Lin, Doong, and Eisingerich 2021). Few research projects have investigated service encounters in consumers' homes, with the notable exception of Harvey et al. (2020). The findings of this dissertation suggest that consumers' homes as new service frontline will gain importance, a development that may have been accelerated by the ramifications of the worldwide COVID 19 pandemic

(Maalsen and Dowling 2020). As clarified in Chapter 3, consumers' (smart) homes constitute segregating spaces that separate consumers' private spheres from the public and become transformed into scenes for commercial transactions and marketplace dynamics through the inclusion of smart technology. Service research could therefore profit from adopting a spatial approach to service settings, such as that recently proposed by Holmes, Fernandes and Palo (2021), to better understand how consumers design their individual smart homescapes and how this individuality may be leveraged in service encounters. Such work could additionally aim at generating novel insights into consumers' privacy negotiations and how certain services delivered via smart technology could aid and respond to these negotiations. As a point of departure, researchers may want to consult Thomaz et al.'s (2020) valuable contribution to the topic.

Smart services and their provision are topics of equally intense interest among service scholars. Most conceptualizations of smart services, as Chapter 5 demonstrates, tend to consider the smartness of services as something they inherit from the smart device through which they are delivered (e.g., Boukhris and Fritzsche 2019). Researchers (e.g., Bunz and Meikle 2018), however, predict that technological development may soon lead to the disappearance of smart devices as artifacts, while the functions of these devices are likely to become built-in features of the physical environments in which smart services are deployed. Thus, a vital element of current conceptualizations of smart services will likely disappear in the future, raising questions as to how the smartness of services is to be conceptually understood independent from a smart device as a mediator of that service. Similarly, the transience of the smart device renders more urgent the ambiguities concerning consumers' service provision attribution explicated in Chapter 4 and identified by Wünderlich et al. in 2012 already. If consumers in the future will be confronted with increasingly reduced cues for service provision attribution (e.g., when they are left to judge service provision based on vocal interaction with the service provider only), it is essential that service research has a detailed understanding of consumers' inferential processes during service provision. Despite recent progress in the field (e.g., Hildebrand et al. 2020), this thesis encourages more research that links the physiological and psychological processes of consumers' interaction with smart technologies (for instance, via voice) to (service) marketing strategy.

On a final note, the introduction of this dissertation highlights the exceptional role of marketing as a field that presumably benefits the most from the application of smart devices and AI (Davenport et al. 2020). Because of this pioneering task, scholars have

argued that both marketing theory and practice ought to assume a special position in the negotiation of responsible as well as ethical use of the technology (e.g., Guthrie 2013; Belk 2020; Hermann 2021). The results presented in Chapter 4, which give an idea of the extent to which consumers trust their smart devices, lend additional support to these claims by illustrating the degree of vulnerability and risk consumers encounter during smart technology use. Consequently, this dissertation posits that marketing research on smart technology and AI should not only investigate topics that are either interesting and creative (see Chapter 2) or are directly related to managerially relevant output, but also be aware of its potential societal impact (Lehmann 2020; Haenlein et al. 2021). For research on smart devices, technologies that strongly depend on the generation and analysis of sensitive consumer data, this means that its findings implicitly or explicitly impact the behavior of multiple stakeholders (Haenlein et al. 2021) – this includes the providers of smart technology platforms. Recently, Kozinets and Gretzel (2021) pointed to marketers' vulnerability that originates from their dependence on smart platform providers (e.g., Amazon), if they want to provide smart services. This thesis argues, however, that this dependence is mutual; hence marketers – often constituting key accounts for platforms – may be able to actively impact on the terms and conditions under which smart devices operate and smart services are provided.

Across marketing, consumer behavior, and service marketing research, many studies have dealt with questions revolving around consumers' privacy (e.g., Weinberg et al. 2015; Aguirre et al. 2016; Rauschnabel, He, and Ro 2018; Letheren, Russell-Bennett, and Whittaker 2020; Mani and Chouk 2019; Pizzi and Scarpi 2020). The findings from this thesis suggest, however, that this focus on privacy may not do justice to the breadth of potential problems resulting from smart technology use, because, for example, (as Chapter 4 emphasizes) consumers using the technology already have found individual ways to cope with privacy intrusions through the technology (e.g., by temporarily removing the smart device). Consumers' trust in their smart devices appears to occupy a particularly central position in their reaction to problematic experiences with smart technology (e.g., to level out the information asymmetry prevalent in current use of data collected through the smart devices; Prainsack 2019). These asymmetries have not only produced questions regarding ownership of that data (Bunz and Meikle 2018), employee discrimination (e.g., Winter, Föhr, and Neder 2021), or aspects of unpaid human labor to produce training data for commercial AI applications (e.g., Tubaro, Casilli, and Coville 2020; Newlands 2021), but they have also called for more comprehensible forms of AI,

or what has been termed "explainable AI" within human–computer interaction and computer studies (Gunning et al. 2019). Explainable AI aims at producing results of processes conducted through AI, whose emergence can be understood by consumers (Adadi and Berrada 2018). Although as a research field, explainable AI provides some promising links, particularly for consumer researchers (e.g., to investigate the extent to which the comprehension of an AI decision moderates consumers' trustworthiness evaluations of that technology), it is as yet dominated by the computational disciplines. Consumer behavior and service marketing researchers could contribute to this literature stream by examining how consumers evaluate and interpret the algorithmic processes underlying AI and smart technology interactions. In addition, these researchers could add to the development of more explainable AI as an interdisciplinary feat, by considering technology not from a computer interface–focused perspective (as is present in the computational disciplines), but instead through a non-technical understanding of "technologies in terms of their concrete presence in human experience and practice" (Mele, Polese, and Gummesson 2019, p. 967). Such approaches that promote the contextualization of AI and smart technology rather than a device-focused perspective could be eminently helpful in establishing ways of conveying the mechanics of algorithms and AI programs mimicking human thought processes (Boden 2018), when consumers themselves may be unable to understand these processes in their own cognition (Karppi and Granata 2019). That way, consumer behavior and service marketing researchers could contribute to more transparent (and thus potentially less discriminatory) algorithm and AI design, helping prevent algorithmic opacity (Burrell 2016), and could facilitate a more realistic understanding of the current state of the art in AI among consumers, hence aiding them in better negotiating between fear and anxiety (Belk 2017). Promising work, recently presented in both service research (e.g., Henkel et al. 2020) and marketing (e.g., Banker and Khetani 2019; Stahl et al. 2021), invites further investigation.

6.4 Overall Conclusion

Although this dissertation ends here, the phenomenon that it investigates does not. Instead, phenomena such as consumption experiences involving smart devices, are to be recognized as what Wierenga (2021, p. 23) in a recent commentary has termed a "moving target" – a term that, the author suggests, may well be interpreted as deliberately ambiguous. On the one hand, consumption experiences involving smart devices are in

constant motion – not least because technology is continuously further developed. To metaphorically decelerate this movement for a short moment, this dissertation began with an introduction that placed the phenomenon within a larger (theoretical) context by shedding light on the concept of smart devices and how consumers have come to build expectations of these devices. These expectations, in turn impact their use behavior of the technology, for instance, by requiring consumers to take leaps of faith when using the device. Such leaps of faith exceed mere reliance and necessitate that consumers build trust in their technological devices, quite similar to what they would do with regard to another human. With this theoretical foundation laid, this dissertation first explores the phenomenon and its individual facets in more detail, thereby pointing out differences from previous forms of digital consumption as well as highlighting the role of physical contexts in smart technology use. The dissertation then goes on to further scrutinize the contexts, more precisely consumers' homes. Through this process, it becomes clear that smart technologies are not only able to adapt to their users (e.g., in terms of their personal preferences), but that they in turn affect the physical surroundings within which they are set. Consumers' homes, through the inclusion of smart technology, are thus tacitly, and presumably unnoticed by most consumers, transformed into service frontlines. Because consumers place their devices within their homes – contexts that are as private as they are laden with value – their use of these devices continuously confronts them with situations that necessitate trust in the technology. So far, how consumers' trust in technology can be thought of and how consumers develop and maintain their trust, has remained mostly nebulous; this dissertation provides some clarity to this topic. Lastly, smart devices as such are also mediators of smart services, in which marketing researchers have shown some interest but have often treated somewhat simplistically. The notion developed here that smart services gain much of their perceived smartness to consumers because they combine digital and analog realms in unpreceded ways, and not because they are transmitted via smart devices per se, has thus extended and further developed the discipline's understanding of smart service provision.

The moving target metaphor presented previously also highlights the realization that this dissertation, despite its scope and the variety of topics covered, is essentially just a snapshot of a phenomenon that continues to evolve – just as the technological artifacts that are such a vital part of it continue to be developed. This dissertation is therefore a first, modest attempt to construct a theoretical base for a phenomenon that will continue to occupy marketing, consumer behavior and service marketing research in the future.

Just as the Amazon Astro robot that we encountered in the introduction to this work follows its human owners, researchers should continue to follow smart digital consumption as a phenomenon, to keep on track and contribute to its understanding.

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7. Appendix

Appendix 1: Interview Questions Study 2A (Chapter 4)

HF = main questions were asked to every respondent in lose order, depending on the course of the conversation

VF = sub-questions were posed when the researchers wanted delve deeper into a certain topic and the respondent has not addressed the topic, yet.

HF1: Welchen Smart Speaker benutzen Sie?

HF2: Warum haben Sie sich für einen Smart Speaker entschieden?

HF3: Inwiefern hatten Sie vor der Anschaffung Ihres eigenen Geräts bereits Kontakt zu Smart Speakern? Wie haben Sie die Kontaktsituationen wahrgenommen?

HF4: Wie hat es sich angefühlt, den Smart Speaker einzurichten?

    VF: Wie haben Sie die erste Benutzung Ihres Smart Speakers erlebt?

HF5: Wie haben Sie den Umgang mit Ihrem Smart Speaker gelernt? Was ist Ihnen beim Erlernen schwergefallen? Was war leicht?

    VF: Haben Sie zuvor bereits Erfahrungen mit Sprachsteuerungen gesammelt? Wenn ja, wann und wo war das?

HF6: Worüber haben Sie sich vor der Anschaffung über Ihren Smart Speaker informiert?

    VF: Was war Ihnen bei der Anschaffung wichtig?

HF7: Inwiefern Sie bei der Anschaffung Ihres Smart Speakers über Risiken nachgedacht?

    VF: Wie äußert sich dieses Risiko in der täglichen Nutzung?

HF8: Schildern Sie bitte einen beispielhaften Tag mit Ihrem Smart Speaker: Wann und wie nutzen Sie diesen vor allem?

    VF: Weshalb nutzen Sie Ihren Smart Speaker genau in diesen konkreten Momenten?

VF: Welche Fähigkeiten Ihres Smart Speakers nutzen Sie nicht? Weshalb?

HF9: Was glauben Sie, hat Google / Apple / Amazon davon, wenn Sie das Gerät benutzen?

VF: Warum nutzen Sie diesen Smart Speaker von Google / Apple / Amazon und nicht den Smart Speaker eines anderen Herstellers?

VF: Waren Sie bereits vorher Kunde des Herstellers? Weshalb?

HF10: Wie empfinden Sie die Stimme Ihres Smart Speakers?

HF11: Welche Charaktereigenschaften würden Sie Ihrem Smart Speaker zuordnen?

HF12: Sie haben Ihren Smart Speaker als …, … und … beschrieben. Kennen Sie eine Person in Ihrem Umfeld, die diesem Charakter gleicht? Wenn ja, wer?

HF13: Wirkt die Stimme / der Charakter vertrauenserweckend? Wenn ja, warum?

VF: Was würden Sie Ihrem Smart Speaker nie verraten? Warum?

HF14: Wo steht der Smart Speaker bei Ihnen zuhause? Warum genau dort?

VF: Haben Sie Ihn schon einmal umplatziert? Wenn ja, warum?

VF: Wo würden Sie das Gerät niemals hinstellen?

HF15: Wie reagieren Gäste auf Ihren Smart Speaker?

VF: Was glauben Sie, könnten Menschen gegen einen Smart Speaker haben?

HF16: Haben Sie Ihrem Smart Speaker schon einmal misstraut? In welcher Situation war das und warum?

VF: Gibt es Situationen, in denen Sie Ihren Smart Speaker ausschalten würden? Wenn ja, wann und warum?

HF17: Wenn Sie Ihren Smart Speaker verändern könnten, was würden sie verändern?

Appendix 2: Interview Questions Study 2B (Chapter 4)

HF = main questions were asked to every respondent in lose order, depending on the course of the conversation

VF = sub-questions were posed when the researchers wanted delve deeper into a certain topic and the respondent has not addressed the topic, yet.

HF: Wie kamst du dazu, dir einen Smart Speaker anzuschaffen?

    VF: Wie viele Smart Speaker hast du inzwischen? Welche?

    VF: Wie haben deine Familienmitglieder / Mitbewohner auf die Anschaffung reagiert?

HF: Weshalb hast du genau diesen Smart Speaker angeschafft?

    VF: Inwiefern hat es eine Rolle gespielt, dass er von Amazon / Google kommt?

    VF: Inwiefern hattest Du vor der Anschaffung deines Geräts bereits Kontakt zu Smart Speakern? Wie hast du das erlebt?

HF: Wie hast du die erste Benutzung deines eigenen Smart Speakers erlebt?

HF: Wie fühlt er sich inzwischen an mit dem Smart Speaker zu sprechen?

HF: Wie hast du den Umgang mit deinem Smart Speaker gelernt? Was ist dir beim Erlernen schwergefallen? Was war leicht?

HF: Worüber hast du dich vor der Anschaffung über Ihren Smart Speaker informiert?

    VF: Was war dir bei der Anschaffung wichtig?

HF: Schildere bitte einen beispielhaften Tag mit deinem Smart Speaker: Wann und wie nutzt du diesen vor allem?

    VF: Weshalb nutzt du deinen Smart Speaker genau in diesen konkreten Momenten?

    VF: Was könnte man mit dem Smart Speaker alles machen? Was machst du damit und was nicht? Weshalb?

    VF: Nutzt du den Smart Speaker anders im Vergleich zur Zeit direkt nach der Anschaffung?

HF: Wo steht der Smart Speaker bei dir zuhause? Warum genau dort?

    VF: Hast du Ihn schon einmal umplatziert? Wenn ja, warum?

    VF: Wo würdest du das Gerät niemals hinstellen?

    VF: Welche anderen Smarten Technologien nutzt du in deinem Zuhause? Wie sind diese Technologien miteinander verbunden?

HF: Kannst du dich an eine Situation erinnern, in der dein Smart Speaker nicht funktioniert hat? Wenn ja, wie sah diese aus?

    VF: Wie hat das deine weitere Nutzung verändert?

HF: Was glaubst du, hat Google / Apple / Amazon davon, wenn du das Gerät benutzt?

    VF: Warum nutzt du diesen Smart Speaker von Google / Apple / Amazon und nicht den Smart Speaker eines anderen Herstellers?

    VF: Warst du bereits vorher Kunde des Herstellers? Weshalb?

HF: Wie empfindest du die Stimme deines Smart Speakers?

HF: Welche Charaktereigenschaften würdest du deinem Smart Speaker zuordnen?

    VF: Warum? Wie zeigt sich dies?

    VF: Wie sieht Alexa aus?

HF: Du hast deinen Smart Speaker als …, … und … beschrieben. Kennst du eine Person in deinem Umfeld, die diesem Charakter gleicht? Wenn ja, wer?

    VF: Gibt es Personen in deinem Umfeld, an die Alexa dich erinnert?

HF: Wirkt die Stimme / der Charakter vertrauenserweckend? Wenn ja, warum?

    VF: Was meinst du, worüber würden Menschen mit ihrem Smart Speaker nicht sprechen? Warum? Machst du das genauso?

HF: Wo liegt für dich der Unterschied zwischen deinem Smart Speaker und deinem Smartphone?

HF: Wie reagieren Gäste auf deinen Smart Speaker?

VF: Was glaubst du, könnten Menschen gegen einen Smart Speaker haben?

HF: Hast du deinem Smart Speaker schon einmal misstraut? In welcher Situation war das und warum?

VF: Gibt es Situationen, in denen du deinen Smart Speaker ausschalten würdest? Wenn ja, wann und warum?

HF: Inwiefern hast du bei der Anschaffung deines Smart Speakers über mögliche Gefahren nachgedacht?

VF: Wie äußern sich diese Gefahren in der täglichen Nutzung?

HF: Wenn Du deinen Smart Speaker verändern könntest, was würdest du verändern?

Appendix 3: Sample Overview Study 2B (Chapter 4)
For an overview of the sample of study 2B, please see the table and the corresponding explanations on the following two pages.

An online version of this overview can be found via this link:
https://www.journals.uchicago.edu/doi/suppl/10.1086/707731

Informant*	Age	Gender	Occupation	Household composition**	Smart speaker model(s) ***	Owner of smart speaker since (estimated)	Perceived role of smart speaker
Julia	31	Female	Project manager	OF / S	AE (1. Gen)	Two years	Technological device
Sophia	23	Female	Student	OF / P	AE (2. Gen)	Seven months	Assistant
Claire	20	Female	Student	OF / S	AED (3. Gen)	Nine days	Object
Monica	26	Female	Marketing communications manager	OF / P	AE; SO with Alexa	Twelve months	Technological device
James	22	Male	Student / Headhunter	SF	AED (3. Gen)	Nine months	Tool
Rudy	20	Male	Student	SF	AED (3. Gen)	Ten days	Assistant
Frank	40	Male	Head of Distribution	H / F	2x AE (1. Gen); AEP (2. Gen); AED; SO with Alexa; AES	Two years	Tool
Carl	21	Male	Student	H / PA	AED (3. Gen)	Ten days	Friend
Bill	23	Male	Student / video producer	OF / P	2x GHM	Three years	Assistant
Derrick	23	Male	Student	OF / P	AED; AE	Thirteen months	Service provider
Robert	19	Male	Student	SF	AED (3. Gen)	Eight months	Assistant
Oliver	24	Male	Guest Relations Manager	SF	AED (2. Gen)	Eight months	Toy
Jack	29	Male	Director of photography	OF / P	A E; 3 x AED	Three years	Technological device
Harry	24	Male	Student / event manager	OF / S	3 x SO with Alexa	Ten months	Assistant
Kyle	22	Male	Student	SF	AE (2. Gen)	One year	Toy
Philipp	19	Male	Student	H / PA	AED (3. Gen)	Five Days	Tool

Tim	42	Male	Journalist	OF / S	AED (2. Gen); GH; GHM	Thirty months	Service provider

*Pseudonyms are used in order to mask informant identity

Note: ** Household composition coding scheme: SF = shared flat (usually with students); OF = own flat, H= house, S = single, P= with partner, F = with own family, PA = with parents; *** Smart speaker model coding scheme: AE = Amazon Echo, AED = Amazon Echo Dot, AEP = Amazon Echo Plus, AES= Amazon Echo Show, SO = Sonos, GH = Google Home, GHM = Google Home Mini