Exploring Customer Experiences with Smart Self-service

A Customer Ecosystem Approach

MICHAELA LIPKIN
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Exploring Customer Experiences with Smart Self-service: A Customer Ecosystem Approach

Key words: Customer Experience, Smart Self-service, Customer Ecosystem, Customer-dominant Logic

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“Rivers know this: there is no hurry. We shall get there some day.”
— A.A. Milne, Winnie-the-Pooh

When I’m sitting here writing down the last few lines of this thesis, I can’t believe that I’ve almost made it over the finish line. I am both happy and relieved. The past 8 years have been quite the journey: rewarding and challenging at the same time. Juggling full-time work and an “almost complete” PhD for the past few years is not something I necessarily recommend. This approach has involved countless weekends of work, tons of caffeine and a few tears every now and then. On the other hand, I’ve learned a great deal about what it means to be patient and to keep going also at times when it feels like you just want to give up. Now that I’m finally there and get to hand in my work, I would like to take the opportunity to thank the people that have helped me along the way.

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1 INTRODUCTION

Technological innovations (Rust and Huang, 2014), demographic movements (Letaifa, 2015) and the rise of the individual (Van Doorn et al., 2010) are disrupting not only the ways in which businesses offer service but also how customers serve themselves. Whereas traditional service provision has primarily occurred in the vicinity of the firm, today’s customers often select, experience and embed business offerings into their everyday lives beyond the focal firm’s visibility and control: for example, with wearable technology and smart service devices (Wunderlich et al., 2015). The COVID-19 pandemic in 2020 illustrates how customers may even be forced to minimize interactions with firms and consume most business offerings in the comfort of their own homes. For firms to remain competitive and research to remain relevant, it is therefore increasingly important to understand how the customer’s ecosystem shapes her experiences with offerings. This thesis addresses this topic.

By “customer experience”, I refer to the customer’s idiosyncratic and active sense-making of her context (Bustamante and Rubio, 2017; Helkkula et al., 2012; Schembri, 2006), which consists of environmental, social and temporal dimensions. The context further denotes the customer’s ecosystem, a managerially relevant concept that aims to capture the system of actors and other elements that relate to the focal customer and are relevant to a business offering (Heinonen and Strandvik, 2015). This business offering may include anything from a product or service to a solution, promise or value proposition, but it essentially becomes “what the customer gets out of the connection with the provider” (Heinonen and Strandvik, 2015, p. 478). Similarly, Drucker (1974, p. 64) argues that “it is the customer who determines what a business is.” This thesis further focuses on one particular business offering: smart self-services (Wunderlich et al., 2013): services that are delivered to or via intelligent objects, often in the customer’s own settings.

This approach to customer experiences, customer ecosystems and business offerings builds upon the work of Heinonen et al. (2010) and Heinonen and Strandvik (2015) and their customer-dominant logic (CDL), in addition to this thesis’s own findings. Exploring how customer experiences with business offerings are formed within customer ecosystems goes beyond listening to the customer voice (Griffin and Hauser, 1993), studying atomistic customer evaluations (Zeithaml, 1988), or investigating customer–firm interactions throughout the customer journey (Payne et al., 2009) to understand how customers make sense of these offerings in their everyday lives. Studying how the
factors and actors deemed relevant by the customer, rather than the service, form the experience and value of a business offering can reveal key insights into customers' everyday lives and guiding principles: their motivations, goals, frustrations and prioritizations (Mickelsson, 2013). Using such insights, the firm can design, manage and market business offerings that have a greater chance of becoming selected, used and embedded in customers' lives (Heinonen et al., 2010).

Still, these topics have been insufficiently problematized in the existing marketing and service literature; in particular, the customer experience and customer ecosystem remain theoretically and empirically underdeveloped concepts (Christensen and Olson, 2002; Heinonen and Strandvik, 2015). Furthermore, smart self-service offers an interesting and contemporary – yet insufficiently researched – context to explore how customers’ ecosystems shape their experiences with such a business offering. The next section aims to explain this problem area more in detail, before discussing the thesis’s purpose, positioning, delimitations, definitions and research process and the structure of its subsequent chapters.

1.1 Problem area

Academics and practitioners agree that the customer is a key actor in the marketplace and that firms need to be customer-focused to achieve business success. Research shows that, by developing a thorough customer understanding – and using these insights to design, manage and market offerings – firms increase their chances of achieving business growth (Patricio et al., 2011; Strandvik et al., 2019). Therefore, it is not surprising that the marketing and service literature has devoted great efforts to conceptualizing and empirically exploring the customer and her role in business (Bitner et al., 1997; Prahalad and Ramaswamy, 2004; Verhoef et al., 2009). To date, various approaches to the customer have emerged.

Scholars have recently attempted to understand customers as co-creators (Prahalad and Ramaswamy, 2004) within networks (Tax et al., 2013) and service (eco) systems (e.g. Edvardsson et al., 2018), conceptualizing customers as active participants in service. These studies go beyond the traditional marketing and service research, which defines customers as passive actors experiencing offerings and value largely based on the firm’s actions during isolated touch points (see Payne et al., 2008). Instead, they adopt a more holistic and dynamic view exploring how customers co-create value experiences through service exchange over time (McColl-Kennedy et al., 2015; Verleye, 2015). This revision
of perspectives reflects a larger shift in marketing from a goods-dominant approach focused on units of output (i.e. goods and services) and discrete producer–consumer transactions to a service perspective emphasizing the customer's use of service and long-term customer–firm relationships (Edvardsson et al., 2005).

This thesis argues, however, that both approaches only marginally consider the issues related to customers’ processes in their own contexts. Following a customer-dominant approach to business and marketing (Heinonen et al., 2010), I suggest that, instead of exploring how to involve customers through co-creation or interactions, we should review how customers involve providers and business offerings in their own ecosystems. Indeed, to truly understand the customer, it is key to ask: “How do customers go about living their lives? What drives them? How do they experience and embed business offerings in their own ecosystems over time?” By focusing on what customers consider relevant to their lives, this lens expands the view of the customer and her context. As a result, customer experiences and value become emergent in the customer’s domain, which also lies beyond market-led interactions (Lipkin, 2016). This approach thus helps illuminate what goes on beyond the focal firm’s environment yet plays an important role in how business offerings resonate with customers. It also helps providers better understand how they can become present in their customers’ ecosystems.

Applying such a perspective on the customer and her role in business is even more important in today’s marketplace, where the power balance between the customer and the firm has shifted in favor of the customer (Seybold, 2011). Customers can often choose among many different business offerings and simply switch to another provider if a business offering doesn’t match what they are seeking. In contrast to traditional service settings, much of what customers experience and do with business offerings unfolds outside the firm’s environment: e.g. with smart self-service. This evolving customer nature and business landscape demand approaches that dive deeply into customers’ realities.

By challenging some prevailing customer approaches in the marketing and service literature, this thesis takes on a problematizing approach (Sandberg and Alvesson, 2011), citing Foucault, Sandberg and Alvesson (2011, p. 32), who present problematization as an “endeavour to know how and to what extent it might be possible to think differently, instead of what is already known.” Problematization thus approaches old topics and themes questioning their underlying assumptions to identify a research problem, rather than identifying gaps in the literature and generating research questions based on these
gaps. This thesis focuses on three key problems, all relating to how customers experience smart self-service offerings in their own ecosystems.

First, I argue that understanding customer experiences, especially how such experiences are formed, is hampered by theoretical underpinnings that need to be systematically reviewed and discussed. For example, due to prevailing provider-dominant approaches, many studies view customer experiences as firm-created (Berry et al., 2006; Pullman and Gross, 2004), or the result of dyadic interactions (Prahalad and Ramaswamy, 2004) or co-creation in service (eco) systems (Patricio et al., 2011) and institutions (Akaka et al., 2015). Alternative frameworks for understanding customer experiences as formed in customer ecosystems should be conceptually and empirically explored.

Second, the customer ecosystem represents another concept to help researchers and managers gain a better customer understanding. While previous studies have highlighted different aspects of customer ecosystems and argue for the importance of understanding this concept (Heinonen and Strandvik, 2018; Voima et al., 2011), relatively little effort has been taken to define its conceptual domain and key components. Which actors and actor constellations form a customer ecosystem? In what ways do these actors shape customers’ experiences with business offerings? As the customer ecosystem remains elusive and underdeveloped, we should explore these aspects.

Third, thanks to technological advances, new types of self-service technologies (SSTs) have emerged. Referring to Wünderlich et al. (2015), Ostrom et al. (2015) note that these new types of “technology-enabled wearable devices, home appliances, cars, and so forth...enable the provision of smart services.” Wünderlich et al. (2015, p. 442) characterize such smart services as being “delivered to or via an intelligent object that is able to sense its own condition and its surroundings and thus allows for real-time data collection, continuous communication, and interactive feedback.” While traditional SSTs are often confined to the firm’s environment, these services enable customers to borrow, buy or rent the interface and engage in self-serving behavior in their own contexts. Current SST frameworks, however, remain firm-focused and obsolete in that they do not account for such customer SSTs. Alternative, more customer-focused typologies, as well as empirical research on this contemporary topic, are needed to better understand how customers experience smart service in their own ecosystems.
1.2 Purpose and objectives

The purpose of this thesis is to identify how customers’ ecosystems shape customer experiences with smart self-service. To fulfill this purpose, I have formulated three main research objectives:

Objective I

The first objective focuses primarily on the customer experience, aiming to conceptually clarify how customer experiences are formed by identifying and assessing different approaches to this concept in the service literature.

Objective II

The second objective focuses primarily on the customer ecosystem, aiming to conceptually and empirically explore customer-ecosystem actors and actor constellations and how they shape the customer experience in a smart self-service context.

Objective III

The third objective focuses primarily on smart self-service, aiming to develop a smart self-service typology that captures how customers increasingly serve themselves and experience business offerings in their own ecosystems.

Three articles were crafted as part of the research project. Each article comes with individual research objectives aiming to contribute to the thesis’s purpose and objectives (See Gummerus et al., 2009; p. 45; Lipkin, 2016 p. 679). Table 1 captures the objectives of each article and the applied research questions, theoretical framework, methods and empirical contexts. Chapter 4 summarizes the key findings, contributions and implications of each article. Chapter 5 further discusses the contribution and implications of the thesis overall. Finally, this thesis contributes to the contemporary service and marketing literature and CDL stream (Heinonen and Strandvik, 2015) by clarifying and conceptualizing the elements of customer experience formation, customer ecosystems and customer self-service devices, essentially providing managerially relevant and actionable frameworks to better understand and examine how customers’ ecosystems shape customer experiences with smart self-service.
## Table 1: Summary of articles

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<th>Article 1</th>
<th>Article 2</th>
<th>Article 3</th>
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<tr>
<td><strong>Authors and their work contribution</strong></td>
<td>Michaela Lipkin (100%)</td>
<td>Michaela Lipkin (90%) Kristina Heinonen (10%)</td>
<td>Johanna Gummerus (35%) Michaela Lipkin (35%) Apramey Dube (10%) Kristina Heinonen (20%)</td>
</tr>
<tr>
<td><strong>Objective</strong></td>
<td>This paper aims to review customer experience formation by 1) locating and analyzing how researchers approach this phenomenon in service research and 2) assessing which approaches are best suited for today’s service landscape.</td>
<td>This paper aims to 1) conceptualize and empirically illustrate how different customer ecosystem actors shape customer experiences. This paper also suggests 2) theoretical and managerial implications for the customer ecosystem and its actors and actor constellations in a customer experience context.</td>
<td>This paper aims to 1) introduce and characterize a specific form of self-service technology (SST), customer self-service devices (SSDs). This paper also aims to 2) propose and apply a classification scheme of these SSDs.</td>
</tr>
<tr>
<td><strong>Theoretical framework</strong></td>
<td>Service and marketing literature on the customer or service experience concepts.</td>
<td>Service and marketing literature on ecosystems and customer experiences. A customer-ecosystem lens on customer experiences, based on a customer-dominant logic.</td>
<td>Service and marketing literature focused on self-service technology.</td>
</tr>
<tr>
<td><strong>Method</strong></td>
<td>Applying a systematic approach, this paper reviews 163 articles published in the service field 1998–2015.</td>
<td>This study uses explorative, qualitative data collected among customers of activity trackers to illustrate how actors within the customer ecosystem shape the customer experience.</td>
<td>This study uses explorative, qualitative data collected among companies to develop a classification scheme of various types of SSDs.</td>
</tr>
<tr>
<td><strong>Empirical context</strong></td>
<td>N/A</td>
<td>Data consist of 28 in-depth interviews and 10 self-reported diaries with customers regularly using a smart service.</td>
<td>Data consist of six companies offering various types of SSDs.</td>
</tr>
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1.3 Positioning

This thesis addresses different aspects of customer experiences, customer ecosystems and smart self-service by applying a customer-focused perspective viewing the customer as the primary actor in the market. The thesis is therefore best positioned within the contemporary marketing and service literature placing the customer and customer insights at the forefront. The sections below detail the applied literature streams – contemporary service marketing, the Nordic School of thought and Customer-Dominant Logic (CDL) – as well as the customer experience and ecosystems literature. The last section includes a short overview of interpretive phenomenology, which is applied as this thesis’s philosophical and methodological standpoint, and the smart self-service literature that is applied as this thesis’s empirical context.

Contemporary service marketing has proposed a move from a Goods-Dominant Logic (GDL) grounded in the neoclassical economics research tradition (Hunt, 2002) to a service perspective on business and marketing (Grönroos and Voima, 2013; Vargo and Lusch, 2008). While GDL focused on exploring units of output (i.e. goods and services) and discrete transactions between producers and consumers, the service perspective emphasizes the customer’s service use and long-term customer–firm relationships (Edvardsson et al., 2005). Researchers have applied various versions of this service perspective resulting in different service logics: Service-Dominant Logic (SDL; Vargo and Lusch, 2004), Service Logic (SL; Grönroos, 2006) and Customer-Dominant Logic (CDL; Heinonen et al., 2010). A business logic denotes a mental model or information filter that guides practitioners in their work (Prahalad, 2004). Prahalad and Bettis (1986) explain it thus:

\[ \text{[. . .] a mind set or world view or conceptualization of the business and the administrative tools to accomplish goals and make decisions in that business. It is stored as a shared cognitive map (or a set of schemas) among the dominant coalition. (p. 491)} \]

Although some may view their applied logic as a superior or ideal approach to a phenomenon (Brown, 2007), all logics present distinct opportunities and challenges. Within the contemporary service marketing research, this thesis assumes the position of CDL, which builds on the Nordic School of thought (See Gummesson and Grönroos, 2012). This school represents a research stream that emerged in the 1970s as a response to the limitations of transactional marketing. The Nordic School emphasizes customers’ processes (Edvardsson et al., 2005) and customer–firm relationships (Voima et al., 2011), encouraging researchers to engage in conceptual work and out-of-the-box
thinking when conducting research. In this spirit, CDL advocates for the primacy of the customer in the business landscape. As Heinonen and Strandvik (2015, p. 473) note, the “internal logic of CDL is based on positioning the customer insight in the foreground in place of the type of offering (product or service) or the system of providers (service (eco) systems).” This contrasts with SL (Grönroos, 2006; Grönroos and Voima, 2013) – another Nordic School logic– whose focus lies on the dyadic individual-level interactions between the provider and customer. CDL also presents an alternative to the widely popular SDL (Vargo and Lusch, 2004, 2008). SDL focuses on how providers in service (eco) systems deliver service to customers through interactions, which CDL argues makes SDL provider-dominant in nature. CDL focuses not on interactions between the customer and provider, but rather on how customers embed service in their processes. We should therefore explore customer activities and experiences “beyond customers’ perceptions of offerings and market interactions” (Heinonen and Strandvik, 2015, p. 472).

CDL also differs from the superficially similar CCT (Arnould and Thompson, 2005; Cova et al., 2013) approach. As Heinonen and Strandvik (2015) posit: “Although CCT studies customers’ market-related experiences beyond customer-firm encounters, it is focused on aggregate cultures, practices, and shared meanings” (Arnould and Thompson, 2005, p. 475). CCT thus differs from CDL, which recognizes the individual customer within her ecosystem (Heinonen and Strandvik, 2015). CCT studies tend to emphasize market interactions and dynamic aggregates (Akaka et al., 2015), but without discussing their managerial implications. CDL’s primary goal is to be relevant for businesses. Aligned with a CDL approach, this thesis centers the customer and her experiences and ecosystems while aiming to generate managerially relevant insights.

Consequently, in terms of discussing and studying customer experience formation and customer ecosystems 

per se, I primarily position this thesis within the CDL research stream. Becker and Jaakkola (2020) recently introduced a theoretical map of the customer experience literature that aims to capture existing studies’ scope (ranging from broad to narrow) and metatheoretical assumptions (ranging from positivist to interpretive). Although this map does not specifically address CDL, I position this stream and consequently my approach to customer experiences at its broad and interpretive ends. In doing so, however, I also acknowledge and discuss other customer experience approaches and literature. Furthermore, in conceptualizing and empirically exploring the customer ecosystem I draw from the literature discussing the systemic aspects of
business, including business networks (Hakansson and Snehota, 1995) and service ecosystems (Akaka et al., 2015). Nonetheless, I maintain a customer-dominant approach to the customer ecosystem throughout.

Furthermore, this thesis draws from interpretive phenomenology, which advocates that all human behavior is facilitated by a social and subjective world view grounded in the individual’s context (Dreyfus, 1991). To understand how a human thinks and behaves, the researcher must enter an individual’s social world. Advocates of phenomenology state that the subjective experience is essential in understanding an individual’s life world. It is therefore impossible to interpret some universal objective truth of the reality in which we live; we can only interpret an individual’s subjective experiences and realities (Reckwitz, 2002). This phenomenological standpoint is visible in the articles (1–2) focusing on customer experiences. Phenomenology is also the chosen methodological approach in the empirical study in article 2.

Finally, this thesis is positioned within the self-service technology (Curran and Meuter, 2005; Meuter et al., 2010), smart service (Ostrom et al., 2015; Wunderlich et al., 2015) and wearable technology (Paluch and Tuzovic, 2019; Sultan, 2015) literature, as I explore customer experiences and ecosystems in a smart self-service context and conceptualize one type of this service: customer-owned self-service devices.

1.4 Delimitations and definitions

I discuss the customer in general terms, as an individual, a collective of customers, a business, an individual within a business entity, or a collective of businesses (See Strandvik and Heinonen, 2015), but I principally adopt an individual-focused perspective in exploring customer experiences and ecosystems.

The term customer experience is used to depict individual customers’ idiosyncratic sense-making of their contexts (Helkkula et al., 2012; McColl-Kennedy et al., 2015; Schembri, 2006), consisting of environmental, social and temporal dimensions. In doing so I approach the experience as a phenomenon, applying an event-based rather than knowledge-accumulating perspective. This customer experience concept is complex in nature and overlaps with similar terms like consumer experience (Cari and Cova, 2003), brand experience (Brakus et al., 2009) and service experience (Helkkula, 2011) that are commonly applied in the marketing and service literature. Following the CDL approach, I retain the term “customer experience” to emphasize the primary role of the customer.
Furthermore, rather than viewing the customer experience as a result of individual responses to stimuli from a firm and other actors (Becker and Jaakkola, 2020), I view the customer experience as the individual customer’s active sense-making of her context. This context may entail firm-related factors and actors, but also goes beyond market-related interactions.

I use the term *customer ecosystem* to depict both the concrete context in which the customer experience is formed and a lens on customer experience formation. When approached as a concrete context, following Heinonen and Strandvik (2015, p. 479, referring to Voima *et al.*, 2011), this customer ecosystem is defined as a “system of actors and elements related to the customer and relevant to a specific service.” Unlike business networks (Hakansson and Snehota, 1995) and service (eco) systems (Akaka *et al.*, 2015), that focus on service, the customer ecosystem focuses on the customer’s systems. Depending on what the focal customer considers relevant, this customer ecosystem can include actors and actor constellations consisting of service providers, other individual and B2B customers and other actors, such as family, friends and strangers. I view these actors as distinct, considering that they have different goals, experiences and activities. Furthermore, when approached as a lens, a customer ecosystem perspective reflects the researcher’s theoretical underpinnings for understanding how customer experiences are formed. Researchers may adopt different lenses to explain how various contextual boundaries frame individual customer experience evaluations. The customer ecosystem lens represents one such approach.

The empirical context in this thesis contains delimitations. Both empirical studies focus on *smart self-service*. The qualitative study in article 2 addresses a specific form of such service: wearable activity trackers. The customers’ experiences with this type of business offering are investigated from the individual customer’s perspective. The illustrative data used in article 3, on the other hand, incorporates a wide variety of smart customer self-service devices. Although these services are discussed from the customer’s perspective, data are based on insights from company representatives. As such, this thesis includes data from both the customer’s and the provider’s perspective.
1.5 Research process

During my first year as a doctoral student my primary goal was to identify and delineate the research problem. I knew that I wanted to focus on the customer. For me the customer is by far the most important actor in the business landscape. Without customers, markets and industries would simply not exist. I began my journey by attending PhD courses and studying key marketing and service literature to better understand how existing work approaches the customer. I soon realized that researchers have applied multiple perspectives on this actor. The traditional business literature grounded in a manufacturing context approaches the customer as simply another actor in the value chain (Porter, 1985) or a passive being to whom companies market (Kotler, 1972). By contrast, contemporary marketing and service studies (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2011) apply more customer-centric approaches, acknowledging the customer’s active role in service. This approach is not entirely new; the consumer research stream has long highlighted the need to understand how consumers think, feel and behave (Holbrook and Hirschman, 1982). Still, their focus was mostly on consumption beyond managerial relevance (Arnould and Thompson, 2005).

Despite researchers’ increasing focus on the customer’s role and importance (Prahalad and Ramaswamy, 2004), the studies often seem to apply firm- or service-focused perspectives when exploring key marketing concepts, such as customer experiences (Meyer and Schwager, 2007) and value (Flint et al., 2002). The questions focus on how firms can affect and involve the customer during pre-defined customer–firm touch points, rather than how the customer involves the firm in her processes and life. Greatly inspiring me during this time was the work of Heinonen et al. (2010), who proposed a CDL perspective on business: specifically Strandvik et al.’s (2012) paper on customer needing that encourages researchers and managers to go beyond listening to the customer’s voice to explore how she resonates around business offerings in her own context.

Two often-discussed concepts within these customer-focused studies that intrigued me were customer experiences and customer ecosystems. I saw the customer experience as a holistic concept that could generate valuable insight into the customer and how she resonates around various business offerings. As customer experiences are contextual in nature (Helkkula et al., 2012), the customer ecosystem emerged as a natural ally and key concept to explore how the individual customer’s context related to a specific service frames such experiences.
Following this reasoning, **article 1** explores the customer experience and its formation, discussing different approaches to this phenomenon and questioning which are best suited for today’s service landscape. This literature review confirmed my initial observations – traditional research has largely approached the customer as a passive being subject to company actions and has focused on what goes on in the firm’s context during isolated touchpoints (Berry *et al*., 2002; Pine and Gilmore, 1998). Nonetheless, an increasing number of articles applied holistic, dynamic approaches to customer experiences (Schembri, 2006; Helkkula *et al*., 2012; Voima *et al*., 2013). These approaches were also deemed most relevant for studying customer experiences in today’s service landscape. In this thesis, I decided to adopt the approaches focusing on the customer’s idiosyncratic sense-making and ecosystems and use them as the theoretical framework for my empirical work.

While reviewing **article 1** I pondered how to design my thesis’ empirical study. Since taking up running, I had observed that activity trackers and sports watches were gaining traction among fellow runners. Given the simultaneous emergence of the smart service literature and researchers’ calls for more studies on this topic (Wunderlich *et al*., 2013, 2015), I found this context an interesting area for exploration that offered ample opportunities to explore how customers experience a business offering in their own ecosystems. Most customers aren’t even in contact with the provider of a specific activity tracker but rather buy it from a retailer, then serve themselves in their own settings over time. Against this backdrop, **article 2** explores how various customer ecosystem actors shape the customer experience with smart self-service.

I found this smart self-service context fascinating, as it enables customers to serve themselves in previously unimaginable ways. Some devices made it possible to keep track of one’s cat by monitoring its location. Others helped diabetics monitor their blood sugar levels and automatically injected insulin when needed. Simultaneously, the existing research on self-service technologies (SSTs) seemed to be stuck in time – focused on traditional company-controlled interfaces, like self-check-in at airports (Liljander *et al*., 2006) and online banking (Ho and Ko, 2008). This served as the main motivation for **article 3**, which characterizes and classifies these newer types of customer self-service devices.

Over the last years, I’ve dedicated my time to finalizing and analyzing the latter two articles and summarizing the work of the three articles into this kappa.
1.6 Structure

The remainder of this kappa is organized into two parts. Part I explains its theoretical framework, discussing its origin and characterizations and my approach to customer experiences, customer ecosystems and smart self-service. Next, I introduce my research paradigm, including my ontological and epistemological assumptions, methodology and methods applied in articles 1–3. I then present the findings and contribution of each article. The final section of part I discusses this thesis’s overall contribution and implications. Part II includes the three articles that form the basis of this thesis.
2 THEORETICAL BACKGROUND

2.1 Customer experiences

This section reviews how the marketing and service literature has approached the customer experience, including a short overview of its origin and various characterizations, then summarizes this thesis’s approach to the concept.

2.1.1 Origin and characterizations

Researchers often trace the origin of the term *customer experience* to the seminal work of Holbrook and Hirschman (1982), who noted that customers seek out not only products and services but also experiences meeting their desires and needs. As Lemon and Verhoef (2016) note, these authors proposed a broader perspective on human behavior, advocating the importance of understanding emotions in experiences and decision-making. This contrasted with the prevailing view of the customer as someone merely guided by reason who therefore only makes rational buying decisions (Alderson and Cox, 1948). Since then, customer experience has gained significant interest across the consumer and psychology (Carù and Cova, 2003), marketing (Schmitt, 2003) and service (Edvardsson et al., 2005) fields. Early studies focused on the hedonic aspects of consumption by exploring extraordinary and positive experiences, like river rafting (Arnould and Price, 1993) and skydiving (Celsi et al., 1993). In the late 1990s, studies discussed the customer experience as a discrete economic offering, separate from commoditized products and services (Pine and Gilmore, 1998). Today, most researchers agree that customers always have an experience with a business offering and that it can range from extraordinary (Schouten et al., 2007) to ordinary (Carù and Cova, 2003) and from positive (Mascarenhas et al., 2006) to negative (Edvardsson et al., 2010) in nature.

The marketing and service literature entails multiple characterizations of this customer experience. This divergence partly stems from the complex nature of the experience per se. An experience can be approached from a knowledge-accumulating perspective or a process- or event-based view (Helkkula, 2011) because in English the word can be a noun or a verb (Palmer, 2010). Although in this thesis I will not discuss this knowledge-accumulating view, I recognize that customers also acquire knowledge when they experience business offerings.

Most marketing research has focused on this “verb experience” – conceptualizing it as multi-dimensional in nature. For example, Schmitt (1999) identified five experience

...
dimensions: affective, cognitive, physical, sensory and social-identity. The customer experience thus differs from other related concepts, like service quality (Johnston, 1995) and satisfaction (Getty and Thompson, 1994), as it aims to capture the customer's feelings and behavior instead of cognitive attributes alone (Palmer, 2010). Verhoef et al. (2009) and Gentile et al. (2007) discuss similar components, characterizing the customer experience as the customer’s cognitive, affective, emotional, physical and social responses to a firm. In the management literature, Meyer and Schwager (2007, p. 2) conceptualize the experience as “the internal and subjective response customers have to any direct or indirect contact with a company.” The more recent work of Lemon and Verhoef (2016) builds on these characterizations, emphasizing the customer experience as multi-dimensional, but they approach the concept as more holistic and dynamic in nature, spanning the entire customer journey with a company.

Service research has historically adopted an S–O–R (Stimulus–Organism–Response; Mehrabian and Russell, 1974) view similar to that of traditional marketing literature, emphasizing customers’ passive perceptions of environmental stimuli as the mechanisms through which experiences are formed (Berry et al., 2006). In this perspective the firm provokes the desired cognitive and emotional customer reactions and interactions by placing experience cues alongside consumption (Pullman and Gross, 2004). The customer experience then becomes firm-created: designed and choreographed for the customer during the service encounter (Johnston and Kong, 2011). By highlighting the firm’s actions, the firm gains the most control over the outcome experienced; the experience is restricted to pre-defined service encounters and changes only because of process inefficiencies or the poor management of service elements (Fließ and Kleinaltenkamp, 2004).

The contemporary service and relationship marketing literature (e.g., Gummesson and Grönroos, 2012) has criticized these sensation–perception frameworks as insufficiently emphasizing customers’ active processes and patterns. Instead of exploring passive customer reactions, they argue that the focus should be on how the customer actively interprets her surroundings. Drawing from hermeneutics (Bleicher, 1980) and phenomenology ([1931] 1967), the customer experience is conceptualized either as a process unfolding during the customer–firm relationship (Edvardsson et al., 2005), or as a phenomenological event formed through the individual’s subjective and collective sense-making of her context (Helkkula et al., 2012; McColl-Kennedy et al., 2015). This context can also refer to inner realism, as the customer fantasizes about future
experiences or reminisces about the past (Dube and Helkkula, 2015). This phenomenological approach in particular has become increasingly popular as various business logics, including SDL (Vargo and Lusch, 2004, 2008), CDL (Heinonen et al., 2010) and SL (Grönroos and Voima, 2013), encourage researchers to approach experiences as subjective and context-specific in nature.

Following SDL (Vargo and Lusch, 2011), many of these process- and phenomenon-focused studies view experiences as co-created (Payne et al., 2009) during the customer’s journey (McColl-Kennedy et al., 2015) or within wider service (eco) systems (Tax et al., 2013) and institutional structures (Akaka et al., 2015). The firm is no longer the central actor. Instead multiple actors form the customer experience. Other studies place customer experiences as emergent within customers’ realities and self-chosen ecosystems based on the customer logic (Heinonen and Strandvik, 2015). These customer-dominant studies highlight the customer’s central role and control and the fact that the contemporary customer often picks and chooses between offerings to create a personalized customer experience landscape (Heinonen et al., 2010; Leino, 2017).

These multiple approaches and perspectives on the experience have resulted in a patchy body of customer experience literature. Article 1 aims to further disentangle the many approaches in the service literature to clarify and structure how the customer experience is formed.

### 2.1.2 My approach to customer experiences

Drawing from interpretive phenomenology, I approach the customer experience as the customer’s idiosyncratic and individual sense-making of her context (Helkkula et al., 2012; Schembri, 2006). With sense-making I denote the customer’s mental processes inherent in the experience through which the customer readily construes the world. Sense-making can occur both consciously and unconsciously (Smith, 2007), entails affective and cognitive processes (de Keyser et al., 2015) and acts as an intermediating mechanism between the individual and her life world context (Lipkin, 2016). This approach lends itself to a more individual-focused and active approach than traditional S–O–R and process frameworks. I view the context as comprising multiple dimensions – environmental, social and temporal – as have many other researchers (McColl-Kennedy et al., 2015b; Verhoef et al., 2009). The environmental dimension often refers to an externally observable space, although “experience may not always be externally observable, and cannot be considered as evidence of what really happened” (Helkkula et
As Helkkula et al. (2012a, p. 59) further note, the customer experience emerges through an “iterative circular process of individual, and collective customer sense making.” Similarly, I argue that the context includes a social dimension. Finally, I view the customer experience as continuous and accumulative in nature, apt to change in and over time. This approach differs from that of many traditional marketing and service studies, in that it provides a more holistic and dynamic view of the customer experience.

Finally, in line with CDL (Heinonen and Strandvik, 2015), I argue that it is possible and worthwhile to approach the context as the customer’s ecosystem, a managerially relevant concept that aims to capture the system of actors and other elements that relate to the focal customer and are relevant to a business offering (Heinonen and Strandvik, 2015). Considering the customer ecosystem’s central role, this concept is also key to increase our understanding of the customer experience. The next section moves on to discuss this customer ecosystem more in detail, including its key components and how it differs from other related constructs, such as service (eco) systems. This approach to the customer experience is discussed partly in the systematic literature review of article 1 and applied as the focal approach in the empirical article 2.

2.2 Customer ecosystems

This section reviews how the marketing and service literature has approached the customer ecosystem, including a short overview of its history and various characterizations. The section ends with a summary of this thesis’s approach to the concept.

2.2.1 Origin and characterizations

There is a growing interest in ecosystems and the systemic aspects of business in the marketing and service literature (Alexander et al., 2018; Vargo and Lusch, 2008). As the boundaries between traditional provider and customer roles blur and markets and industries are becoming increasingly interrelated, researchers have recognized the need to go beyond dyadic interactions to explore how value and experiences are experientially co-created among multiple actors (Prahalad and Ramaswamy, 2004) or formed within networks (Hakansson and Snehota, 1995; Tax et al., 2013), ecosystems (Vargo and Lusch, 2008) and institutions (Akaka et al., 2015). These systems have been argued to be of great value to advancing our understanding of the provider, customer and other key
actors and their roles in business (e.g. Dass and Kumar, 2014; Maglio and Spohrer, 2008; Maglio et al., 2009). The customer ecosystem has emerged as one such system, aiming to capture the actors and systems relevant to a focal customer. Although some studies (Strandvik et al., 2018; Voima et al., 2011) have aimed to characterize this system type, research on the topic remains scarce. Before discussing this concept in detail, I will first attempt to review the origin of ecosystems per se in the business and marketing literature. This review will also illustrate how the customer ecosystem differs from similar constructs.

Despite the recent proliferation of studies focused on the systemic aspects of business, the “ecological” thinking in the business and marketing literature is not new. In the 1960s, Alderson and Martin (1965) proposed the adoption of systems thinking. Borrowing from biology, in which an ecosystem is a group of living organisms sharing their living environment with non-living components and interacting as a system (see Hatcher, 1990), Alderson and Martin (1965) discussed the importance of exploring “value-creating organized behavior systems.” Later, Normann and Ramirez (1993) presented “value constellations” as value-creating systems, within which various actors (e.g. customers, suppliers, partners) interact and co-produce value. The key task of such organization constellations is to reconfigure roles and relationships among these actors to activate new forms of value creation. The same year, Moore (1993) discussed “business ecosystems” as comprising not only the focal firm’s value chain but also other actors like companies from other industries and competitors. Research within the IMP stream has similarly explored “business networks” between corporate actors but has emphasized the aggregate level rather than distinct actors (e.g. Hakansson and Snehota, 1995). It was not, however, until the emergence of the various business logics (SDL, SL, CDL) that the ecosystem became an integral part of the marketing and service literature.

SDL (Vargo and Lusch, 2008) adopted the term “service ecosystem” when proposing an alternative view of service exchange and value creation. Vargo and Lusch (2016, pp. 10–11) define a service ecosystem as a “relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange.” According to SDL, these service ecosystems exist at different levels of abstraction (micro–meso–macro). They can also be firm-, customer- or non-centered in nature (Akaka et al., 2015). By emphasizing their macro-aspects, actors in these systems are often viewed as generic (Akaka et al., 2013) and include the customer, provider and other service-related actors. Central to these system
types is their focus on service, which is seen as something one actor does for another actor’s benefit in a dynamic and constantly changing context (Barile et al., 2016).

Some authors, however, argue that the above views are not customer-focused enough, as they consider issues related to customers’ processes in their own contexts to a limited degree (Strandvik et al., 2019). Instead of concentrating on service exchange, as with the above-mentioned approaches, this CDL perspective (Heinonen and Strandvik, 2018) places the customer and her ecosystems at the core. This perspective argues for the need to “shift focus from how (systems of) providers involve customers in their processes to how customers in their ecosystems engage different types of providers” (Heinonen and Strandvik, 2015, p. 472). By focusing on what customers consider relevant, we may better understand how the customer experiences and determines the value of providers and their offerings.

Heinonen and Strandvik (2015, p. 479, referring to Voima et al., 2011), characterize the customer ecosystem as a “system of actors and elements related to the customer and relevant to a specific service.” This ecosystem thus includes various actors (e.g. individuals, firms, family, friends, strangers) and actor configurations and physical, virtual and commercial features and structures, as deemed relevant by the focal customer in her context (Heinonen and Strandvik, 2018). For example, in the specific service of air transportation, when exploring the customer ecosystem in this context, the customer ecosystem will likely include actors related to the airline, such as its employees (flight attendants) and co-customers (fellow travelers). Customers may also, however, deem other actors important and thus relevant to the service: for example, family members with whom they have planned the trip, a stranger’s tip on the travel destination and a ticket comparison site offered by an independent firm. These actors undertake various roles and positions within the customer ecosystem and, in so doing, affect how the focal customer experiences the business offerings within her systems (Voima et al., 2011).

The contextual frames of these customer ecosystems are generally broad but may vary in scope. As the customer can be observed at varying levels of abstraction – as a single unit (e.g. individual) or a collective (e.g. family) – this scope depends on the focal customer unit (Voima et al., 2011). For example, previous studies have researched the customer ecosystems of individuals (Leino, 2017) and families (Epp and Price, 2011). In addition, the focal customer largely decides which actors to include into her processes related to a business offering. The boundaries of customer ecosystems can thus stretch beyond market-led interactions, as highlighted by the air transportation example. Finally, as
Heinonen and Strandvik (2018) note, this customer ecosystem is highly dynamic: apt to change as the customer's goals, activities and experiences evolve, while concurrently affecting these phenomena symbiotically. Natural ecosystems have likewise been described as dynamic in nature (Mars et al., 2012).

**Article 2** aims to further characterize the components of this customer ecosystem.

### 2.2.2 My approach to customer ecosystems

This thesis views customers as orchestrators of their unique realities and the firm as embodying a more supportive role in their lives. This study thus goes beyond co-creation approaches (Frow and Payne, 2007; Vargo and Lusch, 2011), as it does not limit customer experiences and value creation to a service setting or interaction sphere (Grönroos and Voima, 2013). Instead, it adopts a systemic lens focused on the customer and her context.

In this thesis, the customer ecosystem represents this customer's individual context related to a specific service. Following a CDL perspective (Heinonen and Strandvik, 2018), I approach this customer ecosystem as customer-centered, comprising various actors and structures deemed relevant by the customer. These actors may be human or non-human and collective or individual actors, and can for example include firms and co-customers, but also the customer's friends, family and even strangers. Contextually, the customer ecosystem thus goes beyond market-related interactions. Further, similarly as Heinonen and Strandvik (2018) note, I also approach the customer ecosystem as a dynamic entity as its actors and actor constellations may change over time as the customer's goals, activities and experiences evolve.

I further view this customer ecosystem as the primary contextual frame for exploring customer experiences within the customer’s context. This approach broadens the scope of customer experiences to include not only core experiences with a service but also related experiences, for example with other providers – even non-related experiences forming the total experience with a business offering. As further elaborated in **articles 1 and 2**, I argue for the benefits of exploring customer experiences within the customer ecosystem. **Article 2** further explores how these various actors and actor constellations form the customer ecosystem and shape the customer experience with a specific form of smart self-service: activity trackers.
2.3 Smart self-service

The next section reviews how the marketing and service literature has approached self-service technology, smart self-service and one specific form of such services: wearables. The section ends by summarizing this thesis’s approach to smart self-services.

2.3.1 Origin and characterizations

Advances in technology have significantly changed how customers and providers interact in the marketplace. One noticeable manifestation of these changes is the proliferation of self-service technologies (SSTs), which enable customers to interact with technology instead of employees – often on a 24/7 basis (Bateson, 1985; Dabholkar and Bagozzi, 2002; Meuter and Bitner, 1998). Common examples include airport self-check-in (Liljander et al., 2006), self-checkout in stores (Wang et al., 2017), mobile banking (Ho and Ko, 2008) and online food ordering (Kimes, 2011). By replacing traditional “high-touch and low-tech” service encounters with more modern “high-tech and low-touch” interfaces (Wang et al., 2013), these SSTs enable individuals to achieve more convenience and flexibility by serving themselves (Liljander et al., 2006). Simultaneously, SSTs help the firm manage variations in service demand and improve service quality (Bitner, 2001; Meuter et al., 2000). SSTs have thus fundamentally changed “how services are conceived, developed, delivered, and integrated” in the marketplace (Lin and Chang 2011, p. 426). They have received wide scholarly attention in the contemporary marketing and service literature (Curran and Meuter 2005; Curran et al., 2003; Dabholkar, 1996; Meuter et al., 2005;). In the 1980s, Bateson (1985) identified ATM machines and pay-at-the-pump facilities as a form of customer self-service. Dabholkar (1994) introduced the term technology-based self-service to describe this self-service process. Dabholkar and Bagozzi (2002, p. 184) characterize these TBSSs as comprising both onsite (e.g. touch screens at hotels) and offsite (e.g. online banking) components. This work was later expanded upon by Meuter et al. (2000, p. 50), who defined SSTs as “technological interfaces that enable customers to produce a service independent of direct service employee involvement.” Aiming to create a solid conceptual foundation for future research on the topic, these authors provided a typology of SSTs based on the dimensions of interface, the type of technological interface with which the customer interacts, and purpose, which denotes what tasks the customer is trying to accomplish with this interaction.
To date, many studies have explored the various SSTs captured in this framework, investigating their relationship to technology adoption, service use and recovery, customer satisfaction, loyalty and overall company performance (Collier et al., 2014; Wang et al., 2017; Wang et al., 2013). Focus, however, has largely been on company-owned or controlled SSTs – meaning that the firm operates or manages the interface while the customer uses the technology on- or offsite. I argue that recent technology advances have led to a new interface type, often called smart service (Wünderlich et al., 2015). As Ostrom et al. (2015, p. 145, referring to Wünderlich et al., 2013) and Wünderlich et al. (2015) note, new types of “technology-enabled wearable devices, home appliances, cars, and so forth...enable the provision of smart services.” Wünderlich et al. (2015, p. 442, further referring to Allmendinger and Lombreglia, 2005) characterize such smart services as those that are “delivered to or via an intelligent object that is able to sense its own condition and its surroundings and thus allows for real-time data collection, continuous communication, and interactive feedback.” Research on this topic has increased recently, with studies exploring, for example, smart cities (Caragliu et al., 2009), smart mobility (Cledou et al., 2018), smart homes (Paetz et al., 2012) and smart wearable technology (“wearables”; Paluch and Tuzovic, 2019). Many of these smart services also enable customers to engage in self-serving behavior beyond company-owned or controlled SSTs. For example, the customer may borrow, buy or rent such a technological interface and then engage in self-serving behavior.

This is especially the case with wearables, which have emerged as the next frontier in smart self-services. Pioneering startups and tech and fashion giants have all entered the wearable market, offering consumers a wide variety of wearable devices and textiles. For example, in 2008, Fitbit launched their first wearable activity tracker. In 2015, Apple entered the market with the Apple watch. Five years later, sleep tracking has emerged as a serious wearable trend, helping people, for example, detect signs of sleep apnea and overall sleep quality. These wearables all have in common that they consist of tiny computers worn directly on the body. In a similar manner to the way mobile phones revolutionized communication, wearables are now changing how customers integrate self-service technology into their daily lives. Wearables as smart self-service take many shapes and forms, are applied in a variety of industries and functions and target diverse groups. In terms of shape and form, the main categories encompass smart watches, armbands, glasses, cameras and e-textiles. Sub-categories include rings, necklaces, earplugs, patches and pills. These wearables are further found in multiple different industries and functions. Today, one major category is fitness and wellbeing-related
wearables (Paluch and Tuzovic, 2019; Sultan, 2015), which enable customers to track and monitor their physical activities, such as running.

The characteristics of smart self-services are discussed more in detail in article 3.

2.3.2 My approach to smart self-services

In this thesis I build on the Dabholkar's (1994) and Meuter et al.’s (2000) foundational work on SSTs, but I further combine this stream with more recent research on smart service (Wünderlich et al., 2015) and wearables (Paluch and Tuzovic, 2019). I argue that many of today's SSTs are smart in nature – delivered through an intelligent object, which can range from a small-scale gimmick (wearable) to a complex ecosystem of services (a smart city). As such, not all smart services necessarily enable self-service. In this thesis, I focus on those that do, as these represent the majority of smart services. I further posit that smart self-services can be both firm- and customer-owned. Similarly, Meuter et al. (2000) recognize that some SSTs are indeed customer-owned, although they don’t elaborate upon the characteristics of such devices. Article 3 addresses this type of customer-owned smart self-service, aiming to extend the traditional SST classification scheme with a more contemporary view. Article 2 incorporates a specific form of customer-owned smart self-service as its empirical context: a wearable activity tracker.
3 RESEARCH APPROACH

This section discusses the research paradigm applied in this thesis, including its ontological and epistemological assumptions, methodological choices and the methods used to collect and analyze the empirical data.

3.1 My research paradigm

The term paradigm stems from Greek meaning “pattern” (Kivunja and Kuyini, 2017) and was first introduced in the research community by Kuhn (1962) as “an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools” (cited in Flick, 2009, p. 69). According to Kuhn (1977), the research paradigm essentially denotes a research culture and comprises the values, beliefs and assumptions that unite a research community around the nature of research as well as its conduct. A paradigm is powerful in that it creates the lens through which the researcher sees the world (Covey, 1989) – guiding how she interprets and acts within that world. Simply put, a paradigm represents the researcher’s worldview. This research paradigm is reflected in the researcher’s ontological and epistemological assumptions and methodological choices (Guba and Lincoln, 1994). Ontology refers to the study of being (Crotty, 1998) and addresses the question of what constitutes reality – i.e. what is – and the different entities and categories within that reality (McQueen and McQueen, 2010). Epistemology refers to the study of knowledge (Crotty, 1998). Epistemological assumptions address how knowledge can be created, acquired and communicated – i.e. what it means to know. Epistemology thus concentrates on the connection between the knower and the known. Finally, methodology refers to the action plan that justifies the use and choice of certain techniques (Crotty, 1998). These ontological and epistemological assumptions inform the researcher’s selection of methodology and methods.

Research paradigms have traditionally been categorized as dichotomies or as a continuum with extreme poles. The two commonly discussed paradigms include positivism and interpretivism. Positivism aims to identify “regularities and relationships that lead to generalizations and (ideally) universal principles” (Gioia and Pitre, 1990, p. 590). Ontologically, positivism views reality as independent of human perception, and, epistemologically, the researcher and the researched object represent distinct entities (Gioia and Pitre, 1990). This approach favors quantitative methods to reveal objective truths. In contrast, interpretivism argues that multiple realities and truths are socially
constructed and constantly change. The researcher and the object are interactively linked, and meaning is reciprocally created in the context of the situation. This subjective approach favors qualitative methods to reveal subjective truths.

This thesis applies interpretivism as its paradigm, and more specifically the phenomenological approach within this paradigm, as it sets to study customer experiences and customer ecosystems through a customer ecosystem lens. Phenomenology represents both a discipline and a method of inquiry, focused on studying the structures of experience and consciousness (Husserl, 1970; Heidegger, 1962). Phenomenology thus refers to the study of the individual’s lived experiences of the world and the meaning of this experience, including what is experienced and how it was experienced (Neubauer et al., 2019). As my focus in this thesis largely lies in the individual customer experience, I determined that this approach was the most suitable.

3.2 Ontological and epistemological assumptions

Ontologically, I view the experience as the basis of all existence. My focus is on the individual customer’s experiences with business offerings – the “customer experience.” Furthermore, epistemologically, I view the researcher and the researched as an inseparable entity, in which the researcher should aim to interpret the embedded meaning of the customer’s experiences. To better explain this standpoint, it is key to review the Husserlian and Heideggerian schools of thought within phenomenology.

Phenomenology as a philosophy emerged in the 20th century as a reaction to the prevailing positivist paradigm. The German philosopher Edmund Husserl (1859–1938) is often mentioned as its founding father – introducing not only descriptive phenomenology but also phenomenology generally (Giorgi, 2009). Husserl (1859–1938) believed that positivism’s complete focus on unbiased observations of external contexts did not sufficiently capture the reality of life and living. From a philosophical perspective, Husserl approached phenomenology as a way of penetrating deep into individual realities with the aim of reaching true meaning.

Ontologically, Husserl's descriptive phenomenology believes that the phenomenon of an object of an individual – a lived experience – is the reality. This reality exists independently of the researcher and can be discovered and described objectively when the researcher actively sets aside her personal beliefs, values and assumptions through reduction and bracketing (Natanson, 1973). The ultimate aim of descriptive
phenomenology is to discover the pure essence of this reality and generate new knowledge of this essence (Flood, 2010). For Husserl, phenomenology is thus primarily grounded in an epistemological attitude aiming to answer the question: “What do we know of the world?” This world is often described as the individual’s life world.

Husserl’s work was later adapted and expanded upon by Heidegger and his colleagues. In contrast to Husserl’s theory of knowledge, Heidegger (1962) proposed that phenomenology should be investigating the ontological question of “What is the meaning of being?” – building on ideas present in hermeneutics. Ontologically, Heidegger’s interpretive phenomenology argues that the lived experience denotes an interpretive process within the individual’s life world. Instead of aiming to reveal the essence of a phenomenon, it aims to understand the phenomenon in relation to the researcher. Epistemologically, Heidegger (1962) argued that a researcher is part of the world and that human beings simply can’t fully set aside their personal beliefs, values and assumptions. Instead of taking a detached observer position, one must use one’s personal biases and previous experiences to better understand an individual’s lived experiences (Finlay, 2009).

Ontologically, I recognize the Husserlian and Heideggerian schools of thought, both of which emphasize the individual’s reality, but instead of approaching customers as knowers of phenomena within their respective life worlds, I view them as actors in their worlds and focus on their relationship with their life worlds. I use the term “customer ecosystem” to describe this life world from a more managerial perspective. I don’t separate the customer’s experience from this customer ecosystem, nor from past or future experiences. As elaborated in article 1, I also view this customer ecosystem as a contextual lens through which to better understand customer experiences. As such, it also represents a frame of reference (see Shrivastava and Mitroff, 1983) that researchers and managers can use when exploring customer experiences. Ontologically, my thesis is thus more aligned with Heidegger’s than Husserl’s thoughts. Similarly, my epistemological assumptions are based on interpretive phenomenology. I believe that a researcher must immerse herself in the studied phenomenon and that it is impossible to set aside personal beliefs, values and assumptions in doing so. I am not looking merely to gain a descriptive understanding of the customer experience but to interpret its embedded meaning.
3.3 Methodology

Phenomenology represents both a philosophy and a method. Berger and Luckmann (1967) note that, when seen as a method, phenomenology offers the best set of tools with which to examine and understand everyday life and its foundations of knowledge. Usually, two methodological choices are possible in descriptive and interpretive phenomenology: semi- or unstructured interviews and written experience records (Landridge 2004). As its main objective is to obtain data, which include a concrete description or interpretation of an experience, the informant is often asked either to answer questions regarding the experience or to write a description of the experience. This facilitates the researcher's analysis and comprehension of another person's experiences with a phenomenon. In line with these guidelines, I have chosen in this thesis both methods to increase our understanding of how customers experience smart self-service in their own ecosystems.

3.4 Methods

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<td>Article 1</td>
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As Table 2 outlines, various data collection methods were applied in the articles. Article 1, which is conceptual in nature, applies a systematic literature review to identify and analyze articles on the formation of customer experiences. This article does not apply phenomenology per se as a research method, but phenomenology does emerge as a key topic in its findings. In line with common phenomenological approaches, both articles 2 and 3 use semi-structured interviews as the main data-collection method. Article 2 also complements these data with customer-reported diaries. The next section explains these methods and their application more in detail.
3.4.1 Article 1

Originally developed and used in the healthcare field, systematic reviews are used by an increasing number of business researchers for a wide variety of topics. According to Tranfield et al. (2003), a systematic literature review aims to synthesize and categorize the literature on a specific topic in a transparent, orderly and replicable manner. Such a review presents several benefits. Lightfoot et al. (2013) argue that a systematic review increases our understanding of a topic and guides future work, thus advancing the research field. Based on the guidelines of Tranfield et al. (2003) and consistent with other similar reviews (e.g., Bizzi and Langley, 2012; Mustak et al., 2013), the systematic-review process in article 1 comprised different phases. The first phase entailed a literature search in three databases (Emerald, Abi/Proquest and EBSCO). To locate the relevant literature, the searches employed various keywords. As article 1 aimed to study customer experience formation, I used the following keywords:

- In the title: customer or service experience
- In the abstract: service
- In the full or all text: marketing

I chose these keywords to locate as many relevant studies on the topic as possible, while simultaneously being able to demarcate the review’s scope. The time span for the studies was set as 1998–2015, as most research on customer experiences were published within this time frame (at the time of the database searches). After I removed the duplicates, these initial searches yielded 453 articles.

Phase two included a review of the abstracts based on a set of inclusion and exclusion criteria. For an article to be included in this phase, it had to 1) be written in English, 2) be available in full text, and 3) not refer to customer experience as suggestive of “knowing.” To ensure consistency and transparency across the reviewing process, I created an Excel file with general information on each article, such as (a) database, (b) publication name, (c) author(s), (d) journal and (e) publication year.

In the third phase, I analyzed the remaining sample (n=206) in detail, looking for referrals to the service literature and authors’ discussions around customer experiences. Although many of the included articles also discussed related concepts, like value and service quality, my emphasis was specifically on discussions around customer
experiences and their formation. To that end, the articles included had to 4) refer to the service literature and 5) discuss customer experience as a key concept. Based on these criteria, I excluded 54 additional publications.

Phase four involved a search for relevant references in the included articles, since the employed keywords in the initial search may have overlooked important articles due to differences in terminology. This search identified ten additional articles. These were included either because of their extensive citation in service research or their significant contribution to the service field. Other reviews (e.g. Mustak et al., 2013) have used similar criteria to strengthen a systematic review's final sample. With these additional publications, the final sample included 163 articles. Following the guidelines of Tranfield et al. (2003), I then performed a detailed analysis of these 163 articles. During this analysis, I read each article twice, looking for similarities and differences in the text. I focused on the discussions related to, and the characterizations of, customer experiences and their formation. At the end of this process, the Excel file contained detailed information for each included article about their (f) applied conceptualizations and (g) theoretical approaches, models and underpinnings. In doing so, two distinct approaches to customer experience formation, including the individual-level and contextual lenses – with various sub-approaches – emerged. These findings are discussed in the next chapter.

3.4.2 Article 2

According to Crossley (2006), the most common way to collect data using the phenomenological approach is with interviews. These can be unstructured or semi-structured. Unstructured interviews require no framework for the interview process, whereas semi-structured interviews contain some major themes that the interviewer aims to discuss during the interview (Bryman and Bell, 2011). Data in article 2 were obtained in two phases: first, semi-structured interviews among 28 customers regularly using an activity tracker. We used this semi-structured interview approach (Warren, 2002), as it is particularly suitable to gain a rich and in-depth understanding of phenomena like activity tracking (Deshpande, 1983). The study participants were selected purposively (Golafshani, 2003) based on the following criteria. The participant had to have used an activity tracker for at least one month. This was to ensure the participant’s familiarity with the device. The activity tracker could be a mobile application (e.g. Runkeeper), activity watch (e.g. Polar) or activity tracker (e.g. Jawbone). In total, 11 females and 17 males aged 20–50 participated in this first phase.
During the interviews for article 2, the participants were asked questions about their experiences with the activity tracker. Following the semi-structured interview approach, the interview guide included pre-defined themes like running, activity tracking and positive or negative memories of events around these themes and the customers’ everyday use of the devices. The themes were chosen to discover and map the customer’s experiences within her ecosystem as thoroughly as possible. Other studies (Dube and Helkkula, 2015; Helkkula et al., 2012) have used similar frameworks when exploring concepts like customer experiences, relationships and ecosystems. Each interview took about 30–60 minutes and was transcribed and saved to a separate Word document for analysis.

The second phase of data collection in article 2 consisted of customer-reported diaries. This method has been applied mostly in social science research (Hammersley and Atkinson, 1995) and psychology (Breakwell et al., 2006), but recently marketing and service research have also begun to explore the method. According to Patterson and Hogg (2004), diaries represent a valuable tool for exploring phenomena as they occur, as they help the researchers “capture rich insights into processes, relationships, settings, products, and consumers” (p. 142), all within the diarists’ daily life contexts. As such, they can also provide in-depth understanding of customers’ experiences with activity trackers in their own contexts, in real time (Bolger et al., 2003).

To complement the interviews, diaries of 10 customers using activity trackers were added to the final sample. The study participants were selected following the same criteria as in the first phase. In total, eight females and two males aged 20–50 participated in this second phase. All participants were given the same directives in writing their diaries. We asked the participants to elaborate upon and write freely about their activity tracking experiences after 5–6 consecutive runs. We provided the customers with some guidelines, including questions like “Describe your run today,” “Elaborate upon what affected your run today beyond the activity tracker” and “Describe how your experience of running with an activity tracker has evolved since you started using it.” By not focusing only on the activity tracker, we aimed to gain a more in-depth understanding of the customer’s ecosystem and its actors in forming the customer experience. The average time was 1–2 weeks of diary-keeping, consistent with other similar studies (e.g. Dube and Helkkula, 2015). All diaries were saved to separate Word documents.

For the coding and analysis of the collected data we used the guidelines of Strauss and Corbin (1990) and Spiggle (1994), who propose a structured approach to analyzing data,
by first focusing on abstraction and categorization before moving on to comparison and integration. Accordingly, the first phase entailed a thorough reading of the transcribed Word documents and a categorization of the data. The aim of this stage was to gain a more rigorous understanding of the participants and their experiences with the business offerings. Next, the transcripts were read through again, this time looking for emerging themes among the texts, following the same type of thematic analysis of qualitative data used by Braun and Clarke (2006) and Miles and Huberman (1994).

While reading through the transcripts, we concurrently sought and noted possible themes related to the customer ecosystem: specifically, its different actors and actor constellations and their influence on the customer experience. We located six distinct actor groups and three distinct actor constellations, resulting in three distinct customer ecosystem types. We also examined how these actors influenced the customer experience, identifying four actor roles with varying influence on the customer experience. We divided each transcript into data units and coded these under each actor, actor constellation and actor role. Finally, we compared these categories to identify similarities and differences.

3.4.3 Article 3

Data in article 3 were also obtained through semi-structured interviews, this time with six company representatives from technology industries. We applied the semi-structured interview approach, following the same reasoning as in article 2. This approach enabled the company representatives to discuss their company’s offerings openly while we could simultaneously probe for insights related to self-service devices (Richards and Morse, 2007). The companies included offer various types of self-service devices, such as robots, wearables, smart home appliances and other smart service devices. We selected the participants based on our assumptions about their ability to help us reach a better understanding of SSDs (Burns and Grove, 2001). The participants embodied various roles in their companies, yet were all considered experts in their respective industries. Following the semi-structured interview approach, the interview guide included pre-defined themes under five dimensions of enquiry: What? How? When? Where? Who? Service researchers have discussed and used similar dimensions in previous research on services (Gummerus and Pihlström, 2011). These dimensions provided a sound analytical framework to discover insights about customer SSDs in various technology industries. Each interview lasted for approximately 30–60 minutes and was transcribed and saved to a Word document for analysis.
During the data coding and analysis phase, this article followed the analysis framework provided by Spiggle (1994) and Strauss and Corbin (1990). While reading through the transcripts, we structured the findings in two steps with the help of the service and customer use framework and Lovelock’s (1983) service classification. Step 1 included structuring the findings into the categories of service features (who, what, how) and customer use features (when, where). In step 2, we adapted and applied Lovelock’s (1983) service classification to the empirical data. In doing so, we looked at 1) the subject of the service act (who) and 2) the nature of the service act (how or what). In this classification, the how and what dimensions were integrated because service outcomes and delivery are highly mutually dependent. We excluded the when and where dimensions, which likely vary extensively in an SSD context, as most SSDs can be used anytime and anywhere by the customer. To further acknowledge the unique characteristics of self-service, we made several assumptions in categorizing SSDs.

First, we position the customer as a subject instead of a mere recipient of the service act. This view is justified in the self-service context, as the customer is often expected to carry out service acts herself. We also distinguish self and other-directed devices. In self-directed devices, the customer is the main user. In other-directed devices, the service is often embedded in others or belongings, such as a pet or a refrigerator.

Second, instead of separating the intangibility and tangibility of the service act (Lovelock, 1983), we propose to use either monitoring or acting to describe the service’s content. Monitoring is more intangible: it includes sensing, data collection and storage, and acting is more tangible: it includes performing physical activities. In the next chapter, these theoretical underpinnings will be substantiated with empirical illustrations with the aim of providing a nuanced characterization of SSDs.
4 FINDINGS AND CONTRIBUTIONS OF ARTICLES

This section summarizes each article and discusses its primary contributions and role in this thesis.

4.1 Article 1

Article 1, published in *Journal of Service Management*, aims to increase our understanding of how customer experiences are formed in today’s service landscape. Although the customer experience concept has received wide interest in the existing marketing and service literature (Jaakkola *et al.*, 2015; Prahalad and Ramaswamy, 2004) most studies have focused on the *what* instead of the *how* of such experiences. To advance our understanding of customer experience formation, this article systematically reviewed and analyzed 163 articles from the service field, guided by the following research questions (See Lipkin 2016, p. 678):

- How have researchers approached customer experience formation in the existing service literature?
- Which theoretical underpinnings guide researchers in their approach to customer experience formation?
- Which approach or approaches are best suited for understanding, facilitating, and evaluating customer experience formation in today’s service landscape?

The findings reveal that service researchers have approached customer experience formation as multilayered. These layers include the individual level and contextual lenses. Whereas previous customer experience reviews (Helkkula, 2011; Verhoef *et al.*, 2019) identify similar perspectives as outlined within the two layers, this is, to my knowledge, the first attempt to outline the differences between them.

On the **individual level**, researchers have applied *stimulus-, interaction- and sense-making-based* perspectives when discussing customer experience formation. These perspectives explain service researchers’ theoretical framework for understanding how customers realize the experience in environmental, social and temporal contexts through intermediation (see Lipkin, 2016 p. 684). Depending on the perspective, this intermediation can be individual perception, interpretation or sense-making. These
perspectives demonstrate the individual nature of customer experiences. The perspectives are detailed in article 1 (Lipkin, 2016).

Researchers further apply contextual lenses (dyadic and service- or customer-ecosystem) to understand customer experience formation from a more systemic or managerially-relevant approach. These lenses echo “researchers’ theoretical underpinnings for explaining how various actor constellations and contextual boundaries frame” the individual customer’s experience formation (see Lipkin, 2016, p. 688). They provide a more managerially-focused angle on customer experience formation. These perspectives are detailed in article 1 (Lipkin, 2016).

Finally, this study argues why the sense-making-based perspective in particular, combined with a service- or customer-ecosystem lens, can help both researchers and managers better understand, manage and measure customer experience formation in today’s complex service environment. These perspective combinations provide holistic and systemic – rather than atomistic and dyadic – views of how customer experiences are formed and therefore succeed in portraying a more accurate view of contemporary customer experience formation.

This study makes several contributions to the existing service and customer experience literature. First, it extends previous work on customer experience by taking a broader view by recognizing, clarifying and increasing awareness of the individual-level approaches and contextual lenses. Second, it provides a more systematic and deeper understanding of customer experience formation by demonstrating the intermediation between an individual and her context and between various actor roles and contextual boundaries (see Lipkin, 2016). Third, by assessing the approaches’ opportunities and challenges, this study contributes valuable and actionable research and managerial implications for understanding, facilitating and evaluating customer experience formation.

4.2 Article 2

Article 2, to be sent under review to *Journal of Services Marketing*, aims to conceptualize and illustrate empirically how different customer ecosystem actors shape customer experiences. To date, most studies have focused on exploring customer experiences within dyadic interactions (Berry *et al.*, 2006). Only a few acknowledge the role of systemic contexts (e.g. Akaka and Vargo, 2015; Heinonen *et al.*, 2010). Applying a
customer ecosystem lens enabled a deeper understanding of customer experiences occurring in the customer’s life world, guided by the following research question (see Gummerus et al., 2009, p. 44):

- Which actors and actor constellations are present in the customer ecosystem, and how do they shape the customer experience with a smart service offering?

The study begins with a discussion of existing approaches to the customer experience and its context, including the dyadic (Meyer and Schwager, 2007; Prahalad and Ramaswamy, 2004), service (Vargo and Lusch, 2008, 2011) and customer-ecosystem (Heinonen et al., 2010; Strandvik et al., 2018) lenses. Building on work presented in article 1 (Lipkin, 2016), this study conceptualizes and explores customer experiences through a customer-ecosystem lens. It then empirically illustrates how actors within the customer ecosystem shape the customer experience in a smart service setting. Data consist of 28 in-depth interviews and 10 self-reported diaries with customers regularly using an activity tracker. The key findings of this section are threefold.

First, this study identified **six actor types** in the customer ecosystem: **focal customer, focal provider, other providers, co-customers and peers, family and friends** and **strangers**. By illustrating how various actors – including those unfamiliar with the focal service – can be relevant to the focal customer in her ecosystem and shape the customer experience with the service, this study encourages researchers and managers to go beyond market-related interactions to better understand the customer and her context.

Second, this study identified **three actor constellations** (see Table 3) based on the number of actors present in the customer ecosystem and their importance to the focal customer: **individual-, brand- and socially-driven customer ecosystems**. These customer-ecosystem types help demonstrate how the customer’s logic guides which actors are present in her ecosystem. This customer logic – comprising the customer goals, activities and experiences – thus is an excellent means to explore and categorize customer ecosystem types.
### Customer ecosystem types

<table>
<thead>
<tr>
<th>Ecosystem type</th>
<th>Actor constellation</th>
<th>Examples of focal customer goals driving the actor constellation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual-driven ecosystem</td>
<td>Individual customer dominates, while a few other actors are located farther from the focal customer.</td>
<td>Individually-focused Examples: Personal performance and improvement, or the goal of having no goals.</td>
</tr>
<tr>
<td>Brand-driven ecosystem</td>
<td>The focal provider dominates, while other actors vary in number and position.</td>
<td>Brand-focused Examples: Understanding running patterns through data, engaging with the latest technology/clothes</td>
</tr>
<tr>
<td>Socially-driven ecosystem</td>
<td>Multiple social actors dominate and are located close to the focal customer.</td>
<td>Socially-focused Examples: Connecting with other single and collective actors. Social status and competition</td>
</tr>
</tbody>
</table>

This study makes three key contributions to the existing service and customer experience literature. First, it extends it by demonstrating how customers’ ecosystems shape the customer experience. This approach challenges the prevailing interaction and co-creation views presented in article 1 by viewing customer experiences instead as emergent in the customer’s domain. Second, this study extends earlier work on ecosystems – particularly customer ecosystems – providing a detailed view of its actors and actor constellations. Although the empirical context was confined to a smart self-service setting, I argue that the findings are transferable to other contexts. Third, this study contributes with a research agenda on customer experiences, customer ecosystems and managerial recommendations for how providers can achieve a supporting role with significant customer experience influence and retain this role and influence over time.
4.3 Article 3

Article 3, published in *Journal of Services Marketing*, aims to introduce and characterize customer self-service devices (SSDs). It also proposes and applies a classification scheme of such devices with the objective of encouraging future research on the topic. In doing so, it aimed to answer the following research question:

- What characterizes a customer owned self-service device, and how does it differ from traditional self-service technology?

To date, service and marketing research has focused mainly on firm-owned SSTs, where customers use the service provider’s technological device, either from a distance or physically. During recent years, a new type of technological interface has also emerged in which customers first buy the technological device and thereafter engage in self-service behavior with the purchased technology. Despite the proliferation of such devices, however, academic research on the topic remains limited. Exploring such customer SSDs has enabled a better understanding of today’s self-service technologies and how customers experience them in their ecosystems.

This study begins with a discussion of the existing literature and perspectives on SST before introducing and characterizing one type: customer SSDs. This study then uses explorative, qualitative data collected among companies to further illustrate different types of such SSDs. Data consist of six companies offering various SSDs.

As outlined in Gummerus *et al.* (2019, p. 49), first, from a possession perspective (*who*), the findings illustrate how customer SSDs denote customer-possessed and -controlled smart self-service devices. As such, the customer largely controls, directs and monitors how she serves herself with these devices. Second, from an outcome (*what*) perspective, these customer SSDs aim to solve problems from the customer’s perspective. This stands in contrast to traditional SSTs, which often aim to solve problems from the firm’s perspective (Lin and Hsieh, 2006). Third, the service provision (*how*) of SSDs often takes place in new and customer-defined service processes and customer ecosystems. Finally, SSDs are not restricted to a firm-controlled service setting or time (*where* and *when*).

Following these empirical findings, article 3 classifies SSDs based on service and customer use features and on the subject and nature of the service act. The *monitoring – self* category includes SSDs enabling users to measure and assess their activities: for
example, activity trackers and other health-focused bodily sensors. The acting – self category includes SSDs embedded in other personal devices or even the human body, such as automatic insulin pumps and artificial organs. The third category, monitoring – others/belongings, includes SSDs that enable customers to monitor others (e.g. pet-tracking devices) or one’s belongings (e.g. home alarm systems). Finally, some SSDs fall into the category of acting – others/belongings. Using sensors and connections, these SSDs provide users with key data to make informed decisions: for example advanced energy-management systems that enable customers to regulate their energy usage. With these findings, this study makes two key contributions to the existing service and customer experience literature. First, this article extends the traditional SST literature with a conceptualization of customer SSDs. It provides a more contemporary view of SSTs, contributing to our understanding of personal and smart handheld devices. Second, the typology offers a useful theoretical framework to better understand different types of customer SSDs and to conduct future research on the topic.
5 CONTRIBUTION AND IMPLICATIONS

This section aims to summarize the thesis’s key insights by addressing the research purpose and objectives and discussing the findings’ contribution to the existing literature and implications for researchers and managers. It then presents the thesis’s limitations and future research directions.

5.1 Discussion and implications

This thesis set out to identify how customers’ ecosystems shape customers’ experiences with smart self-service. In recent years, the marketing and service literature has moved toward more holistic, dynamic and systemic views exploring how customers co-create experiences through service exchange (Akaka et al., 2015; Verleye, 2015) in various types of networks and service ecosystems (Tax et al., 2013; Vargo and Lusch, 2011). These studies transcend the traditional marketing and service literature, which defines customers as passive actors experiencing business offerings largely based on a firm’s actions during isolated touch points (see Payne et al., 2009). This thesis, however, argues that both approaches only marginally reflect issues related to customers’ processes in their ecosystems. Following a CDL approach (Heinonen et al., 2010), I suggest that, instead of exploring how to involve customers through co-creation or interactions, we should examine how customers involve and experience providers and business offerings in their own ecosystems. As the findings demonstrate, this nuance is key to understanding better what matters the most to the customer in her everyday life.

<table>
<thead>
<tr>
<th>Objective I</th>
<th>Summary of main findings</th>
<th>Article</th>
</tr>
</thead>
</table>
| To conceptually clarify how customer experiences are formed by identifying and assessing different approaches to this concept in the service literature. | • First, this thesis finds that researchers approach customer experience formation on the individual level by applying stimulus-based, interaction-based or sense-making-based perspectives. These reflect researchers’ theoretical frameworks for how individuals realize the customer experience within environmental, social and temporal contexts through intermediation.  
• Second, researchers apply dyadic, service-ecosystem and customer-ecosystem contextual lenses. These reflect their theoretical frameworks for how various actor constellations and contextual boundaries frame individual-level customer experience formation. | 1 |
Objective II
To conceptually and empirically explore customer ecosystem actors and actor constellations and how they shape the customer experience in a smart self-service context.

- First, this thesis identifies and describes six relevant actor groups in the customer ecosystem in a smart self-service setting: focal customer, focal provider, other providers, co-customers and peers, family and friends, and strangers. Customer ecosystem actors thus include both human and non-human and single and collective ones.
- Second, the number of actors and their importance to the focal customer results in different actor constellations forming individual-, brand- and socially-driven ecosystems. These ecosystem types show that customer ecosystems vary in size and scope and how actors drive customer experiences in combination rather than isolation.
- Third, in a smart self-service setting, these actors and actor constellations can shape the customer experience in various ways, ranging from marginal to significant and from positive to negative influence.

Objective III
To develop a smart self-service typology that captures how customers increasingly serve themselves and experience business offerings in their own ecosystems.

- First, this thesis introduces customer SSDs as customer-possessed and controlled smart service devices aiming to solve problems from the customer’s perspective, often within new, customer-defined service processes and ecosystems.
- Second, these customer SSDs are classified based on service and customer-use features and on the subject of the service act (self/other vs. belongings) and the nature of the service act (monitoring vs. acting).

The collective findings of these three articles reveal how the individual customer’s ecosystem plays a key role in shaping her experiences with a business offering through its actors and actor constellations (see Table 4, adapted from articles 1, 2 and 3; see Gummerus et al., 2009, p. 44; Lipkin, 2016, p. 678). The findings demonstrate the value and usefulness of approaching customer experiences as being formed within customer ecosystems. This is particularly true in smart self-service settings, where customers increasingly serve themselves in their own contexts (Wunderlich et al., 2015), as with activity trackers. Although this may require researchers and managers to apply a different lens than they are used to using, this thesis demonstrates several benefits of doing so. One primary benefit is that researchers and managers minimize the likelihood of missing key factors, actors or actor constellations present in the customer’s life, which have a significant influence on customers’ experiences with a specific business offering. In today’s competitive business landscape, such insights can give firms a much-needed advantage. The next section further explains how each article contributes to achieving objectives I-III and consequently the overall purpose of this thesis.
**Objective I**

**Article 1** clarifies the different perspectives on customer experience formation and finds that service researchers have approached the phenomenon using various combinations of individual-level perspectives and contextual lenses. Similarly to the related concepts of value (Grönroos and Voima, 2013) and relationships (Grönroos and Voima, 2013), this article makes a conceptual case for the importance of studying not only the *what* but also the *how* of customer experiences. The literature review showcases this approach’s provision of a more systematic and clearer picture of an inherently complex phenomenon. In assessing the challenges and opportunities of each approach, the *sense-making-based perspective* and *customer-ecosystem lens* emerge as especially suited to generating a deeper understanding of experiences in customers’ ecosystems. This perspective–lens combination differs from other approaches in that it highlights the customer’s primary role in business while extending her context beyond the focal service and interactions. Thus, it becomes easier to identify, manage and evaluate factors and actors the customer considers important and who play a role in forming the customer experience. **Article 1** thus meets **objective I**.

**Objective II**

Adopting this perspective–lens combination, **article 2** empirically explores the customer ecosystem’s components and how these shape the customer experience. The findings help establish how multiple actors within and beyond the focal business offering – in various *constellations* – drive the experience with a smart self-service offering. Consequently, researchers and managers should look outside customer–firm touch points and journeys to gain an accurate picture of how customers relate to and experience business offerings. Furthermore, **article 2** finds that actor constellations are essentially grounded in the focal customer’s logic – her goals, experiences and activities (Heinonen and Strandvik, 2018). Mapping customers’ ecosystems then entails exploring customer logic and segmenting customers based on similarities and differences in such logics. Although this thesis acknowledges that each customer ecosystem is distinct and reflects a unique customer logic, there are commonalities that can help drive such categorizations. This also makes the customer ecosystem highly actionable and managerially relevant. By further focusing on the smart self-service context of activity trackers, **article 2** illustrates how customer experiences with such services are driven by a customer-ecosystem context and how the included actors and actor constellations can shape the customer experience in various ways, ranging from marginal to significant and
from positive to negative influence. Thus, the customer ecosystem offers researchers and managers a great lens through which to better understand smart self-service experiences. **Article 2** thus meets **objective II**.

**Objective III**

Finally, article 3 introduces and develops a smart self-service typology that captures how customers increasingly serve themselves and experience business offerings in their own ecosystems. With a conceptual review and empirical illustrations, this article introduces and characterizes customer SSDs as “customer-possessed and controlled smart service devices aiming to solve problems from the customer’s perspective, often within new, customer-defined service processes and ecosystems” (Gummerus et al., 2019, p. 45). These findings contrast with traditional SSTs, which have been explored as solving problems from the firm’s perspective in the firm’s environment during pre-defined touch points (Meuter et al., 2000; Liljander et al., 2006). Researchers and managers must acknowledge that today’s technologies differ from yesterday’s and warrant customer-centric approaches accounting for the customer’s ecosystem. By further classifying customer-owned SSDs based on service and customer use features and the subject and nature of the service act, this article also offers a practical approach to conducting further research on SSTs. **Article 3** thus meets **objective III**.

### 5.2 Contribution to theory

This thesis makes several theoretical contributions to the marketing and service literature. This section details these contributions, linking them to specific research fields.

First, this thesis contributes to the existing marketing, service and customer experience literature by providing a better understanding of the **customer experience**. While previous research on customer experiences has focused on exploring the firm’s activities and effect on the phenomenon (Carbone and Haeckel, 1994; Pine and Gilmore, 1998) or what a customer experience constitutes (Helkkula, 2011; Zomerdijk and Voss, 2010), few studies have discussed or examined how customer experiences come to be – especially within a customer ecosystem. By focusing on these aspects, this thesis adds to existing studies with a nuanced and critical view on customer experience formation. In particular, this thesis extends previous review articles on customer experiences (e.g. Jaakkola et al., 2015; Verhoef et al., 2009) by identifying and reviewing researchers’ various individual-
level perspectives and contextual lenses on customer experience formation in a transparent and replicable way (Tranfield et al., 2003). In doing so, this thesis helps clarify and raise awareness of the different customer experience layers and approaches. Another key contribution is its conceptual and empirical exploration of the formation of customer experiences, specifically in the customer ecosystem. By approaching customer experiences as being formed through intermediation between an active individual and her ecosystem context, where various actors and actor constellations shape the experience, researchers gain a useful and more accurate picture of how customers experience the offerings in today’s service landscape. Although this thesis focuses on exploring customer experiences in a smart self-service setting, I argue that these insights can be extended to other contexts as well and help explore customer ecosystems’ influence on other similar phenomena, like value formation (Voima et al., 2011) and customer activities (Mickelsson, 2013).

Second, this thesis’s key contribution lies in deepening our understanding of the customer ecosystem. It thus responds to recent calls to increase our knowledge of this concept (Leino, 2017). Although interest in networks and the systemic aspects of business has grown, customer ecosystems have received limited attention, with most studies being conceptual in nature (e.g. Heinonen and Strandvik, 2015). The findings of this thesis have established that the customer ecosystem comprises multiple actors and actor constellations. By characterizing these actors and mapping distinct actor constellations, this thesis adds to and extends previous work on customer ecosystems in the CDL literature stream (Heinonen and Strandvik, 2015; Voima et al., 2011) with a more detailed conceptualization, synthetization and empirical evidence of its components. It also contributes empirical insights into how customers experience a specific smart self-service within their ecosystems. In doing so, it answers several calls to empirically explore health-related smart services in more depth (Gummerus et al., 2018; Wunderlich et al., 2013).

The identified actor groups align with and confirm existing studies on customer-ecosystem components (Heinonen and Strandvik, 2015; Voima et al., 2011). For example, as Heinonen and Strandvik (2015, p. 479) note, the customer ecosystem can include “service providers, other customers (individuals and firms), other actors, and the physical and virtual structures related to the service.” The identified actor constellations also add novel insights around customer ecosystem types. To the author's knowledge, this thesis is among the first to map out different customer ecosystems. By further
illustrating how the types and number of actors included in the customer ecosystem are grounded in what the customer aims to achieve, do and experience, this thesis also adds to the existing research on customer logics (Heinonen and Strandvik, 2015). This thesis thus demonstrates how the exploration of focal customers’ selection and prioritization of actors can yield valuable insights into customer logic and vice versa. Researchers are encouraged to study these aspects in more depth in various empirical settings.

Third, this thesis contributes to the existing self- and smart service research by characterizing and defining customer SSDs. To date, the self-service technology (SST) literature (Giebelhausen et al., 2014; Meuter et al., 2000) has largely focused on exploring firm-controlled devices, where customers use the service provider's technological device either from a distance or physically. The introduction of customer SSDs provides a more contemporary view to the existing literature, acknowledging that customers increasingly serve themselves in their own ecosystems. The literature review and empirical illustrations help form a better understanding of what these customer SSDs are and how they differ from other company-owned SSTs. Researchers are encouraged to approach customer SSDs as a distinct form of SSTs. The SSD typology further offers researchers and managers a useful theoretical framework to better understand various customer SSD types and conduct further research on the topic. This framework is practical in that it helps researchers and managers distinguish among different SSD types. By focusing on more abstract dimensions instead of technology interfaces, it enables a broader approach to future SSDs than the traditional SST typology frameworks.

5.3 Managerial implications

Companies often struggle to understand their customers while focusing more on internal processes and creating business offerings and communications that they think will engage customers to buy more. As we are all humans doing business with other humans, “stepping into someone else’s shoes” doesn’t come naturally to most of us. Understanding contemporary customers’ experiences within their own ecosystems should, however, be key for any firm aiming to be successful in the market (Christensen and Olsen, 2002). Table 5 captures the key managerial implications of this thesis as they pertain to customer experiences, customer ecosystems and smart self-service.
Table 5  
**Key managerial implications**

<table>
<thead>
<tr>
<th>Managerial implication</th>
<th>So what?</th>
</tr>
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<tbody>
<tr>
<td>1. Approach customer experiences as holistic and dynamic, formed within the customer’s own ecosystem, rather than as static and atomistic firm-created phenomena.</td>
<td>This approach will help you to uncover factors and actors beyond the focal firm’s visibility and control that have a significant influence on the customer’s experience with your firm’s offerings. Such insights will further help you predict long-term customer behavior and innovate and design business offerings that become deeply embedded in customers’ lives.</td>
</tr>
<tr>
<td>2. Map out existing and potential customers’ ecosystems, including their actors and actor constellations, to identify distinct ecosystem types.</td>
<td>This type of segmentation goes beyond traditional demographic and psychographic variables to acknowledge the customer’s ongoing life, including her goals, activities and experiences. Still, by identifying commonalities among a customer’s ecosystems, this approach remains actionable. The identified customer ecosystem types can be used as a basis for your segmentation and targeting efforts: crafting relevant and effective value propositions and marketing communications.</td>
</tr>
<tr>
<td>3. Focus on better understanding what role your firm plays in the customers’ ecosystem and whether you succeed in meeting your customers’ goals.</td>
<td>This allows you to quickly and regularly understand how much influence the firm and other actors (competitors, co-customers, family and friends) have over the customer experience and take appropriate (corrective) actions as needed.</td>
</tr>
<tr>
<td>4. Customer-owned smart self-service devices, such as sports-tracking wearables, present firms with an excellent means to increase their customer understanding, but also a challenge, as it becomes more difficult to influence the customer experience with such services.</td>
<td>Customer-owned SSD tracking mechanisms allow you to closely follow how the customer experiences the offering in her daily life. These insights can be used to further improve the SSDs’ service features and develop new offerings. The tricky task is to find ways to influence the customer experience within the customer’s own ecosystem, as interactions with the firm per se remain limited. This influence could take place, for example, by aiming to become more present in the customer’s ecosystem through social platforms, and other actors’ related to the customer’s ongoing life.</td>
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By increasing their understanding of and thoroughly evaluating customers’ experiences grounded in their ecosystems and how the customer ecosystem shapes the experience with an offering, firms can more easily gain actionable customer insights, predict long-term customer behavior and innovate and design offerings that become deeply embedded in customers’ lives. As noted throughout the thesis, this is becoming even more important as customers increasingly serve themselves (Ostrom et al., 2015) in contexts that often fall beyond the firm’s environment. In addition, as this thesis demonstrates, new smart technologies (Wunderlich et al., 2015) provide companies with excellent tools to achieve this goal.
5.4 Limitations and future research directions

As with all academic work, this thesis has limitations. First, regarding customers’ experiences and ecosystems, it incorporates data from customers to achieve a better understanding of these concepts. The firm’s and managers’ perspectives are excluded as analysis units. Future research could explore how firms and managers approach customer experience formation within customer ecosystems. Such studies could yield insights into the discrepancies and similarities among the firm’s, managers’ and customers’ perspectives.

Second, the individual-level and contextual lenses of customer experience formation were primarily explored from a conceptual point of view. Researchers are encouraged to explore the multiple layers of customer-experience formation in various empirical settings.

Third, this thesis calls for more research on the key components of the customer ecosystem and how these may evolve over time. This thesis provided only an initial qualitative analysis of the customer-ecosystem actors. Future studies could incorporate quantitative methods to map out actors and their different roles – and how these roles may change over time – in the customer ecosystem.

Fourth, customer SSDs were explored only conceptually with illustrative data from firm representatives. Future studies should empirically validate the introduced conceptual framework with data collected among customers.

Fifth, this thesis focuses on the empirical context of smart self-service. The studied concepts of customer experiences and customer ecosystems, however, are by no means restricted to this setting. Future research should study both concepts in various B2B and B2C contexts and industries to increase our understanding of how customer ecosystems’ actors and actor constellations shape the customer experience with various business offerings.
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APPENDIX 1 LIST OF ARTICLES

ARTICLE 1


ARTICLE 2


ARTICLE 3

This is the post-print version (author’s manuscript as accepted for publishing after peer review but prior to final layout and copyediting) of the following article:


**CUSTOMER EXPERIENCE FORMATION IN TODAY’S SERVICE LANDSCAPE**

Lipkin, M. (2016)
Abstract

**Purpose** – This study aims to review customer experience formation (CXF) by first locating and analyzing how researchers approach CXF in the service literature and the theoretical underpinnings of these approaches, and then assessing which approaches are best suited for understanding, facilitating, and examining CXF in today's service landscape.

**Design/methodology** – This study systematically reviews 163 articles published between 1998 and 2015 in the service field.

**Findings** – This study illustrates how researchers approach CXF on the individual level by applying stimulus-, interaction-, or sense-making-based perspectives. These reflect researchers’ theoretical underpinnings for how individuals realize the customer experience (CX) within environmental, social, and temporal contexts through intermediation. Researchers further apply contextual lenses, including the dyadic and service- or customer-ecosystem lenses, which reflect their theoretical underpinnings for explaining how various actor constellations and contextual boundaries frame individual-level CXF. Finally, this study shows why the sense-making-based perspective, together with a service- or customer-ecosystem lens, is particularly suitable for approaching complex CXF in today’s service settings.

**Research limitations/implications** – To advance theory, researchers should choose the approaches resonant with their research problem and worldview but also consider that today’s complex service landscape favors holistic and systemic approaches over atomistic and dyadic ones.

**Practical implications** – This study provides managers with recommendations for understanding, facilitating, and evaluating contemporary CXF.

**Originality/value** – This study advances our understanding of CXF by systematically reviewing its multiple layers, approaches, and dimensions and the opportunities and challenges of each approach.

**Keywords** – Customer experience formation, Systematic review, Individual level, Contextual lens, Service landscape

**Paper type** – Literature review
1. Introduction

Interest in customer experience (CX) has increased exponentially over the past decades among service researchers and practitioners. Many researchers now consider CX to be a key research priority in the contemporary service and marketing literature (Jaakkola et al., 2015). Likewise, managers recognize the need to invest in CX strategies across offerings, categories, and channels to remain competitive in a rapidly evolving service landscape (Ostrom et al., 2015). Zomerdijk and Voss observe that, “increasingly, many service organizations are placing the customer experience at the core of the service offering” (2010, p. 67). Meaningful CXs play a pivotal role in enhancing a firm’s competitive advantage (McColl-Kennedy et al., 2015a) and engendering increased customer satisfaction, loyalty, and firm revenue (Klaus and Maklan, 2012), essentially forming the fundamental premise of all business (Helkkula, 2011).

However, despite this wide interest, CX requires further exploration. In particular, researchers call for more research on how CXs are formed (Edvardsson et al., 2005; Pareigis et al., 2012). This study refers to customer experience formation (CXF) as the different ways in which an experience is realized through intermediation between individual and the context, as well as is shaped from a more actor-related and often abstract, contextual viewpoint. When studying a concept as complex as CX, it is essential to increase the understanding of how such phenomena come to be, in addition to looking at what constitutes CX. Likewise, in the related value literature, researchers pinpoint the importance of not only studying value but also how value is generated (Grönroos and Voima, 2013). In doing so, we gain a clearer and more analytical perspective of an inherently complex phenomenon, which helps researchers to conduct valuable work on the topic and managers to improve their daily practices around the phenomenon.

Several issues in existing service research further highlight the need, and serve as the present paper’s underlying motivation, to systematically review CXF in more depth. Although some review papers explore CXF by discussing its collective, interactive aspects (Jaakkola et al., 2015) or more instrumental creation (Verhoef et al., 2009), they all approach the phenomenon from a distinct theoretical perspective and do not adopt a systematic approach to analyzing the literature. Because today’s service research on CXs and their formation remains fragmented, with multiple co-existing approaches anchored at varying levels (Akaka et al., 2015) and highlighting different dimensions (Frow and Payne, 2007), actors (Heinonen et al., 2010), and contextual boundaries (Akaka and
Vargo, 2015), there is a clear need to systematically identify this broad spectrum of CXF approaches. A systematic review and analysis of the approaches, especially including their theoretical underpinnings, would go beyond a mere synthesis by adding much needed structure to the CX, and increasing our understanding of how this phenomenon comes to be.

In light of the complex and rapidly evolving service landscape, where trends such as technological advancement (Rust and Huang, 2014) and the rise of the individual (Van Doorn et al., 2010) are transforming service provision and increasing market competition, researchers have begun to replace old views on key concepts such as value and relationships (Grönroos and Voima, 2013). This also applies to CX, with several scholars encouraging researchers to acknowledge the customer and other stakeholder roles to a greater extent (e.g., McColl-Kennedy et al., 2015b), because, for example, traditionally dyadic service provision now often occurs within complex systems (Tax et al., 2013). Due to this changing service landscape (Ostrom et al., 2015) where customers also have more control than ever before, managers are struggling to understand, facilitate, and evaluate how their customers’ experiences are formed. To help researchers to be relevant and managers to be successful in their daily CX practices, this study identifies the need to review the approaches’ opportunities and challenges to further assess which best suit today’s service landscape.

To develop a more in-depth understanding of CXF, this study systematically reviews and analyzes the service literature, guided by the following three research questions: How do researchers approach CXF in the existing service literature? Which theoretical underpinnings guide researchers in their approach to CXF? Which approach or approaches are best suited for understanding, facilitating, and evaluating CXF in light of today’s service landscape?

This paper systematically reviews 163 articles published between 1998 and 2015 to first identify how researchers approach CXF at a concrete, individual level, whether applying a stimulus-, interaction-, or sense-making-based perspective. This level reflects the theories underpinning researchers’ understanding of how individuals realize CX within an environmental, social, and temporal context. This study further shows how researchers apply different contextual lenses, including dyadic and service- and customer-ecosystem lenses, to explain how various actor constellations and contextual boundaries frame individuals CXF. These lenses reflect researchers’ theoretical
underpinnings for understanding CXF as a wider market-related and/or managerially relevant phenomenon.

This study adds to and extends previous reviews on CXs with a more wide-ranging view by identifying, clarifying, and raising awareness of the individual-level perspectives and contextual lenses for CXF, including their underlying theories. By highlighting the intermediation between individual and context, and actor roles and contextual boundaries, this study provides a more structured and in-depth understanding of CXF. Assessing the approaches’ opportunities and challenges encourages researchers and managers to apply a holistic (sense-making) individual-level perspective, together with a systemic contextual lens (a service- or customer-ecosystem lens) to portray CXF in today’s service landscape. Based on its analysis, this study also contributes valuable implications for understanding, facilitating, and examining contemporary CXF.

The remainder of this paper is organized as follows: Section 2 introduces the CX literature and CXF. Section 3 describes the systematic review process and section 4 analyzes the individual-level perspectives and contextual lenses. Section 5 provides a summarizing discussion of these approaches. Section 6 further discusses the approaches' opportunities and challenges, and includes recommendations for researchers and managers. The final section ends with this study's theoretical contributions and limitations.

2. Customer experience and customer experience formation

Service researchers often use the terms customer experience (CX) and service experience interchangeably (Jaakkola et al., 2015). For clarity, this study will only use CX to depict customers’ experiences with service. The service literature currently includes multiple characterizations of CX, partially due to the experience concept’s complexity. According to Palmer (2010) we can approach the experience from a knowledge-accumulating view or from a process- or event-based perspective because it can be both a noun and a verb in the English language. Service researchers often characterize CX as the latter, by discussing CX as a sequential process or a non-linear phenomenological event (i.e., a verb) (Edvardsson et al., 2005; Helkkula, 2011). Some authors also view the CX as an outcome in the form of a total CX (Berry et al., 2002). This study acknowledges all three CX characterizations to not exclude any relevant research.
CX thus also signals that something is (a process or phenomenon) or has been (an outcome) formed in one way or the other. To explicitly emphasize how CX comes to be, this study adds the term formation. To date, researchers have described customer experience formation (CXF) as a multifaceted phenomenon, taking place through individual, internal processes (Sandström et al., 2008) and observable, contextual events (Verhoef et al., 2009). Many recent papers further study this phenomenon by looking at collaborative co-creation (Frow and Payne, 2007), instrumental creation (Meyer and Schwager, 2007), or the more organic emergence of CXs (Heinonen et al., 2013). Indeed, authors increasingly discuss various aspects of CXF; yet extant research lacks a systematic study of all the different approaches to CXF and their theoretical underpinnings. Existing review papers often highlight distinct CXF forms like co-creation (Jaakkola et al., 2015) or creation (Verhoef et al., 2009), rather than the many different theoretical perspectives on the phenomenon.

Worth noting here is that although researchers also employ terms such as co-creation (Payne et al., 2009) or creation (Meyer and Schwager, 2007) to depict CXF, this study retains formation because its connotations are less biased and more wide-ranging than other terms, which represent distinct streams, such as service-dominant logic (SDL) (Vargo and Lusch, 2008) and management practice (Berry et al., 2002). Consequently, in this study, the term CXF does not refer to a specific theoretical approach (although its connotations could indicate a more natural than instrumental perspective, see Grönroos and Voima 2013), but operates as an overarching term. The next section identifies how researchers have approached CXF.

3. Methodology

This study employs a systematic search and review process to identify the relevant literature on CXF. A systematic review synthesizes and categorizes research findings in a transparent, replicable, and orderly manner to increase the understanding of a phenomenon (Lightfoot et al., 2013).

3.1. Sample and preliminary analysis

Following guidelines from Tranfield et al. (2003) the first phase of the reviewing process comprised searches in three scientific databases: Business Source Complete (EBSCO), Emerald, and ABI/Proquest. These databases cover a wide range of publications relevant
to the research topic. The search employed the following key words: customer experience or service experience in the title, service in the abstract, and marketing in the full text or all text (depending on search engine options). These purpose-driven terms were chosen to locate as many relevant publications as possible (Schibrowsky et al., 2007). Using only customer experience could have excluded important papers, given that many researchers use customer and service experience interchangeably (Jaakkola et al., 2015). The time span for the included studies was January 1998 to September 2015, because most CX studies have been published within this time frame. After removing duplicates, the initial searches returned 453 articles.

All abstracts were then reviewed based on predetermined inclusion and exclusion criteria. To be included at this stage, an article had to be (a) written in English and (b) available in full text. Only (c) peer-reviewed articles were selected, because they represent validated academic knowledge (Podsakoff et al., 2005). Articles (d) that did not refer to CX, or which did so only loosely, by viewing the concept as indicative of learning or knowing, were excluded. If there was any question about whether an article could potentially contribute to a more in-depth understanding of CXF, the article’s introduction and theoretical discussion were also reviewed. All articles (included and excluded) were reported in an Excel file to ensure transparency. This file included general information on each article, including the (1) database source, (2) publication title, (3) authors, (4) journal title, (5) and publication year.

Next, the remaining sample articles (n = 207) were scanned for references to the service literature and theoretical discussions on the topic. Although many articles mention related concepts, such as value and service quality, an article had to (e) refer to service literature and (f) discuss CX as one of its main concepts to be included in this study. Based on these criteria, another 54 publications were excluded. This step also involved reviewing the articles’ reference lists to ensure that seminal papers were not overlooked due to divergent keyword phrasing. Ten additional publications (see Table 1) were deemed important due to extensive citation, significant contribution to service research or contemporary discussions on CXF. The final sample included 163 articles.

(Insert Table 1 here)
3.2. Content analysis

As in Tranfield et al. (2003), the next phase was a more detailed, qualitative content analysis. All articles were first arranged in chronological order and read twice to identify their approaches to CXF. To achieve this objective, the author analyzed the differences and similarities between texts, focusing on discussions related to, and definitions of, CX and its formation and theoretical approaches, including underlying theories and models. At the end of this analysis, the researchers’ (6) definitions of CX, (7) their approach(es) and references to its formation, and (8) their underlying theories and models were added to the Excel database for all included studies. Although researchers did not often clearly distinguish between them, this study identified two overarching modes of approach to CXF as a result of this process: the individual-level perspective and the contextual lens (See figure 1).

First, it became evident that researchers discuss CXF by applying different perspectives at a very concrete, individual level. This individual level represents a micro approach that focuses on the individual (often referred to as the customer) and how s/he experiences a service within a given context – that is, realizes that an experience is taking place. This individual level reflects the theories (i.e., the ontological and epistemological assumptions, see Tronvoll et al., 2011) underpinning researchers’ understanding of how a CX comes to be for the individual, and thus, represents a fundamental premise for advancing our CXF knowledge.

Second, it became apparent that researchers approach CXF by applying various contextual lenses, consisting of different actor constellations and contextual boundaries, to explain how these frame the individual’s CX evaluation. These lenses range from the concrete to the abstract, often transforming CXF into a multilayered phenomenon. The different lenses also necessitate further analysis to increase our understanding of CXF, because they illustrate how researchers approach CXF not merely as a subjective and conscious state (Holbrook and Hirschman, 1982) but also as a wider market-related (Akaka et al., 2105) and/or managerially relevant phenomenon (see Heinonen and Strandvik, 2015).

The next section first reviews the different CXF perspectives at the individual level, including key studies and their criteria. Then, this study does the same for the contextual lenses. Worth noting here is that researchers apply an individual-level perspective
together with a contextual lens when discussing CXs and their formation, although they may not always be aware of this themselves. This study, however, distinguishes between the two to illuminate how multiple approaches guide researchers in their views on CXF, making this a multilayered phenomenon. This study names the approaches ‘perspectives’ and ‘lenses’, respectively, to clearly distinguish between the two.

4. Findings

4.1. CXF at the individual level

Most service researchers characterize CX as subjective, personal, and, at least partially, internal (e.g., Helkkula et al., 2012a), highlighting the individual customer having both a physical body and a psychological mind. Most scholars further conceptualize CX as event-specific and contextual (e.g., Edvardsson et al., 2005). This study refines this (often external) context according to the spatial, social, and temporal dimensions of CX, as have many other researchers (e.g., Verhoef et al., 2009). It is through intermediating mechanisms — the links between individual and context — that formation takes place. This study refers to these mechanisms as the mental processes (e.g., perception, interpretation, and sense-making) through which CXs are realized.

The content analysis reveals how researchers apply various theoretical perspectives to explain CXF at this level (see Table 2). The next section discusses these perspectives (stimulus-, interaction-, and sense-making-based) to understand their approaches to the context, the individual, and the intermediation between the two in forming CX. Worth noting here is that because the experience per se represents a universal concept and such a fundamental part of our lives (Pollio et al., 1997), the perspectives inevitably have some similarities in their views on CXF. Nonetheless, as the subsequent analysis shows, they do diverge on a number of important aspects, such as their theoretical underpinnings and areas of foci.

To review the perspectives, a number of key articles (n = 27) were selected from the final sample based on citation count, publication outlet, and contribution/novelty value (as in Bizzi and Langley’s [2012] network processes review), each exemplary in its approach to formation. The studies were grouped according to their (1) theoretical underpinnings,
(2) central concepts, (3) CX conceptualization and, importantly, their explanation of the 
(4) individual, the (5) context, and (6) the intermediating mechanisms between the two 
(see Table 2). Researchers highlight similar categories for identifying the differences 
between theoretical perspectives (Strandvik et al., 2014). While some studies incorporate 
elements and terminology from multiple perspectives when discussing CX, as is often 
the case with review papers, they were not included as key studies.

(Insert Table 2 here)

4.1.1. The stimulus-based perspective

The content analysis shows that service researchers traditionally apply a stimulus-based 
perspective to explain CX. This perspective reflects service researchers’ heavy emphasis 
on quantitative, static and linear quality measurement of service per se (Zeithaml et al., 
1996) over past decades, by focusing on external stimuli, responses and perception. 
Many researchers, however, still apply this approach, especially in the service design and 
management literature. This perspective often uses the stimulus-organism-response (S-
O-R) model and/or a generic sensation–perception framework, both of which stem from 
environmental and behavioral psychology (Mehrabian and Russell, 1974), and 
psychophysics (Fechner, 1860). The S-O-R model (Mehrabian and Russell, 1974) 
suggests that environmental stimuli (S) affect the individual’s (O) cognitive and affective 
inner states, thereby influencing behavior (R) (i.e., approach or avoidance). Similarly, 
the sensation–perception framework (Fechner, 1860) says that externally stimulated 
sensations lead to internal perceptions, which give rise to individual actions. These 
theories characterize perception as the process of interpreting responses through 
internal cognition and emotion to gain meaning from the external world (Goldstein, 
2009).

In line with this perspective, stimulus-based studies conceptualize CX as comprising 
subjective and internal responses to, and contact with, the service elements created by 
the service provider (e.g., Berry et al., 2002; Meyer and Schwager, 2007). In doing so, 
researchers see the individual as rather passive, with CXF largely determined by the firm. 
Consequently, the environmental dimension that includes stimuli-labeled service 
elements (Meyer and Schwager, 2007) cues (Pine and Gilmore, 1998), and clues (Berry 
et al., 2006) also plays an essential role in forming the CX. Many researchers refer to this 
dimension as the servicescape (see Bitner, 1992): it follows the same logic as the S-O-R 
model, emphasizing atmosphere, spatial layout, and functionality, as well as signs,
symbols, and artifacts. Some researchers also acknowledge the social dimension of this context, albeit often emphasizing this dimension less than the environmental one. Berry et al. (2006), for example, characterize some service clues as humanic, i.e., emanating from people, while Zomerdijk and Voss (2010) say that experiential context also consists of relational elements, like interactions with other customers and the firm.

These external stimuli prompt sensations (Pullman and Gross, 2003) and responses (Meyer and Schwager, 2007) in primarily passive individuals and thereby activate internal cognitive (thinking) and emotive (feeling) processes through which individuals gain meaning from the external world. Berry et al. postulate that, “it is often small clues that influence a customer’s overall perception of an experience” (2006, p. 43). Perception thus acts as an intermediating mechanism between the external context and the individual, forming the CX. Ideally, this perception should also elicit desired behavior (acting) in the individual, eventually leading to greater customer satisfaction and loyalty. Researchers further characterize this CXF as rather atomistic. That is, studies often adopt a snapshot view (Slåtten et al., 2009) of a given point in time. Few researchers (e.g., Zomerdijk and Voss, 2010) also acknowledge the temporal dimension from a more dynamic, monologic perspective (James, 1912) observing that past experiences can affect how customers perceive future ones.

4.1.2. The interaction-based perspective

The content analysis further shows how some researchers in the early 2000s begin to apply an interaction-based perspective as an extension of the stimulus-based approach, positing that the latter does not sufficiently emphasize social interactions and individual processes. This approach draws from the theories discussed above but adds elements found in the dialogic paradigm (Clark and Brennan, 1991) and hermeneutics (Bleicher, 1980). The dialogic paradigm focuses on the more explanatory and dialogical aspects of consumption. Tronvoll et al. explain that dialogic principles are “deeply rooted in the social reality of consciousness, reflection, and interaction and closely linked to human activities” (2011, p. 573). Hermeneutics focus on the individual’s personal interpretation of events (Pollio et al., 1997). Not surprisingly, the central concepts emerging from this approach are interactions, processes, and interpretation.

This perspective defines CX as subjective and internal responses to, and interactions with, the service organization (e.g., Edvardsson et al., 2005; Teixeira et al., 2012).
Researchers no longer approach individuals as mere passive recipients to external stimuli but as active contributors to their social reality (Pareigis et al., 2012), which also grants the individual more control. Although researchers acknowledge the environmental dimension of social reality, as with Edvardsson et al. (2005), referring to Normann (2001), who notes that the servicescape helps to “create a social reality and therefore to provoke action — mental and physical” (2001, p. 253), researchers approach servicescapes somewhat differently from stimulus-based studies, placing heavy emphasis on social interactions. As Pareigis et al. put it, the traditional view on servicescapes “has been challenged by a view that conceives services, including servicescapes, as an issue for interaction” (2012, p. 678). Similarly, in referring to Echeverri (1999), Walter et al. (2010) say that CX research has not focused sufficiently on social interactions and individuals’ processes.

Researchers often discuss this interaction-focused servicescape as the experience room — a context that “incorporates operational, customer use, and atmospheric perspectives to a greater extent than the servicescape model” (Pareigis et al., 2012, p. 679). Although researchers (Edvardsson et al., 2005) first introduced this concept to examine simulated pre-purchase experiences, many now use it to depict non-simulated ones (e.g., Pareigis et al., 2012; Walter et al., 2010). In this experience room context, the individual not only senses and perceives but also interprets through internal cognitive and emotive processes (Edvardsson et al., 2005, 2010). These intermediating mechanisms between the external, interaction-based context and the individual may be passive or active, and are often referred to as perception and interpretation, respectively (Pareigis et al., 2012). Nonetheless, both mechanisms help to make the “service come alive” for customers (Sandström et al., 2008, p. 120), thus forming the CX. Finally, researchers include a linear temporal dimension, positing that a total CX occurs based on past, sequential experiences (Payne et al., 2009).

4.1.3. The sense-making-based perspective

The content analysis further shows how many scholars now adopt a sense-making-based perspective on CXF. This perspective views the previous approaches as too atomistic and static and advocates for a more holistic and dynamic approach instead. Although fields such as consumer culture theory have long utilized similar approaches, these ideas have only recently become commonplace in service research, much in line with the emergence of various business logics (e.g., Vargo and Lusch, 2004). These studies draw mainly from
theories on phenomenology (Husserl, [1931] 1967), which studies how the individual subjectively experiences his/her lifeworld and makes sense of this individual and social reality, giving meaning to it through experiential transportation back and forth in time. Thus, this approach frequently uses lifeworld, inner realism, and circular sense-making as central concepts.

These studies conceptualize CX as a phenomenon involving subjective, active, collective, and dynamic sense-making (e.g., Carú and Cova, 2015; Heinonen et al., 2013; Helkkula et al., 2012a). CX is thus formed through sense-making within a phenomenological lifeworld context (McColl-Kennedy et al., 2015b), where the individual is often actively involved and in control. Although the environmental dimension of this context often denotes an externally observable space, it does not always have to because “phenomenological experience may not always be externally observable, and cannot be considered as evidence of what really happened” (Helkkula et al., 2012b, p. 557). Thus, it may be inner realism (Helkkula and Kelleher, 2010). The emphasis lies more on the individual’s mental processes and actions than on what happens externally (Heinonen et al., 2013). This approach is in contrast to the two previous perspectives, where external activity- and interaction-based experiences receive most attention. However, researchers adopting the sense-making-based perspective do not disregard the social dimension. As Helkkula et al. note, CXs emerge through an “iterative circular process of individual, and collective customer sense making” (2012a, p. 59), making the individual’s reality socially constructed (Heinonen et al., 2013).

Through this circular sense-making, individuals interpret the physical and social worlds by engaging in cognitive and emotive processes. Thus, sense-making is often highlighted as the intermediating mechanism through which customers reconstruct their accumulated realities and form the CX (Heinonen et al., 2013). Although researchers often use interpretation and sense-making interchangeably, some researchers within phenomenology (e.g., Weick et al., 2005) say that sense-making goes beyond interpretation to the more active authoring of events. Through circular sense-making, the customer is also transported back and forth in time across a broad and non-linear, even future-anticipating, timeline (Dube and Helkkula, 2015). CXF is therefore continuous and highly dynamic.
4.2. The contextual lenses for CXF

The content analysis also reveals how researchers apply contextual lenses, defined by different actor constellations and boundaries, to explain how various contextual boundaries frame individual CX evaluations. Most service scholars, regardless of approach, agree that CXF occurs within market-related and/or managerially relevant contexts and consists of at least two actors and, often, multiple actor constellations (Patrício et al., 2011). The next section discusses the theoretical underpinnings, contextual boundaries, and implications of these lenses (the dyadic, service-, and customer-ecosystem lenses, see Table 3) for the contextual dimensions of CXF.

To review the contextual lenses, a number of key articles (n = 20) were again selected from the final sample, based on same criteria as in the individual-level analysis, each exemplary in its applied lens. To assess each lens, a set of criteria was developed, including the (1) theoretical underpinnings, (2) central concepts, (3) conceptualization of CX, and the (4) contextual boundaries and actor roles, and (5) their implications for the contextual dimensions. Because these contextual lenses were applied in conjunction with one of the individual-level perspectives, some of the articles included were also reviewed at the individual level.

(Insert Table 3 here)

4.2.1. The dyadic lens

The dyadic lens echoes the traditional theories of service marketing and management, which focus on functional processes and the quality of service offerings and provision (See Grönroos and Voima, 2013). This lens thus largely emphasizes firm activities and/or customer–firm relationships, highlighting these concepts as important for advancing our understanding of CXF. This dyadic focus reflects conventional service provision, which often requires customers to interact within a provider-created environment to realize service, such as in banks, restaurants, and retail environments. For this reason, this lens represents the primary contextual frame in studying CXF.

Studies adopting a dyadic lens conceptualize CX as being either created or co-created. For example, studies from the stimulus-based perspective, which emphasize physical surroundings, usually adopt a more instrumental view by referring to formation as the
creation (Berry et al., 2006) or design (Pullman and Gross, 2004) of CX by the firm for the customer. These studies view the firm’s role as the stager and creator of the CX, whereas customers are invited to undergo this CX. Some interaction-based studies adopt a dyadic co-creation approach by viewing CX as actively created by both parties (Payne et al., 2009). Prahalad and Ramaswamy (2004) and Frow and Payne (2007), for example, note that CX is co-created through high-quality customer–firm interaction points. By engaging in co-creation, the customer takes on a more active role, together with the service firm. However, researchers rarely explicate exactly how much is co-created by parties involved. Worth noting here is that although some researchers (e.g., Berry et al., 2006) include other customers as potential experience influencers, this study retains the dyad as the main contextual boundary, not only for the sake of clarity but also because customer-to-customer interactions often occur within firm-related contexts.

The dyadic lens limits the scope of contextual dimensions. Although many researchers argue that formation occurs through multiple touch points (Zomerdijk and Voss, 2010) with the firm, which further accumulate into a journey or customer corridor (Meyer and Schwager, 2007), this lens often confines the environmental dimension to a firm-related context that includes direct and indirect service encounters. For the social dimension, researchers focus on social actors (employees, the customer, and co-customers) in these encounters. For the temporal dimension, researchers concentrate on the present but sometimes also distinct pre- and post-consumption phases by discussing, for example, how customers’ pre-encounter states affect actual purchasing situations and later evaluations (Puccinelli et al., 2009).

4.2.2. The service-ecosystem lens

Over the past decade, many researchers have moved from a purely dyadic lens to a systemic contextual frame instead. The driving force behind the service ecosystem lens is SDL (Vargo and Lusch, 2004, 2008), which encourages researchers to view CX as a result of systemic resource integration and generation, through interactions with multiple actors and stakeholders in overlapping service ecosystems (Tax et al., 2013), or, as some researchers posit, through shared institutions and networks (Akaka et al., 2015; Carú and Cova, 2015). Because these ecosystems and networks are essential to SDL, researchers often view collective practices, schemas, norms, social structures, and culture as important concepts through which to study CXF (Akaka and Vargo, 2015). Several researchers posit that this lens also better reflects contemporary service
provision because technological advances have enabled multi-interface systems to emerge (Patrício et al., 2011) and, increasingly, suppliers collaborate to co-create the experience with the customer (Tax et al., 2013).

When adopting a service-ecosystem lens, researchers conceptualize CX as co-created, regardless of the applied individual-level perspective (which tends to be either interaction- or sense-making-based). But instead of merely including customer–firm co-creation activities, these studies characterize CX as co-created in service ecosystems. A service ecosystem is a “relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (Lusch and Vargo, 2014, p. 24).

These ecosystems can be firm-, customer-, or non-centered. The first places the firm in the center, whereas the second analyzes other actors in relation to the customer (Patrício et al., 2011; Tax et al., 2013). In the latter, researchers assign a very active role to the customer, whereas other actors become more of co-creation facilitators. According to Akaka et al., we can also apply a view that goes “beyond the firm/customer dyad and consumer-centric views, to a multi-level network or constellation of value co-creation and articulates the dynamic ecosystems — systems of systems — through which value is collaboratively created” (2015, p. 212). This system of ecosystems lens includes generic actors as equal contributors to CXF. Contextual boundaries are thus broadened to include “all market interactions and their associated institutions” (Akaka and Vargo, 2015, p. 459). Depending on the applied service ecosystem, firms’, customers’ and other actors’ roles in CXF thus vary; however, researchers rarely explicate exactly how much is co-created by the parties involved.

The service-ecosystem lens offers a broad approach to the contextual dimensions. Many studies mention both direct and indirect interactions with social actors. Indeed, researchers view all of these actors as participants in CX co-creation activities (Akesson et al., 2014). While environmental and temporal dimensions are not limited to specific service encounters, purchase phases, or servicescapes, they do include service, at least to some degree, to illustrate how customers evaluate and re-evaluate their experiences over space and time, including the past, present and future, in relation to service ecosystem(s) (Akaka et al., 2015) and based on the larger institutions guiding those ecosystems.
4.2.3. The customer-ecosystem lens

In 2010, Heinonen et al. introduced a third contextual lens, arguing that the two aforementioned approaches are not sufficiently customer-focused. Rather than focusing on service exchange, as with the dyadic and service-ecosystem lenses, the customer-ecosystem lens is based on customer-dominant logic (CDL) (see Heinonen et al., 2010), which focuses on how customers embed and experience service in their everyday lives and how the provider can be present in these experiences (Heinonen and Strandvik, 2015). Researchers are encouraged to move away from restrictive interactions to study customers’ goal-directed actions and tasks instead. This lens thus highlights customer goals, activities, and tasks as concepts through which researchers can better understand CXF. In doing so, the studies simultaneously acknowledge how customers have become increasingly knowledgeable and empowered (van Doorn et al., 2010) in today’s service landscape.

When applying a customer-ecosystem lens (which is often used in studies with a sense-making-based perspective at the individual level), CX is neither created nor co-created but emerges through customers’ actions and processes in customers’ ecosystems. As Heinonen and Strandvik (2015) note, referring to Voima et al., a customer ecosystem refers to a “system of actors and elements related to the customer that is relevant in a specific service” (2013, p. 1015) and can include “service providers, other customers (individuals and firms), other actors, and the physical and virtual structures related to the service” (Heinonen and Strandvik, 2015, p. 479). We can describe these customer ecosystems at varying levels of abstraction, ranging from individual to customer collectives, and the contextual boundaries are as broad as the customer determines them to be. The customer’s role then becomes to invite other actors to participate in his/her CXF activities, whereas the firm’s and other actors’ roles are to support the customer in achieving his/her goals.

Naturally, this lens applies very broad frames to the contextual dimensions. For example, customers build their own ecosystems and select the relevant actors in CXF. In terms of the environmental dimension, researchers further argue that CXF occurs in provider and customer worlds (Heinonen and Strandvik, 2015) and in the intersection between the two, known as the interactive service context. The provider’s world includes the provider’s backstage and onstage actions, whereas the customer’s world refers to what is beyond the provider’s control and visibility. CX is thus formed not only by direct
experiences but also by related, and even unrelated, experiences (Heinonen et al., 2010) in the past, present, and future (Tynan et al., 2014).

5. Discussion

This study aimed to review CXF by first identifying and analyzing service researchers’ different approaches to the phenomenon, including the underpinning theories.

The findings illustrate how CXF is multilayered and complex. Researchers approach the phenomenon from a stimulus-, interaction-, and sense-making-based perspective at the individual level, and further apply contextual lenses, including dyadic and service- and customer-ecosystem lenses, to this individual-level CXF. These two modes of approach diverge in that the first illustrates how CX comes to be through intermediation between individual and his/her context, whereas the second looks at actor constellations, roles, and contextual boundaries framing the individual’s CXF, and the boundaries’ implications for the contextual dimensions.

Authors apply an individual-level perspective and contextual lens together, albeit they may not always be aware of this themselves. This study distinguishes between the two to clarify and raise the awareness of the different CXF layers and approaches. CXF as an overarching term thus depicts the different ways in which an experience is realized through intermediation between the individual and the context, as well as how it is shaped from a more actor-related, and often also abstract, contextual viewpoint.

The reviewed approaches are further guided by distinct theoretical underpinnings, as with any theoretical perspective (Tronvoll et al., 2011). The underpinnings are diverse including, for example, theories present in the psychology and philosophy literature, and various business logics (SDL, CDL) typical for service literature. These underpinnings both collide and diverge in their views on CXF. It is essential that researchers acknowledge these underpinnings. This will help them to better understand why they view a concept the way they do and as a result, they will also be able to make more informed decisions regarding future research initiatives (Heinonen and Strandvik, 2015).

Based on these underpinnings, the individual is viewed as either more or less in control. The contextual dimensions also receive varying degrees of attention, and the intermediating mechanism becomes more passive or active, for example, as in the
discussions of external stimuli and perception (Meyer and Schwager, 2007), social interactions and interpretation (Edvardsson et al., 2005), or life worlds and circular sense-making (Helkkula et al., 2012a). In the contextual lenses, the underpinnings guide the selection of actors involved, their roles, and the breadth of the applied contextual boundaries. The dyadic lens, viewing CXs as being created or co-created, restricts the contextual boundaries of CXF to customer–firm contact points, or interactions (Payne et al., 2009). The service-ecosystem lens (McColl-Kennedy et al., 2015b) emphasizes systemic co-creation and adopts a wider view of CXF as a function of interactions within and between systems, even larger institutions. The customer-ecosystems lens (Heinonen and Strandvik, 2015) finally illustrates a more organic approach where CX is emergent and customers themselves define contextual boundaries of CXF, with or without interactions.

As the findings show, researchers often apply a dyadic lens to stimulus-based studies, a dyadic or service-ecosystem lens to interaction-based studies, and, finally, a service- or customer-ecosystem lens to sense-making studies. These perspective–lens combinations also highlight some similarities between ‘approach allies’. The interaction-based individual-level perspective and service-ecosystem lens, for example, both heavily emphasize interactions. Naturally, the different perspective–lens combinations will share areas of foci, because researchers apply them together. Yet, by clearly distinguishing between the two, this study brings more structure and clarity to CXF, illustrating how researchers utilize multiple perspectives forming varying layers, to understand how CXs come to be.

6. **CXF in today’s service landscape**

The reviewed approaches come with distinct opportunities and challenges in accurately portraying CXF. Given their specific foci, however, some approaches may be better suited for illustrating the complexities of CXF, especially in today’s multifaceted and rapidly evolving service settings. As Ostrom et al. (2015) contend, the service field has undergone immense and radical change over past decades, and many trends are transforming the ways in which companies provide services and customers serve themselves.

Technological breakthroughs represent one of the most visible forces shaping the service landscape (Rust and Huang, 2014), such as the emergence of social media and smart services (Wünnderlich et al., 2015). Other trends include increased market competition
(Heinonen and Strandvik, 2015) and rapid urbanization (Letaifa, 2015), which are sparking global growth in the service sector. Individuals are also more knowledgeable and empowered than ever before (Van Doorn et al., 2010) and can even produce the offering themselves as prosumers (Chandler and Chen, 2015). A sharing economy (Möhlmann, 2015) is thus emerging, sparking new service forms such as AirBnB and Taxi Uber, where the service firm no longer even exists in the traditional meaning.

In combination, these forces have made the service landscape more complex and dynamic than ever before. Much of today’s service provision is no longer constrained to mere in-house interactions but rather occurs on multiple levels within systems consisting of various actors, formed by broad and fluid contextual boundaries (Jaakkola et al., 2015). For these reasons, the next section aims to answer the third research question by analyzing the reviewed approaches in light of the phenomenon’s complexity in today’s service landscape. Researchers are encouraged to adopt the individual-level perspective and contextual lens that resonates with their worldview and research problem (Gummerus, 2013). However, this section illustrates how some combinations may be more useful for understanding, facilitating, and evaluating contemporary CXF.

6.1. Assessing opportunities and challenges

At the individual level, studies applying a stimulus-based perspective have recently received a lot of criticism (Carú and Cova, 2015), particularly with regard to their heavy emphasis on external stimuli and the firm’s controlling role at the expense of individual agency. Because this perspective often focuses on the impact of firm-initiated factors on relatively passive individuals, it not only provides a very simplified picture of CXF but also struggles to accurately portray technology-enabled CX for today’s empowered individuals. Contemporary customers engage with multiple services simultaneously whenever and wherever they so wish. Thanks to the Internet of Things (Lee and Lee, 2015), some smart services are even literally wearable (Wünderlich et al., 2015). These experiences are largely controlled by the customer and are based on a wide range of factors, which is why a simple S-O-R framework focusing on pre-determined variables is insufficient. Although a stimulus-based perspective may prove useful when examining how specific factors trigger customer responses during service encounters, it lacks the more holistic view required both by the CX phenomenon and today’s service landscape.
The interaction-based perspective provides a more holistic view, emphasizing interactions and the customer–firm relationship more so than stimulus-based studies. This perspective is fit for studying how social, firm-related reality affects individual-level CXF. The perspective’s heavy emphasis on observable interactions can, however, restrict a study’s scope by giving less attention to factors beyond visible interactions, which may play an important role in CXF. This perspective’s temporal, linear approach also provides a simplified picture of CXF. Contemporary service highlights circularity by enabling customers to monitor their experiences by scrolling back for past events and even simulating future ones, as with many mobile applications (Dube and Helkkula, 2015). As a result, a cyclical approach could more accurately portray today’s CXF.

When combined with a dyadic contextual lens, as is often the case, these studies face a major challenge in mirroring a service landscape where multiple actors (Tax et al., 2013) and factors beyond the firm also drive CX (Verhoef et al., 2009). Indeed, thanks to technological advancements such as the Internet and mobile devices, little contemporary service provision is confined to dyadic in-house interactions. As an example we can take smart cities, which have largely emerged as the result of technological advancements (Rust and Hang, 2014) and rapid urbanization (Letaifa, 2015). Customers living in such cities are able to engage with and experience service within complex and multilayered systems, including a broad range of actors, such as schools, libraries, transportation, and hospitals. So while the dyadic lens is great for studying how simple relationships form CXs, it does not provide wide and fluid enough contextual boundaries to fully depict contemporary CXF.

Many recently published papers apply a sense-making perspective to individual-level CXF, suggesting that this is the most suitable approach given the phenomenon’s complex nature (e.g., McColl-Kennedy et al., 2015a). This study agrees that this perspective helps to build a very holistic representation of individual-level CXF — with its broad and circular approach, it also succeeds in mirroring today’s service settings where knowledgeable and empowered individuals (Van Doorn et al., 2010) often serve themselves in their own social contexts, in and over time. Although the perspective gives rise to some minor challenges, for example, by being criticized for being over-intellectual (Helkkula et al., 2012b), this study contends that it indeed provides the most comprehensive and contemporary view of CXF of all the individual-level perspectives.
When this sense-making perspective is further combined with a service- or customer-ecosystem lens, we come near perspective–lens combinations that meet the requirements of today’s complex service landscape. Indeed, a service-ecosystem lens with a sense-making-based perspective gives researchers the opportunity to illuminate how complex networks (Akaka et al., 2015) shape CXF within broad contextual boundaries. For example, this lens is ideal for studying the effects of reciprocal relationships and practices on CXF within complex service contexts, including multiple stakeholders, while accounting for the role of more schematic and structural meanings in this formation. The generic actor-networks may also reveal new aspects of CXF, because researchers have not generally applied this context to the phenomenon.

Nevertheless, to avoid neglecting the individual customer’s goal-directed agency, researchers need to balance the culture versus individual dichotomy. Here, the customer-ecosystem lens helps to illuminate how individual customers orchestrate CXF within self-chosen ecosystems (Heinonen and Strandvik, 2015). This lens also presents researchers with the means to go beyond market interactions (Medberg and Heinonen, 2014), to creatively identify the actors and factors affecting CXF in the customer’s ecosystem, even though they need to be careful in considering the research scope, because such studies can easily become so broad as to lose relevance. The customer-ecosystem lens’ focus on the customer’s world further mirrors how much of today’s service provision occurs in individuals’ homes or other non-commercial settings, which also blurs the line between consumption and life.

This paper concludes that both systemic contextual lenses, combined with a holistic sense-making-based perspective at the individual level, can provide very useful insights into CXF and help to accurately portray this complex phenomenon in today’s service landscape.

### 6.1.1. Implications for researchers

This study has several implications for service researchers on how to conduct valuable work on CXF. The study encourages researchers to approach CXF from both a holistic individual-level perspective and a systemic contextual viewpoint to increase the understanding of this multilayered phenomenon. As this review illustrates, the service field is already moving in this direction (e.g., Akaka et al., 2015; Dube and Helkkula, 2015; Strandvik and Heinonen, 2015). Yet, the literature warrants much more work
applying such approaches. Table 4 provides an overview of potential research themes and questions to advance future work on the topic.

(Insert Table 4 here)

This study encourages researchers to focus on the individual, the context, and the intermediation between the two. By studying how customers live their lives and engage in various projects, we gain more insight into customers’ goals and how CXF occurs for different individuals. It could also be useful to map out what the provider can and cannot control in CXF. As this study illustrates, researchers have traditionally approached CXF as largely firm-controlled (e.g., Pine and Gilmore, 1998) but today, many researchers (e.g., Helkkula et al., 2012a) also highlight factors beyond the firm’s direct control. By studying such factors and their impact on CXF, also those beyond the firm’s visibility, we gain a more holistic understanding of CXF. Moreover, researchers often discuss the contextual dimensions driving formation and note that CX is subjective and internal; however, they rarely analyze these internal processes in depth. This study encourages researchers to study the intermediating mechanisms in greater depth to fully understand the interplay between the individual and his/her context.

Regarding the contextual lenses, this study calls for more research on central concepts in the service- and customer-ecosystem lenses (see Table 4). For example, studying provider presence or social structures can further help to illuminate individual-level CXF. Researchers should also focus explicitly on the differences between co-creation and emergence, because the existing service literature lacks in-depth discussions on how they vary. By studying the different types of ecosystems and their characteristics and evolution over time, we also gain more insight into how ecosystems come to be and change, and how this impacts CXF. Researchers should also study different roles in CXF, as seen from multiple actors’ perspectives. Such studies may reveal interesting discrepancies between perspectives, for example, in terms of what experiences actors value most at given points in time.

Researchers should also continuously benchmark their approaches and empirical work on CXF with the contemporary service landscape. For example, many studies still apply a dyadic lens as their sole contextual frame (Heinonen et al., 2010), even though contemporary service provision is rarely limited to dyadic in-house interactions. That is not to say that we should no longer study CXs through a dyadic lens but that we need to
acknowledge the limitations of such frames. Service researchers play an important role in helping managers to perform better (Ostrom et al., 2015). Future work should focus not only on increasing our understanding of CXF but also improving related managerial practices across different service industries. One way of achieving this is to radically increase collaboration with service firms.

Finally, the phenomenon’s complexity demands a multi-method approach. To gain a holistic understanding of CXF in today’s service landscape, researchers should not restrict themselves to traditional procedures but utilize new and innovative methods enabled by technological advancements, such as smart services’ tracking mechanisms (Wünderlich et al., 2015). Although a sense-making, individual-level approach favors more qualitative efforts, these can and should be complemented by quantitative data to illustrate for example, the systemic structures framing individuals’ CXF.

### 6.1.2. Implications for managers

The next section provides managers with recommendations for improving their daily practices regarding CXF.

- To increase understanding, approach CXF as multilayered

CXF is complex, especially when approached from a holistic and systemic viewpoint. Therefore, managers need to increase their understanding of the phenomenon to better facilitate and evaluate how their customers’ experiences are formed. To do so, managers should also approach the phenomenon as multilayered, including the individual level and the contextual lens.

In particular, managers should focus on mapping out and acknowledging what they can and cannot control. The firm can, for example, control many aspects of the environmental context, whereas individual facets (e.g., personality and goals) and intermediation are often beyond the firm’s control. By understanding what falls under the firm’s control and what does not, managers may further categorize visible and invisible factors to identify where they can increase their influence or what they simply need to recognize. In doing so, managers will gain a more holistic understanding of the phenomenon on the individual level.
Managers should also aim to better understand their role in CXF at a systemic level. In particular, this study encourages managers to look at the contextual frames that shape formation and map out actor roles within these frames. This will not only help managers to see how they fit into customers’ ecosystems but also how other actors fit into larger, interconnected service ecosystems. This focus will also increase managers’ understanding of structures guiding CXF in today’s service settings.

- **To facilitate, focus on what you can control and match customers’ activities**

Once managers are aware of what they can control and their role in CXF, they should focus on managing this well to facilitate better CXs. For example, whether or not firms invest in their relationship with the customer will impact their customers’ experiences (Payne et al., 2009). This study encourages managers to streamline actions across departments, functions, and communication channels to increase the seamlessness of CXF. Managers should avoid working in isolation by continuously striving for increased systemic collaboration within, and even beyond, the organization to ensure that firm-controlled contextual factors are aligned and favorably presented. Managers would also benefit from identifying ways to influence factors that are traditionally beyond their control, because this could help them to shape the total CX in a company-desired direction.

When facilitating CXF, it is essential to ensure that the actions taken fit customers’ lives, especially when adopting a customer-ecosystem lens. Managers need to ensure that what they do mirrors what the customer wants to achieve and experience. From the customer’s perspective, a specific service provider is only one among many. Managers should become more present in their customers’ lives (Heinonen and Strandvik, 2015), because this will help them to see how customers integrate providers into their activities and will make managers more prepared for possible changes in customers’ life patterns.

- **To evaluate, collect actionable customer insights**

To increase the understanding and better facilitate CXF, managers need insights they can act on. Because time and monetary resources are often scarce, firms often under-prioritize certain activities, such as customer and market research. When applying a holistic and systemic approach to CXF, managers need to overcome this barrier. This study encourages managers to consolidate data capture across the organization by
increasing communication across departments, for example, by integrating various data management systems to gain more interlinked and valuable data.

Managers should also utilize technological innovations for collecting insights. Mobile devices, applications, and other smart services give managers the opportunity to gain insight into customers’ lives and other actors’ activities in a relatively cost-efficient and unobtrusive manner. Through such efforts, managers may even come to see what was previously invisible. However, to achieve a holistic understanding, big data need to be complemented with qualitative data. Whenever possible, managers should closely monitor customers’ online conversations (Medberg and Heinonen, 2014) and shadow or even live with customers to gain in-depth understanding of their lifeworlds and self-chosen ecosystems.

Adopting a holistic, individual-level perspective and systemic contextual frame does not require managers to monitor all factors impacting CXF. This is neither feasible nor cost effective. Instead, managers should focus on what is important for their customers, while gaining valuable insights that help to improve their practices. Managers need to remember that what the firm views as important is not always what customers value the most. Customers’ perspectives should continuously be benchmarked with the firm’s, or even other stakeholders’, to identify possible discrepancies. This gap could be assessed, for example, by examining what customers find are the most essential touch points along their journeys and comparing these to the perspectives of the firm and other actors.

Because multiple actors impact CXF in today’s service settings, this study also encourages managers to cooperate with relevant actors and institutions to optimize insight. For example, suppliers, distributors, and independent institutions such as universities can all contribute valuable data. By sharing this data, all involved actors can become better resource allocators, further improving CXF practices.
7. Conclusion

7.1. Theoretical contributions and limitations

This study makes a number of theoretical contributions to the service and CX literature. First, it adds to the conceptual development of CXF, addressing recent calls to increase our knowledge of this phenomenon (Edvardsson et al., 2005; Maklan and Klaus, 2011). In addition to focusing on the characteristics of CX, it is also essential to look at how CX is formed. Just as with value and value creation (e.g., Grönroos and Voima, 2013), this focus adds with a more analytical perspective and conceptual clarity to CX, helping researchers and managers to better understand, facilitate and evaluate the 'how' of CXs.

Second, his study adds to and extends previous reviews on CXs (e.g., Jaakkola et al., 2015; Verhoef et al., 2009) by identifying and systematically reviewing researchers’ multiple individual-level perspectives and applied contextual lenses on CXF. In doing so, this study clarifies and raises the awareness of the different layers and CXF approaches across service research in a transparent and replicable manner (Tranfield et al., 2003). By going beyond specific streams or forms of CXF, this study contributes a more inclusive and representative review of the existing literature. To the author's knowledge, no studies to date have reviewed the multiple approaches to CXF, including the individual-level perspectives and contextual lenses in service research, as thoroughly.

Third, by highlighting the intermediation between the individual and context and how the different lenses shape actor roles and contextual boundaries, this study provides a more structured and in-depth understanding of CXF. This categorization aids researchers both in interpreting and designing future studies on CXF, regardless of the applied approach.

Fourth, by identifying and assessing the approaches’ opportunities and challenges, this study recommends how researchers and managers should approach contemporary CXF. It is important to continuously evaluate the current theoretical approaches (Russell-Bennett and Baron, 2015) in light of what goes on in the real-world. Such analyses help researchers to conduct work that is relevant to individuals, organizations, and society (Gustafsson et al., 2016). While researchers should apply the views that best resonate with their research problems and worldview, they should also recognize that the
phenomenon’s complexity in today’s service landscape favors holistic and systemic approaches over atomistic and dyadic ones. Based on this assumption, this study also adds recommendations for managers on how to improve their daily CX practices.

This study’s limitations stem primarily from its review and categorization processes. Choosing specific search terms necessarily means that some relevant studies may be excluded from the research if they do not use the same keywords. Searching additional databases may also have yielded more relevant publications. The categorization of the included studies was based on the researcher’s subjective evaluation of each article’s theoretical approach, which also presents a limitation. To increase validity, the researcher developed and applied specific categorization criteria during the review process. Despite these limitations, this study systematically brings together the literature on CXF and highlights the different individual-level perspectives and contextual lenses, their underlying theories, and their respective opportunities and challenges. In doing so, this study contributes to the in-depth understanding of contemporary CXF.
References


Figure 1 Systematic reviewing process
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<th>Excluded in the second phase</th>
<th>Final sample</th>
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<table>
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<th>Perspective</th>
<th>Stimulus-based</th>
<th>Interaction-based</th>
<th>Sense-making-based</th>
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<tr>
<td>Main theoretical underpinnings</td>
<td>Environmental and behavioral psychology, psychophysics, also some monologic principles</td>
<td>Dialogic and hermeneutic principles, also some environmental and behavioral psychology and psychophysics</td>
<td>Phenomenology</td>
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<td>Central concepts</td>
<td>Stimulus, response, perception</td>
<td>Social interactions, individual processes, interpretation</td>
<td>Life world, inner realism, circular sense-making</td>
</tr>
<tr>
<td>CX conceptualization</td>
<td>Subjective and internal responses to, or contacts with, service elements controlled by the service provider</td>
<td>Subjective and internal responses to, and interactions with, the service organization</td>
<td>A phenomenon involving subjective, active, collective and dynamic sense-making</td>
</tr>
<tr>
<td>Individual</td>
<td>The individual is often a rather passive being with little control in CXF</td>
<td>The individual can be more passive or active with some control in CXF</td>
<td>The individual is often a very active being with much control in CXF</td>
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<td>Context</td>
<td>Servicescape, with focus on external environmental stimuli</td>
<td>Servicescape/Experience room, with focus on external social interactions</td>
<td>Individual life world, with focus on the individual's inner and social reality</td>
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<td>Intermediating mechanism</td>
<td>Perception, usually based on others' actions and interactions causing individual reactions</td>
<td>Perception and interpretation, usually based on the individual's interactions and reactions</td>
<td>Circular interpretation and sense-making, usually based on the individual's visible and invisible actions and interactions</td>
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<td><strong>Contextual lens</strong></td>
<td><strong>Dyadic lens</strong></td>
<td><strong>Service-ecosystem lens</strong></td>
<td><strong>Customer-ecosystem lens</strong></td>
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<td><strong>Theoretical underpinnings Central concepts</strong></td>
<td>Service marketing and management literature</td>
<td>SDL</td>
<td>CDL</td>
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<td><strong>CX conceptualization</strong></td>
<td>Firm activities and customer-firm interactions and relationships Firm-created or customer-firm co-created</td>
<td>Practices, schemas, norms, social structures and culture</td>
<td>Customer activities, goals and tasks</td>
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<td><strong>Contextual boundaries and actor roles</strong></td>
<td>The dyadic customer-firm relationship Either the firm receives a very central and active role, or then customer and firm together actively co-create the CX</td>
<td>Firm - and customer-centered service ecosystems and non-centered ecosystems within larger networks and institutions Depending on the applied service ecosystem, actors receive roles at varying degrees of importance and activity</td>
<td>Customer-centered ecosystems The customer possesses the central and active role, whereas the firm and other actors receive a more helping function</td>
</tr>
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<td><strong>Implications for contextual dimensions</strong></td>
<td>The environmental dimension denotes a firm-related context, including both direct and indirect service encounters (e.g. touch points) The social dimension includes the firm, customer and other customers present in direct/indirect encounters with the firm The temporal dimension includes pre-, present and post-consumption phases over the customer journey</td>
<td>The environmental dimension’s frame is service exchange-related yet broad, dependent on the service ecosystems’ contextual boundaries The social dimension includes any actor present in one or overlapping service ecosystems through direct/indirect interactions The temporal dimension includes the past, present and anticipated future</td>
<td>The environmental dimension includes the provider’s world, the customer’s world, and the intersection between the two The social dimension includes any social actor present in the customer ecosystem as determined by the customer The temporal dimension includes the history, present and future</td>
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al. (2015b), Patrício et al. (2011), Tax et al. (2013) and Teixeira et al. (2012)
<table>
<thead>
<tr>
<th><strong>Table 4</strong></th>
<th><strong>Future research directions</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Individual level</strong></td>
<td></td>
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</table>
| Individual | How do customers live their lives in relation to a specific service? How do these life patterns impact CXF?  
What type of CXF personas can we segment customers into, based on their personalities and goals?  
What in CXF do customers enjoy controlling the most?  
What type of customer life projects will have a significant impact on CXF over time?  
In what ways can the firm best impact the contemporary, empowered individual and his/her CXF? |
| Context | Which factors within the environmental, social and temporal dimensions fall within the firm’s control?  
Which factors go beyond the firm’s control and line of visibility, yet play an important role in CXF? How can firms become more aware of these factors?  
How does technology (e.g. smart service) embedded into customers’ daily lives, often beyond the firm’s line of visibility, impact CXF?  
How does CXF change in and over time? |
| Intermediation | What are the differences and similarities between perception, interpretation and sense-making?  
Which previously understudied aspects of sense-making can help us conduct valuable research on CXF? |
| **Contextual lenses** | | 
| Central concepts and conceptualization | In what ways do customer activities, tasks and provider presence impact and change CXF, in and over time?  
How can service providers become more present in their customers’ ecosystems?  
In what ways do mental schemas, structures and culture impact and change CXF, in and over time?  
What are the core differences between co-created and emergent CXF?  
How can we better explicate how much different actors contribute with in co-created CXs? |
| Contextual boundaries and dimensions | In what ways are service ecosystems formed and how do they impact CXF in and over time?  
In what ways do customers build and define their own ecosystems, and how does this impact CXF?  
What can we learn of CXF from applying generic-networks as main analysis units, how do they blur the lines between producers and consumers?  
In what ways can actors’ perspectives on CXF diverge, and what are the discrepancies’ implications?  
How can the firm increase intersection between the firm’s and the customer’s world? |
Are there optimal actor-constellations for CXF in specific service industries?
How do actor roles in CXF change over time?

**EXPLORING HOW CUSTOMER ECOSYSTEM ACTORS SHAPE CUSTOMERS’ EXPERIENCES WITH SMART SELF-SERVICE**

Abstract

Purpose – This study aims to characterize how customer ecosystem actors shape CXs. The study also identifies implications for managers and research around the customer ecosystem, its actors and actor constellations in the context of CXs.

Design/methodology/approach – A qualitative study is conducted among activity-tracker users to identify how actors within their ecosystems shape CXs. Data include 28 in-depth interviews and 10 self-reported diaries.

Findings – The study identifies six actor categories in the customer ecosystem driving the CX within and beyond the service. The number of actors and their importance to the focal customer results in different actor constellations forming individual-, brand- and socially-driven ecosystems. These types show how ecosystems vary in size and scope, and how actors drive CXs in combination rather than isolation.

Practical implications – Managers should aim to locate, monitor and join the customer’s life to gain understanding of how CXs emerge in the customer ecosystem based on the customer’s logic.

Originality/value – This paper extends theory on CXs by illustrating how CXs are shaped by various actors and actor constellations forming the customer ecosystem.

Keywords – Customer experience, customer ecosystem, customer logic, customer-dominant logic, smart service

Paper type – Empirical paper
1. Introduction

Academics and practitioners agree that meaningful customer experiences (CX) – with their ability to generate happy customers and increase firm revenues (Homburg et al., 2017; Lemon and Verhoef, 2016) – are a prerequisite for a successful business. Therefore, it is not surprising that marketing and service research has dedicated significant efforts to characterizing and measuring this phenomenon (Helkkula, 2011; Prahalad and Ramaswamy, 2004; Verhoef et al., 2009). Researchers recognize CXs as subjective, individual and highly contextual in nature (Edvardsson et al., 2005) – formed as individuals perceive or make sense of their external (Berry et al., 2002) and internal (Helkkula et al., 2012) settings. Because the context clearly matters in the context of experiences, the literature has extensively discussed this context’s role in CXs (Akaka et al., 2015; Pine and Gilmore, 1998). To date, several approaches have emerged.

Scholars have recently aimed to understand how CXs are co-created within networks and service (eco) systems (e.g., Ramaswamy and Ozcan, 2020; Edvardsson et al., 2018). These studies go beyond the traditional dyadic view, which focuses on how environmental and social cues or elements create CXs during customer-firm touchpoints at a micro-level (e.g. Berry et al., 2006; Meyer and Schwager, 2007). Instead, they adopt a broader and more complex contextual frame, viewing CXs as co-created by many actors at varying abstraction levels. This change in perspective echoes a larger transition in marketing around the understanding of value: a move from conventional models, in which firms deliver value to customers, to systemic approaches, which see value as formed among multiple actors in a shared experiential value-creation process (Edvardsson et al., 2018; Lusch et al., 2018; Ramaswamy and Ozcan, 2020; Patricio et al., 2020).

Still, both lenses only marginally consider issues relating to customers’ processes in their own contexts (Lipkin, 2016; Strandvik et al., 2019). Technological advancements and the rise of the individual have altered the boundaries of service provision (Rust and Huang, 2014), with customers often selecting offerings and serving themselves outside firm-controlled settings (Alexander et al., 2018; Libai et al., 2010). Consequently, it has become increasingly important for researchers and managers to understand how experiences emerge in customers’ contexts beyond the service setting and the firm’s direct control (Heinonen et al., 2010; Grönroos and Voima, 2013). Studies exploring the actors and factors deemed relevant by the focal customer, rather than the service, can
reveal valuable insights into customers’ everyday lives and guiding principles (Caic et al. 2019). Based on such insights, the firm can then create, manage and promote the offerings more likely to be selected and used in customers’ lives (Patricio et al., 2011).

This customer ecosystem view is grounded in a customer-dominant logic (CDL) approach, which emphasizes the importance of placing customers and their systems – rather than the service or service systems – at the center of business (Heinonen et al., 2010). In line with Caic et al. (2019), this view highlights the human-centered view of customers (as e.g. users, citizens or patients) as the primary actors determining the value-in-use of a service. By focusing on what customers consider relevant, this approach broadens the view of the customer and her context. Consequently, CXs become emergent in the customers’ context and unfold beyond market interactions (Lipkin, 2016). This approach thus helps to showcase what goes on outside the focal firm’s visibility and control that plays an important role in forming CXs with an offering.

Still, the research on these customer ecosystems and their role in CXs remains limited. Although some studies have discussed the theoretical underpinnings of such systems, few have explored the customer ecosystem’s different components and their influence on the CX. The perspective on the customer’s domain as a constellation of systemic actors represents a promising research direction, as actors configure and uphold the system and reveal the idiosyncrasy of value-in-use (Lipkin, 2016; Heinonen and Strandvik, 2018; Caic et al., 2019). By better understanding which actors customers consider important and why, researchers and managers can gain a deeper understanding of customers, as well as their context and its role in the CX. Although the social dimension has received attention in the existing CX literature, most studies focus on the actors present in dyads (Payne et al., 2009) or service systems (Jaakkola et al., 2015), where the service is the focal unit of analysis (c.f. Mustak and Plé, 2020).

This study aims to investigate how the customer ecosystem, and its key actors shape the CX. To achieve this goal, we address the following research question:

**RQ1.** Which actors and actor constellations are present in the customer ecosystem, and in what ways do they shape the CX with a smart service offering?
To begin shedding light on this topic, we first draw from the CX literature focusing on studies emphasizing the customer’s active role in forming the experience through sense-making (McColl-Kennedy et al., 2015; Schembri, 2006). We further build on the customer-centered concept of customer ecosystems as representations of the user as the primary actor determining and experiencing value-in-use within a network of other actors. We discuss how this view of customer ecosystems differs from other similar systemic views of actor constellations. We then use explorative, qualitative data collected among users of activity trackers to illustrate empirically how customer ecosystem actors shape CXs. Data include 28 in-depth interviews and 10 diaries from activity-tracker users during their running exercises. The empirical illustrations take an approach of envisioning (MacInnis, 2011) and questioning (Alvesson and Sandberg, 2011), revealing another way to explore how systemic contexts shape CXs. The findings demonstrate how various actors and actor constellations drive the individual CX, resulting in different ecosystem types.

This study makes several contributions to the existing marketing and service literature. First, we advance the current understanding of CX by illustrating how customers’ systemic contexts shape the CX. These findings challenge the prevailing views that emphasize interactions and co-creation, instead stressing how CXs emerge within the customer’s domain. Second, this study extends earlier work on customer ecosystems by providing a detailed view of their actors and their characteristics. Finally, a research agenda is developed around customer ecosystem actors, and their role in CXs. This study also provides managerial recommendations for supporting CX.

The next section begins with a discussion of previous CX research. We discuss different contextual lenses for understanding the CX, specifically the customer ecosystem lens. We develop an initial conceptual framework for studying the customer ecosystem and how it shapes the CX. The following section presents the empirical context and methodology. We then illustrate the findings and discuss the study’s theoretical contributions, managerial implications and suggestions for future research directions.

2. Customer experiences

The idea of “customer experience” (CX) is often attributed to the work of Holbrook and Hirschman (1982), who posited that customers look not only for services and products but also experiences that succeed in meeting their ultimate desires and needs. In recent decades, research on CX has emerged across the literature in psychology (Ariely and
Zauberman, 2002), philosophy (Husserl, [1931] 1967), marketing (Schmitt, 2003), consumer research (Arnould and Price, 1993), and service (Edvardsson et al., 2005). Studies in these fields stress CXs’ multi-dimensional and complex nature. For this very reason, the concept has also been approached from various angles, ranging from atomistic and static perspectives to holistic and dynamic ones.

2.1. From a dyadic to systemic view on customer experiences

The marketing and service literature has traditionally taken a dyadic view on CXs. This is partly because many traditional services, such as banking and stores, predominantly entailed in-house interactions. Drawing on an S–O–R (Stimulus–Organism–Response) (Mehrabian and Russell, 1974) or a sensation–perception framework (Fechner, 1860), these studies focus on how environmental and social cues (Berry et al., 2002, 2006) or elements (Meyer and Schwager, 2007) create CXs during customer-firm touchpoints at a micro-level. Indeed, the CX is viewed as firm-created – designed for the customer during service touchpoints (Johnston and Kong, 2011) – although more recent studies have also highlighted interactions by viewing the firm and the customer as active co-creators of experiences (Frow and Payne, 2007).

This dyadic perspective focuses on the basic unit of relationship analysis: the dyad (Ritter et al., 2004), including two distinct actors: the provider and the customer. The provider is assigned an active and directing role in the CX, whereas the customer represents a receiver or co-producer. These studies further focus on the firm’s context and how direct or indirect touchpoints form CXs across the customer journey (Meyer and Schwager, 2007), which illustrates how the customer interacts with the firm not only in the present but also during pre- and post-consumption phases. Dyadic studies’ analysis unit encompasses the provider–customer dyad actors and pays little to no attention to factors beyond the core service encounter, although some do acknowledge that other actors can also be present in the service environment and affect the CX. For example, Slåtten et al. (2009) found that interactions among customers can positively drive the CX in an amusement park setting.

Considering that contemporary service is often not limited to in-house interactions but also unfolds in more complex settings – for example, with smart service (Wunderlich et al., 2013, 2015; Alexander et al., 2018) – the dyadic lens provides a rather narrow view of the CX. Researchers (Bolton et al., 2018; McColl-Kennedy et al., 2015) have stressed
the need to go beyond dyadic interactions and firm-defined customer journeys to study CXs in systemic contexts. This reflects a transition in marketing around the concept of value: a move from traditional models, where firms deliver value to waiting customers (Hartmann et al., 2018), to systemic approaches, which see value and experiences as experientially co-created among multiple actors, or emergent in networks and systems (e.g., Hakansson and Snehota, 1995; Payne et al., 2009; Heinonen and Strandvik, 2015; Caic et al. 2019).

Table 1 captures the main differences between the dyadic and systemic CX views. Systems and ecosystems have in general been argued to be of value when exploring the roles of provider, customer and other key stakeholders in business (Dass and Kumar, 2014; Maglio and Spohrer, 2008). By studying CXs within service or customer ecosystems, recent studies have aimed for a more contemporary view of how CXs come to be and are influenced. These systemic views acknowledge CXs as formed when individuals actively, subjectively and collectively make sense of their life worlds in and over time (Helkkula, 2011; McColl-Kennedy et al., 2015), thus significantly broadening their spatial and temporal boundaries.

To date, different systemic approaches to CXs have emerged in the service and marketing literature, with the service and customer ecosystem views representing most studies. The next section will discuss these viewpoints in more depth.

<table>
<thead>
<tr>
<th></th>
<th>Dyadic view</th>
<th>Systemic view</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CX characterization</strong></td>
<td>CX created by the firm, or co-created between the provider and customer</td>
<td>CX co-created among multiple actors, or emergent in the customers’ life worlds</td>
</tr>
<tr>
<td><strong>Contextual boundaries (spatial and temporal)</strong></td>
<td>Narrow and static</td>
<td>Broad and dynamic</td>
</tr>
<tr>
<td><strong>Unit of analysis</strong></td>
<td>Dyadic provider–customer relationship</td>
<td>Multiple actors</td>
</tr>
<tr>
<td><strong>Level of abstraction</strong></td>
<td>Micro-focus</td>
<td>Varying levels of abstraction (micro–meso–macro)</td>
</tr>
<tr>
<td><strong>Exemplary studies</strong></td>
<td>Frow and Payne (2007)</td>
<td>Caic et al. (2019)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vargo and Lusch (2016)</td>
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<td></td>
<td></td>
<td>Heinonen et al. (2010)</td>
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<td></td>
<td></td>
<td>Heinonen and Strandvik (2015)</td>
</tr>
</tbody>
</table>
2.2. From service- to customer-focused ecosystem perspectives

The dominant view is that CXs occur through co-creation among multiple actors and stakeholders in overlying service delivery networks (Tax et al., 2013) or ecosystems (Jaakkola et al., 2015), or through shared institutions and networks (Vargo and Lusch, 2016). Vargo and Lusch (2016, pp. 10–11) define a service ecosystem as a “relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange.” These ecosystems unfold at varying levels of abstraction (micro–meso–macro), and can be firm-, customer- or non-centered (Lipkin, 2016), with multiple social actors co-creating the CX within broad contextual frames consisting of both direct and indirect interactions. Increasingly, research emphasizes the macro-aspects of consumption, an emphasis that has resulted in a stronger focus on generic actors (Akaka and Vargo, 2015). Such actors include the customer and provider, as well as other service-relevant actors: distributors, suppliers, co-customers, family and friends. All actors embody more or less active roles in co-creating the experience. For example, as Tax et al. (2013) note, the provider may take on a leading or subordinate role across the customer journey. The customer is a co-creator and may also be a coordinator among multiple service providers co-creating the CX. Key to these system types is their focus on service. This service is characterized as something that one actor does for the benefit of another actor (Maglio and Spohrer, 2008) in a dynamic, constantly evolving setting (Vargo and Lusch, 2011).

Recently, a customer ecosystem lens has been introduced based on the argument that the above approaches are not sufficiently customer focused. Instead of focusing on service exchange as with the dyadic (Meyer and Schwager, 2007) and service-ecosystem lenses (Vargo and Lusch, 2011), the customer ecosystem lens places the customer and her systemic context at the center of the ecosystem (Heinonen et al., 2010). According to Heinonen and Strandvik (2015, p. 479), who refer to Voima et al. (2011), a customer ecosystem represents a “system of actors and elements related to the customer and relevant to a specific service.” An example in the context of elderly care and assistive living are the care-based actor networks for value co-creation that, in addition to humans, also include socially assistive robots (Caic et al., 2019). Still, while actor networks can manifest as bundles, hierarchies, focalized networks or hybrids (Caic et al., 2019) central to them is the customer’s position as the focal actor – not the service or the provider. This does not necessarily mean that the customer controls the system, but that the ecosystem comes to be as the customer lives her life, chooses among the offerings
and providers on the market, experiences these offerings and their value, and embeds them into her context based on her own logic. This lens shifts the focus from what the firm does to produce an offering to how customers select, experience, and embed offerings into their ongoing lives and how the provider can become more present in the customer’s system. It involves a human-centered perspective on the network as experienced by the focal beneficiary (Caic et al. 2019) – what we here label the customer, as a representative of all beneficiaries irrespective of the label used (e.g. consumer, patient, citizen or user). As Lipkin (2016, p. 690) explains, this perspective encourages researchers “to move away from restrictive interactions to study customers’ goal-directed actions and tasks instead.”

While the customer represents the primary actor in the customer ecosystem, other actors can include, for example, the focal provider and its offerings, other providers in the same or another industry, co-customers, family and friends – even strangers (Heinonen and Strandvik, 2015). The customer ecosystem also goes beyond the social to include physical, virtual and commercial features. Different actors and actor configurations, however, form the system’s fundamental premise (Voima et al., 2011) and play an important role in shaping the individual CX. These actors can undertake various roles and positions within the system and, in doing so, influence how the customer experiences the offering (Voima et al., 2011). Instead of viewing these actors as generic, as is often done in studies applying a service ecosystem lens (Akaka et al., 2015), this view approaches customers, providers and other actors as distinct, considering they have different goals, experiences, activities and practices.

Researchers have further discussed the contextual boundaries of such customer ecosystems. Since the customer can be observed at different levels of abstraction – ranging from a single unit, such as an individual, to a collective, such as a family, organization, or community – the scope depends on the focal customer unit. For example, previous studies have explored customer ecosystems of single individuals (Leino, 2017) and families (Epp and Price, 2011). In addition, the customer decides which actors are relevant in the ecosystem. Essentially, the contextual boundaries of the customer ecosystem become as narrow or as wide as the customer sets them in relation to a service. This approach broadens the scope of CXs to include not only core experiences with a service but also related experiences – for example, with other providers – and even non-related experiences, forming the total experience with an offering. Other studies have similarly discussed how CXs unfold both in the firm’s and
the customer’s worlds (Helkkula et al., 2012). This customer ecosystem is also dynamic in that it can change and morph as the focal customer’s goals, experiences and activities evolve. Similarly, natural ecosystems have been defined as dynamic in nature (Mars et al., 2012). As Voima et al. (2011) explain, the customer ecosystem represents a constantly changing influencer, shaping the customers’ experiences with an offering: for example, by forming the CX into a more or less positive one.

This customer-ecosystem lens views CXs as emergent through customers’ actions and processes in customers’ systemic contexts – which are also outside market-related interactions. As a result, understanding the customer ecosystem and the ways it shapes the CX, is key. The next section illustrates empirically how such customer ecosystems, and especially their key actors, shape the CX with a self-service offering.

3. **Method**

An explorative, qualitative study was conducted among users of an activity-tracker device. Activity trackers are smart service offerings that are: “delivered to or via an intelligent object that is able to sense its own condition and its surroundings and thus allows for real-time data collection” (Wünderlich et al., 2015, p. 442). The activity tracker enables users to track and monitor their running, walking and other movements in and over time and communicate these activities to others. It was chosen for a number of reasons. Essentially, an activity tracker allows customers to use the offering in their own contexts and on their terms, whenever and wherever they want to, thus being embedded in the customer’s life world (Wünderlich et al., 2015). We argue that this empirical setting can generate ample insights into the customer ecosystem and how it shapes the CX. In addition, the activity tracker captures, and stores data related to each activity, which further enables customers to more easily reflect on their experiences with the tracker in and over time. There is a call for more research on this type of smart service, especially related to how customers experience it in their everyday lives (e.g. Gummerus et al., 2018; Wünderlich et al., 2013, 2015).

3.1. **Data collection**

We collected data in two phases using two qualitative methods. The first phase entailed in-depth, personal, semi-structured interviews, and the second phase entailed personal diaries. Both were included to ensure we would gain rich insights into customers’ experiences with the activity tracker. Similar approaches have been applied to gain broad
and deep insights into a studied phenomenon or concept (e.g. Fliess et al., 2015). In addition, adopting different approaches to data collection helps researchers gain better understanding of a studied phenomenon (Creswell and Plano Clark, 2007). In both phases, we collected data until we reached a saturation point (Glaser and Strauss, 1967).

Table 2  
**Data collection and analysis process**

<table>
<thead>
<tr>
<th>Data Source</th>
<th>28 customer interviews</th>
<th>10 diaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of smart service</td>
<td>Activity tracker Examples: Activity Tracker, Nike+, Runkeeper, Polar and Jawbone</td>
<td>The participant had used the activity tracker for a minimum of 1 month before the interview 8 women, 15 men, aged between 20 and 50 years</td>
</tr>
<tr>
<td>Participant selection criteria</td>
<td>The participant had used the activity tracker for a minimum of 1 month before the interview 11 women, 15 men, aged between 20 and 50 years</td>
<td></td>
</tr>
<tr>
<td>Data collection</td>
<td>Sample Themes</td>
<td>Sample Themes</td>
</tr>
<tr>
<td></td>
<td>1. Describe a normal, perfect and worst possible run.</td>
<td>1. How was your run today?</td>
</tr>
<tr>
<td></td>
<td>2. Describe your activity tracker</td>
<td>2. What role did the activity tracker play in your run? Has anything changed in your experience with running with the activity tracker since a) last time, b) since you started using it?</td>
</tr>
<tr>
<td></td>
<td>3. How, when, where, with whom and why do you run with the activity tracker?</td>
<td>3. What role does the activity tracker play in your life? What is your role when it comes to the activity tracker?</td>
</tr>
<tr>
<td></td>
<td>4. Describe a positive memory of the activity tracker – what made this memory positive?</td>
<td>4. What role do other actors play in your sports tracking experience?</td>
</tr>
<tr>
<td></td>
<td>5. Describe a negative memory of the activity tracker – what made this memory negative?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. What role does the activity tracker play in your life? What is your role when it comes to the activity tracker?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. What role do other actors play in your sports tracking experience?</td>
<td></td>
</tr>
<tr>
<td>Interview/diary length</td>
<td>30–50 minutes each</td>
<td>5–6 pages/diary</td>
</tr>
</tbody>
</table>

In the first phase, we used a personal and semi-structured interview approach to gain rich insights into the studied phenomenon (Deshpande, 1983). We purposively selected the study participants (Golafshani, 2003) including individuals who had used an activity tracker during their regular runs for a minimum of one month. In this way we ensured
that customers were familiar with the service and could express the ways in which they experienced it. The type of activity tracker could be a mobile application (e.g. Run Keeper), activity watch (e.g. Polar) or activity tracker (e.g. Jawbone). The interview guide consisted of questions covering themes like running, the customer’s everyday use of activity trackers and positive and negative memories with such devices. All interviews were transcribed verbatim and saved to separate documents.

Data from the second phase consisted of 10 diaries conducted among individuals using an activity tracker to varying degrees during their runs. Diaries represent a suitable method for studying different types of activities and experiences occurring in situ and daily (Bolger et al., 2003), allowing for the unobtrusive collection of data about the respondents’ experiences with the service and how their ecosystem actors affected their experiences. The same selection criteria were used for the participants as in phase 1. All diaries were written after 5–6 consecutive runs and saved in a Word document. The average time was 1–2 weeks of diary-keeping. This time frame corresponds with other similar empirical studies (e.g. Dube and Helkkula, 2015).

3.2. Data analysis

For the data coding and analysis, we followed the guidelines for a structured data analysis approach that involved abstraction, categorization, comparison and integration (Strauss and Corbin, 1990, 1998; Spiggle 1994). First, we read through the transcripts twice to gain a good understanding of the study participants’ narratives (Hirschman, 1992). During the analysis, it became apparent early on that the respondents considered their experiences with activity trackers a continuous flow of interrelated experiences. These different experiences shifted in intensity (from extraordinary to ordinary), valance (from positive to negative) and importance (from very important to less important), yet all contributed to their current experience of the activity tracker. Second, the respondents reflected on these experiences by referring to specific real-time events during the consumption phase, as well as through experiential transportation back and forth in time discussing the accumulated past, present and future. As such, pre- and post-consumption were also included along with the past and future to comprise a broad and holistic temporal dimension. We simultaneously identified emergent themes in the transcripts, which centered on the customer ecosystem, its different actors and actor constellations and their influence on the CX. In doing so, we located six distinct actor groups relevant to the respondents’ activity-tracker experiences. For each actor we
recorded key actor characteristics and why the respondent considered the actor relevant. Furthermore, we identified different actor constellations, which resulted in three distinct customer ecosystem types, and how the actors influenced the CX. This type of thematic analysis follows the thematic–variable approach to qualitative data adopted by other studies (e.g. Braun and Clarke, 2006). We divided the interview transcripts into data units. We then coded each unit under the following categories: actors, actor constellations and actor roles. Next, we compared the different categories for similarities and differences. Such an iteration between theoretical and qualitative data aiming to establish refined codes follows an abductive logic (Patton, 2002).

4. Findings

Six actor categories present in the customer ecosystem emerged from the data: the focal customer, focal provider, other providers, co-customers and peers, family and friends and strangers (Table 3). First, we describe the actors, then analyze the ecosystems that involve different actor constellations.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Actor description</th>
<th>Actor unit</th>
<th>Actor empirical example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focal customer</td>
<td>The subjective and active individual making sense of her experience with the business offering. Can be a user, co-user or payer of the business offering.</td>
<td>Human Single</td>
<td>An individual running with a Suunto watch.</td>
</tr>
<tr>
<td>Focal provider</td>
<td>A commercial seller, supplier, deliverer or enabler of a business offering, including the offering per se and other firm-related aspects.</td>
<td>Non-human Collective</td>
<td>Suunto, an activity-watch company offering various activity watches and activity trackers.</td>
</tr>
<tr>
<td>Other providers</td>
<td>Other commercial providers can be a (co-) seller supplier, deliverer or enabler of a similar or supporting business offering as the focal provider. Can be a collaborator with or competitor to the focal provider.</td>
<td>Non-human Collective</td>
<td>Strava, a social fitness network where the individual can upload her running stats and follow up on, compare and discuss running and activity tracking.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Polar, an activity watch company offering</td>
</tr>
</tbody>
</table>
4.1. Actors

4.1.1. Focal customer

The user was identified as the key actor in her own ecosystem and thus was labeled the *focal customer*. This focal customer emerged as a human and a single actor unit, in that we looked at the subjective individual accounts of customers’ activity-tracking experiences, rather than a group of actors, such as a family or, in a B2B context, a corporate organization or buying group. This category comprises individuals who currently use an activity tracker. Many focal customers paid for their own activity trackers, but this was not always the case, considering that some applications are free or the customer used the offering together with someone else who owned an application. Furthermore, some customers had clearly decided to use the activity tracker themselves. Others received the tracker as a present and were thus nudged into using it.

The focal customer differs from the other identified actors in that the ecosystem revolves around and is dependent on this actor. The customer’s position in her ecosystem is central. This individual-centrality was often reflected in the way customers talked about their experiences: sharing their own personal thoughts, feelings and actions around activity tracking, and how their past and current, even future, experiences shaped their total experience with the activity tracker. For example, Maria shared how changes in her ongoing life shaped her sports-tracking experience:
“I think that in the beginning I was more like, or when I started using it, I had more structure in my training. Then I was also more interested in following up all the time. But now I've been running very little. So I've had very little structure in my life, and now I experience that it is no longer that important whether I have a sports watch or not. But that may change in the future.” (Female, 27)

Although the respondents never claimed to have full control over their experiences within their contexts, they clearly played a key role in determining their CX. Other actors were further included as the focal customer saw fit. This resulted in varying ecosystem sizes among customers. As such, customers played a highly dominant role in their own ecosystems.

4.1.2. Focal provider

The focal provider represents another key actor. This non-human actor is responsible for the business offering and various offering-related aspects, such as its technical and functional features. The respondents often mentioned the focal provider by using words like “company,” “firm,” “brand” or “organization,” and frequently talked about the activity tracker offering in conjunction with the focal provider. At times it was challenging to differentiate whether the respondent was referring to the focal provider or its offerings, as the respondents seemed to view the two as a rather integrated entity. The respondents did not mention the focal provider’s employees as distinct actors in their contexts. This has likely to do with the nature of the studied offering, as most users were able to purchase and use the activity tracker without having any direct contact with the focal provider. We do nonetheless acknowledge that the focal provider represents a group of individual actors as part of a commercial organization.

This focal provider was often discussed as the seller, supplier or enabler of the business offering, providing the means to track activities. It was this “means” that became the point of relevance for the respondents when they described the various actors driving the CX. In other words, all other actors were deemed relevant in the customer’s context related to this service. This service, however, was not dependent on the focal service provider, but on something that other providers could also potentially offer. Many respondents even used several focal providers simultaneously: for example, when they had a difficult time selecting only one among many offerings, or when they had recently switched devices, yet wanted to keep collecting data on the old one. For example, Simo
(43 yrs.) noted that he used two different devices (Jawbone and Runkeeper), and both helped him achieve his goals, albeit in different ways.

4.1.3. Other providers

Other providers emerged as another actor group influencing the CX. This group consists of two sub-types: other commercial providers offering alternatives to the focal provider and other commercial or non-commercial providers providing supporting offerings to the focal provider. The first sub-type includes providers of activity-tracking devices other than the focal customer’s primary choice. Many customers regularly benchmarked their current devices to that of other providers:

“I regularly read a lot about different activity trackers. There is this website that tests each and every type.” (Male, 43)

In doing so, they seemed either to reinforce that the current device was indeed the right choice or to end up switching to another brand. Regardless of the outcome, this benchmarking clearly affected their overall CX with the offering. For example, some customers mentioned having negative experiences with their devices after having compared them to other provider’s’ offerings.

The second sub-type includes actors like Strava, a social fitness network enabling users to track their runs and other related data and engage with other like-minded individuals. Several respondents mentioned using their activity trackers with such a social fitness network, by uploading their tracking data and comparing their results with other users of the site. Similarly, music providers were also mentioned as important actors for those runners who listen to music while running. These other providers simply represented other or complementary options to engage with ongoing activities, not as competing suppliers.

4.1.4. Co-customers and peers

Co-customers and peers consist of actors either using the same type of activity tracker as the focal customer or engaging in similar activities around activity tracking, like regular running exercises, training for a marathon, or tracking one’s bodily functions. They could also be non-users of the offering, people simply interested in activities connected to activity tracking. Some respondents talked about these co-customers and peers as a
single unit or individual: for example, as someone with whom the customer could discuss tips and tricks on how to improve endurance when training for a marathon. Others mentioned this actor group by referring to a larger social community or collective, of which the focal customer identified as being or pursuing being a member. Several customers liked to discuss the features and technological developments of activity trackers with other customers using similar services. These discussions played a role in their overall activity-tracking experience, as they helped them realize previously unnoticed technology features or simply reinforced that they were indeed using the right type of offering to meet their individual goals. Furthermore, some respondents shared that merely knowing that peers across the world used the same offering as they did also contribute positively to their experience. This existence of a peer group could also play a negative role in the activity-tracking experience:

“I know there are probably people out there that use it, but just because I, basically I’m isolated from any other than these four people that use it, it doesn’t feel like I’m part of a group that much.” (Male, 25)

These co-customers often became apparent on social media and discussion forums and affected their experience with the focal offering. Actors could thus be included in the customer’s context through social interactions, but also based on the knowledge of their existence.

4.1.5. Family and friends

The CX is also driven by human, non-commercial actors close to the customer. This actor group, labeled “family and friends,” often figured in a user’s life related to – and beyond – the focal offering. These actors differ from co-customers and peers in that they are not necessarily users of the offering, or even familiar with activity tracking per se. This actor group can denote a single unit, such as one family member or friend, but also a collective, like a family or group of friends. Several respondents shared that running with a friend who possessed the same activity tracker they did contributed positively to their tracking experience. They could compare times and even compete against each other. One could further share these results on social networking sites like Facebook or Instagram. On the other hand, some respondents stopped using their activity trackers because their friends were not using it:
“The reason that I stopped carrying it so much is because, well, none of my friends really use it. If there were lots of people using it, we could all compare times.” (Male, 25 yrs.)

Simply spending time with one’s family or friends could also contribute positively or negatively to the activity-tracking experience. For example, Ville (43) shared that his partner thinks he talks too much about activity tracking. His partner uses such devices only sporadically to track distance and tires of hearing him talk about the device. Consequently, Ville noted that his experience with the activity tracker was primarily negative. Although acknowledging that this wasn’t the fault of the focal provider or its offering, the circumstances resulted in the customer having negative associations with the activity tracker.

4.1.6. Strangers

Strangers emerged as an actor group that could shape the activity-tracking experience for some respondents. These actors represent to the focal customer an unknown single individual or a collective of individuals who for some reason cross the focal customer’s path and are deemed relevant enough to be part of her ecosystem. For example, some respondents mentioned that running in new places where they could bump into groups of tourists negatively affected their CX. Even simply going out for a run at the wrong time of day could have a similar outcome:

“The trail also gets very busy, even at 9 am (when we started), and so we are constantly having to pass people on a narrow trail, which sometimes was frustrating and therefore distracting.” (Male, 27 yrs.)

Other respondents mentioned that posting events on social media and knowing that people beyond their immediate circle of acquaintances could see them contributed to the CX:

“I haven’t posted the last couple of runs, but the first few I was posting them, and I guess I just felt that I was pushing myself harder, and I felt like I was competing against someone that I did not even know myself.” (Male, 25 yrs.)

Events earlier in the day also affected their mood and how they experienced the activity-tracking. For example, a bad day at work could result in a bad activity-tracking experience, simply because the focal customer wasn’t in the mood for running.
4.2. Customer ecosystem types

The findings indicate that not all of the above actors were present in each focal customer’s ecosystem. Some customers mentioned all actors and others only a few. For example, in this study, some actors were included to help the focal customer lose weight, become better at running, or simply spend more time with friends and family. Others were included more by chance because of the activities and experiences with which the customer engaged. For example, the customer would meet strangers on the running track or read about running on another provider’s running forum and thus end up incorporating these actors into her ecosystem. Some focal customers included many actors in achieving their goals and aspirations and engaging in their preferred activities and experiences, while others included only a few. Thus, the customer ecosystems varied in scope and size based largely on what the focal customer aimed to achieve, do and experience.

Furthermore, the importance of the included actors varied. While some actors were regarded as key, others played marginal roles in the ecosystem related to activity-tracking. The importance of the different actors became apparent as customers shared their experiences with the activity tracker. Important actors were mentioned often. These actors seemed to engage in activities or goals that closely connected with the focal customer or simply embodied a key role in the customer’s daily life, as, for example, with family and friends. On the other hand, less-important actors received fewer mentions or were explained by the focal customer as actors contributing marginally to the activity-tracking experience.

The importance of the actor further determined the actor’s position in the customer ecosystem. The more important an actor was, the more closely it was located, physically and mentally, to the focal customer. For example, the focal customer could interact physically with some actors, such as friends and family, whereas other actors, like brands, embodied a mental position in the customer’s life. Worth noting here is that, regardless of other actors’ positions, the focal customer always embodied a central position in the ecosystem. This does not, however, automatically mean that the customer ecosystem is always focused on the individual customer. As we analyzed the customer ecosystems and their actors and actor positions, the number of actors and their importance to the focal customer resulted in three main customer ecosystem actor constellations: individual-driven, brand-driven and socially-driven ecosystems (Table 4). These ecosystems are similar in that they all portray the customer’s systems and have
multiple actors present, also related to a specific service. The difference between the ecosystem types is a matter of nuance. This nuance, however, is important to acknowledge and characterize to form a better understanding of the customer ecosystem and its effect on the CX.

Table 4  
**Customer ecosystem types**

<table>
<thead>
<tr>
<th>Ecosystem type</th>
<th>Actor constellation</th>
<th>Examples of focal customer goals driving the actor constellation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual-driven ecosystem</td>
<td>Individual customer dominates, while some other actors are located further from the focal customer.</td>
<td>Personal performance and improvement, or the goal of not having any goals</td>
</tr>
<tr>
<td>Brand-driven ecosystem</td>
<td>The focal provider dominates, while other actors vary in number and position.</td>
<td>Understanding running patterns through data, engaging with the latest technology/clothes</td>
</tr>
<tr>
<td>Socially-driven ecosystem</td>
<td>Multiple social actors dominate and are located close to the focal customer.</td>
<td>Connecting with other individual and collective actors. Social status and competition</td>
</tr>
</tbody>
</table>

### 4.2.1. Individual-driven customer ecosystems

In the individual-driven customer ecosystem (Figure 1), only few other actors are included, and these actors tend to play a minor role in the overall activity-tracking experience. This ecosystem type is all about the focal customer. Although a user may acknowledge that other actors play a role in her context and consequently her activity-tracking experience, she views herself as the most important and dominant actor. This type of individual-driven customer ecosystem has thus emerged as rather limited in size and scope, with other actors positioned relatively further from the focal customer.

The focal customers’ goals tend to focus on individual performance and improvement, such as running faster or longer. This is also why they engage in activities like running and data-monitoring. The overall activity-tracking experience often depends on actors’ moods and performances, rather than the activity tracker, or any other actors for that
matter. If they had a good run, the activity-tracking experience was also great. These respondents often note that the activity tracker is participating in their individual performance and experience around this:

“Those times when you’ve performed extremely well, and you’ve been looking at the pulse and had good interim times, then the activity tracker has also participated in that experience.” (Male, 27 yrs.)

On the other hand, if the respondent has had a bad run, this is also reflected negatively in the activity-tracking experience. Due to this individual focus, some respondents mentioned that they avoided sharing their activity-tracking experiences with other connections: for example, on social media. As social sharing does not further the individual goals, it is simply deemed unimportant. Furthermore, some focal customers with individual-driven customer ecosystems also noted that they had a goal of not having any goals with running and activity tracking. These focal customers were often previous athletes who associated the activity tracker with negative feelings around individual performance. As Laurie (27 yrs.), who used to be a professional orienteer, explained, he doesn’t have any goals with training right now, and that feels really good.

![Individually-driven customer ecosystem](image)

**Figure 1** Individually-driven customer ecosystem

### 4.2.2. Brand-driven customer ecosystems

In the brand-driven customer ecosystem (Figure 2), the focal provider plays a key role and is positioned close to the focal customer. Indeed, customers with this ecosystem type
often consider the brand and its offering key actors in their ecosystem, and thus also their running and activity-tracking experience. The brand-driven customer ecosystem may include many or few other actors, but these are of less importance than the focal provider and positioned further away from the focal customer. Worth noting, however, is that many focal customers of brand-driven ecosystems like to compare their current focal provider to others, as they seek reassurance that they are using the latest and greatest. As such, other providers can also take on a more important role in this type of ecosystem.

The focal customers of brand-driven ecosystems focus on goals and activities revolving around the provided service: in this case, activity-tracking. For example, the users may aim to understand their running patterns and accompanying bodily functions better, or simply to engage with the latest technology. For these customers, the service and its functional and technical elements lie at the core of the experience. Indeed, many of these customers would be characterized as early adopters:

“I’ve heard about some people who don’t like to run with activity trackers because they feel like they can’t run freely. I’m not at all like that. I’m a technology freak. The more gimmicks, the more fun it is to run.” (Male, 43 yrs.)

Other elements related to the brand may also be important and contribute to the activity-tracking experience. For example, Jenny (28 yrs.), who runs with a Nike application, shared how using other Nike products and services further amplified her experience. For these customers, the overall activity-tracking experience is highly dependent on the performance of the activity tracker. For example, if the activity tracker for some reason doesn’t succeed in tracking the whole run, the customer may discontinue the running activity altogether and walk back home. As Pelle explains:

“If the activity tracker for some reason stops tracking during the run, I would joke that this run did in fact not happen”. (Male, 22 yrs.)

On the other hand, these customers often viewed the experience as positive when the activity tracker performed to their expectations – including times when their own performance was sub-par.
4.2.3. Socially-driven customer ecosystems

In socially-driven customer ecosystems (Figure 3), other individual and collective social actors are the key actors for the focal customer. As a result, the socially-driven customer ecosystem often consists of many non-commercial actors positioned closely to the focal customer. This type of customer ecosystem is thus larger and denser in scope and dominated by the collective rather than the individual.
The focal customer of socially-driven ecosystems places much emphasis on connecting with other social beings, such as her peers, co-customers, family and friends. This is more important than her individual performance or the activity-tracking technology. Many of these focal customers like to run and track their runs together with others. The focal customer may also seek social status and significance. She frequently shares her posts on social platforms. Great experiences are characterized by feeling connected to others through the activity tracker. An element of competition can also be present in this experience, either driving or hindering the CX:

“When I was doing challenges with my friends, it was also a way of letting them know that I’m ahead or that I’m pushing, so the competition is also what really drove it.” (Male, 38 yrs.)

“I haven’t been using it as much, though, because I found that actually not that many people have it...So, if there was a much bigger user base, I would definitely use it more, because you can kind of compete. I mean, I like running on my own, but I do like competition. So, if I had more friends on here, I would definitely run more, and it would be fun to compete against them and compare the results.” (Male, 25 yrs.)

5. Discussion

This study investigated how the customer ecosystem and its key components shape the CX. To achieve this goal, we focused on identifying the actors and actor constellations that are present in the customer’s domain, exemplified in the ways they shape the CX with a smart service offering. The study extends the existing service and marketing literature that has treated CX as being created or co-created in dyads (Berry et al., 2002) or service-dominated networks (Tax et al., 2013), service ecosystems (McColl-Kennedy et al., 2015) and institutions (Akaka and Vargo, 2015). In line with previous research (Caic et al., 2019; Heinonen and Strandvik, 2015) the emphasis was on the customers’ idiosyncratic and systemic context as relevant to, rather than centered on, a specific service. This distinction is important to understand better what matters most to the customer. The findings illustrate how multiple actors and actor constellations are present in the customer ecosystem and drive the CX with activity trackers. The study reveals that the CX is not solely confined to the service providers’ offering, which consists of products, services, solutions, promises and value propositions, but also emerges from the customer ecosystem (Table 5). This customer ecosystem is self-chosen and customer-centered actor configuration emergent within the customer’s life world, and shapes the customer’s activities and experiences. It represents the vital context for explaining
customer behavior. The findings demonstrate how actors also beyond the focal provider(s) can drive the CX with the focal business offering. The provider is thus relegated to a supporting role in forming the CX. Another finding of this study is that various actor constellations form the customer ecosystem. These constellations are grounded in the focal customers’ logic, which encompasses their goals, experiences and activities.

Furthermore, these actor constellations illustrate how ecosystem actors drive the CX in combination rather than isolation. We maintain that, to fully understand the CX with an offering, it is key to emphasize all actors present in the ecosystem rather than to solely focus on dyadic provider–customer interactions or other actors in the service context. Some actors, however, may play a bigger role, having more influence on the CX than others. Our findings complement the actor configuration networks proposed by Caic et al. (2019) by specifically identifying the key actors relevant to CX.

Table 5  
**Key implications of customer ecosystems for CX**

<table>
<thead>
<tr>
<th>Customer ecosystem</th>
<th>Key findings</th>
<th>Customer experience implication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Is self-chosen and customer-centered, including key actors and actor configurations, and emergent within the customer’s life world.</td>
<td>The CX has individual and social properties based on idiosyncrasy.</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Has broad contextual frames with physical, virtual and commercial features and structures. The scope is dependent on the customer-unit level of abstraction (e.g. individual customer vs collective unit). It is also dynamic in nature.</td>
<td>The CX is formed and emergent within the customer ecosystem where multiple actors are present, as well as outside market-related interactions.</td>
</tr>
<tr>
<td><strong>Actors</strong></td>
<td>Includes both human and non-human, single and collective actors. The relevance of each (non) selected actor is grounded in the customer’s logic. Includes the focal customer, service providers, other customers and co-customers, and other actors such as peers, family, friends and strangers in the customer context.</td>
<td>The CX is driven by actors both within and beyond the service context, ranging from a marginal to significant and a positive to negative influence.</td>
</tr>
</tbody>
</table>
Actor constellations can vary in size and scope. The constellation is grounded in the customer's logic. Actors drive the CX in combination rather than isolation.

6. Theoretical implications

This study contributes to the marketing and service literature in several ways. First, it advances the research on CXs in systemic contexts by illustrating how the customer ecosystem, defined by its actors and actor constellations, shapes the CX in a smart service setting. This study thus answers recent calls to empirically explore the customer ecosystem’s influence on “what is purchased, used and experienced” by the customer (Heinonen and Strandvik, 2018, p. 11). With respect to the CX and its context, most studies have focused on exploring CXs within dyadic interactions (Berry et al., 2002). Only a few have acknowledged the role of systemic contexts in CXs (e.g. Akaka and Vargo, 2015; Heinonen et al., 2010). The customer ecosystem lens has deepened the understanding of CXs occurring in the customers’ life worlds. In line with Lipkin (2016), we argue that this customer ecosystem lens is key to understanding better today’s customers and how they select, experience and relate to business offerings. Although our focus was explicitly on the CX in a smart service setting, the findings can be extended to other empirical contexts and help explore customer ecosystems’ influence on other phenomena, like customer activities, value and engagement.

Another main contribution is the expanded understanding of the customer ecosystem, responding to research calls to increase the knowledge of this concept (Heinonen and Strandvik, 2018; Leino, 2018). Although researchers have devoted increasing attention to networks and the systemic aspects of business, studies have focused on exploring provider systems (Kingman-Brungade et al., 1995) or, more recently, how multiple actors exchange service within service ecosystems and institutional structures (Akaka et al., 2015; Edvardsson et al., 2018; Patricio et al., 2020). Customer ecosystems as beneficiary-centered systems have received limited attention.

The identified six actor categories add to and extend previous work on customer ecosystems (Leino, 2018; Heinonen and Strandvik, 2018) by characterizing and synthesizing its key components. Although previous studies (e.g. Tax et al., 2013) have considered similar actor categories, they often focus on exploring a distinct actor type, such as co-customers (Letaifa and Reynoso, 2015) or other actors confined to the focal service (e.g. Slätten et al., 2009). The focal customers can include the actors in their
ecosystem deemed relevant based on their idiosyncratic frame of reference. The findings support previous studies indicating that the opinions and activities of family members and close friends matter greatly to customers (Shin, 2013), also in the context of business offerings. Such actors have even been regarded as secondary customers and can play a role in the focal (or primary) customer’s ecosystem (Leino, 2017). By illustrating how multiple actors – including those unfamiliar with the focal service – can be considered relevant by the focal customers in their ecosystem and drive the CX, we encourage researchers to look outside market-related interactions as well in order to increase their understanding of the customer and their experiences with offerings.

The actor constellations that have emerged in this study shed light on different customer ecosystem types and how CXs are driven not only by individual/collective actors but also by their constellation. This study mapping out customer ecosystem types can aid marketing and service researchers in interpreting and designing future studies on customer collectives.

Finally, this study answers a call to explore empirically smart self-services (Gummerus et al., 2018; Wunderlich et al., 2013) – revealing how CXs with such devices are largely driven by a systemic-use context: both in situ CXs and the total experience with the offering. Researchers should continue to study the CX of smart service by applying a customer-ecosystem lens, as this can contribute to our understanding of customers’ technology-enabled experiences and how they evolve as new technologies emerge.

7. Managerial implications

The key managerial challenge is essentially to adopt a customer-ecosystem lens for CXs. Although customer-centricity is acknowledged as the key to effective CX management (Lemon and Verhoef, 2016) and ultimately business success (Prahalad and Ramaswamy, 2004), many managers struggle to apply this in practice. Guided by traditional provider-dominant thinking, managers commonly focus on the firm’s role, or the role of other actors and factors connected to the core service, when exploring and managing CXs. Today’s companies strive for influence, yet the customer may not consider them important enough to actually be influential. This remains a challenge, as companies often focus on setting and meeting their own and shareholders’ objectives rather than prioritizing to understand the customer’s goals. To alleviate this issue, we encourage
managers to be sensitive toward what is happening in the customer’s context. By applying a customer-ecosystem lens on CXs, managers gain a more holistic and expanded view of the customers and their experiences and the provider’s potential role in CX. Mapping customers’ ecosystems, then, essentially means exploring customers’ idiosyncratic actor configurations. Based on such insights, the firm can design, manage and market offerings that have a greater chance of becoming embedded in customers’ lives.

As this study demonstrates, the CXs of business offerings are shaped by multiple actors in the customer’s ecosystem. The study highlights the contingency of all actors on their relevance to the focal customer. The customer’s logic, consisting of the customer’s goals, activities and experiences, drives this relevance. We suggest that managers focus on better understanding this customer logic and how it influences the size and scope of the customer ecosystem, the prioritization of actors within this system and how these actors drive the CX of the offering. We encourage managers to study these actors and their key characteristics to better understand how the complex and dynamic CX is constructed, through individual sense-making within social contexts (Helkkula et al., 2012). We also encourage managers to start always with the focal customer, as the CX is idiosyncratic and the customer ecosystem revolves around and is dependent on this actor. Although this study approached focal customers as individuals, managers should acknowledge that the focal customer may also represent a collective, such as a family. This may add complexity, as each member of the collective comes with her own goals, experiences, activities and practices.

It is equally important to explore other actor groups. By examining their core characteristics (e.g. commercial/non-commercial, individual/collective, human/non-human) and their similarities and differences, managers gain a more systematic overview of the customer ecosystem and its components. To get the most out of such an analysis and propel a customer-centric approach across the organization, managers need to challenge their current thinking and vocabulary. For example, as this study demonstrates, a focal provider’s competitors merely represent other providers to the focal customer. Consequently, instead of analyzing these competitive actors through a competitive analysis, it may be more useful to analyze them through the customer’s eyes. Such insights can help the company successfully position its offerings against competition. Nonetheless, it’s important to keep in mind that these other actors also have ecosystems of their own, and are driven by their respective goals, activities and
experiences. By looking into the multiple goals present in the customer ecosystem, and whether these are currently being met or not, managers can better predict how the customer ecosystem will evolve in the future.

By mapping out different customer ecosystem types, managers also gain a useful tool to segment and target (potential) customers. This type of segmentation goes beyond traditional demographic and psychographic variables, to acknowledge the customer's life, including her goals, activities and experiences. Managers can use these ecosystem types as the basis for targeting offerings: crafting relevant and effective value propositions and marketing communications. Although we acknowledge that each customer ecosystem is unique and may vary in size and scope, there are similarities that can drive such categorizations. For example, focal customers with individual-driven ecosystems in this study likely warrant a value proposition that emphasizes individual performance, whereas focal customers with socially-driven ecosystems will demand a proposition built around the fun of running together.

In summary, as CXs with offerings are largely shaped by the customer’s life and multiple actors present in their context, managers must ensure that the customer ecosystem has been sufficiently considered in the firm’s goals, strategies and actions. Firms that succeed in doing so will gain a competitive advantage.

8. Limitations and future research directions

The customer ecosystem lens on CXs gives rise to a wide array of future research avenues (Table 6). We argue that, by exploring these topics further, researchers and managers will gain an in-depth picture of contemporary customers’ lives in relation to the actors and actor constellations that influence CX. One area of future research is the empirical context. This study was conducted in one specific smart-service setting. We argue, however, that the located actor categories, constellations and roles may be applicable to other contexts, especially technology-enabled services. Future research should explore how the customer ecosystem and its key components shape the CX in other empirical settings, including B2B and B2C contexts. The methodological approach to customer ecosystems also represents an area for future research. We applied qualitative methods to provide a first glimpse of customer ecosystems and their impact on the CX. We encourage researchers to also apply other methods to identify relevant actors and actor
constellations. Especially the mapping of customer ecosystems could benefit from quantitative methods, such as text-mining techniques and cluster analysis. We also encourage researchers to conduct longitudinal studies to reach a more complete understanding of the dynamic nature of customer ecosystems and CXs.

Table 6  Suggestions for future research

<table>
<thead>
<tr>
<th>Customer ecosystem as a lens on CX</th>
<th>Future research: customer ecosystems</th>
<th>Future research: customer experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• How does this lens apply to B2B contexts?</td>
<td>• What else can we learn about the dynamic and holistic nature of CXs by applying a customer ecosystem lens?</td>
</tr>
<tr>
<td></td>
<td>• Are there times when this lens is not as useful?</td>
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<table>
<thead>
<tr>
<th>Customer ecosystem actors</th>
<th>Future research: customer ecosystems</th>
<th>Future research: customer experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• How do these actor categories apply to other settings?</td>
<td>• In what ways does the influence of single vs. collective and human vs. non-human actors on the CX differ?</td>
</tr>
<tr>
<td></td>
<td>• What other actor categories can be identified in customers' ecosystems?</td>
<td>• How does the number of included actors affect the CX? (e.g. crowded vs. spacious ecosystems).</td>
</tr>
<tr>
<td></td>
<td>• How do single vs. collective actors enter the customer ecosystem?</td>
<td>• What other types of actors drive the CX in other empirical settings?</td>
</tr>
<tr>
<td></td>
<td>• In what ways do customers define the relevance of and prioritize actors in their ecosystems?</td>
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<table>
<thead>
<tr>
<th>Customer ecosystem actor constellations</th>
<th>Future research: customer ecosystems</th>
<th>Future research: customer experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• How do these actor constellations apply to other settings?</td>
<td>• In what ways do specific actor constellations (e.g. combination of peers and strangers) drive the CX?</td>
</tr>
<tr>
<td></td>
<td>• What other customer ecosystem types can be identified?</td>
<td>• How does a swift vs. gradual shift in the actor constellation drive the CX?</td>
</tr>
<tr>
<td></td>
<td>• How static/dynamic are these customer ecosystem types?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Are focal customers’ actor constellations related to a specific service similar to those related to other services?</td>
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References


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**TECHNOLOGY IN USE - CHARACTERIZING CUSTOMER SELF-SERVICE DEVICES (SSDS)**

Abstract

Purpose — This study aims to (1) introduce and characterize a specific form of self-service technology (SST): customer self-service devices (SSDs), as well as (2) propose and apply a classification scheme of SSDs to encourage future research on such self-service technologies.

Design/methodology/approach — The paper is based on conceptual development of customer self-service devices and exploratory qualitative insight from representatives of companies offering various types of SSDs.

Findings — This paper introduces SSDs as customer-possessed and controlled smart service devices, aiming to solve problems from the customer’s perspective, often within completely new, customer-defined service processes and ecosystems. SSDs are not confined to the company-controlled service environment, and customers may thus use them wherever and whenever they so wish. The study characterizes SSDs based on service and customer use features, as well as on the subject of the service act (self/other vs. belongings) and nature of service act (monitoring vs. acting).

Research limitations/implications — This study is limited to conceptual exploration with qualitative insights from six companies. Future research is needed to empirically study different SSDs by utilizing both qualitative and quantitative approaches in various settings.

Originality/value — The paper conceptualizes self-service devices (SSDs) as an extension to the traditional SST framework. It contributes to the understanding of how personal handheld devices can contribute to customer experiences. It provides research directions to stimulate further research in self-service technologies.

Keywords — Self-service technology, self-service device, smart services, wearables, service features, customer use features

Paper type — Conceptual paper
1. Introduction

Technology is playing a significant role in advancing services, and leveraging technology is a crosscutting priority for service research and practice (Ostrom et al., 2015; Wirtz et al., 2018). Especially self-service technologies (SSTs) have received wide scholarly attention over the past decades, since they are suggested to empower customers to make better choices (such as manage their finances or time) and be more independent of service providers (Ding, Verma, and Iqbal 2007; Parasuraman and Colby, 2015; Giebelhausen et al., 2014). They may also benefit both customers and companies due to reduced costs.

Self-service as a phenomenon is not new (cf. Bateson, 1985), but the relevance of the self-service customer has increased with the infusion of technology and advancements in service technologies. An SST represents an interface offering customers the possibility to directly interact with technology instead of service personnel, often 24/7 (e.g., Dabholkar and Bagozzi 2002; Giebelhausen et al., 2014; Meuter et al., 2000). Previous studies have investigated how SSTs relate to innovation adoption, customer satisfaction, service use and company performance (Dabholkar, 1996; Liljander et al., 2006; Meuter et al., 2000; Meuter et al., 2005; Robertson et al., 2016; Wang et al., 2017). These studies focus on company-controlled SSTs, where the service provider operates and manages the interface, and the customer interacts with the technology either from distance as with electronic banking, or physically as with ticketing machines.

Service technologies as an emergent field including service robotics, automation, AI, Internet of Things, and machine learning will have a huge impact on service research and practice (Kunz et al 2018). With these technology advancements a new type of interface has also appeared, often referred to as simply “gadgets” in popular press (Pocock, 2014), or smart services in academic research (Ostrom et al., 2015; Wünderlich et al., 2015). This interface enables customers to engage in self-serving behaviour with the help of the technology that is either bought, borrowed or rented. Examples include various types of handheld devices, robots, wearables, implants, sensors, home panels, and other smart devices. Extant research and forecasts show that these devices, which we term customer self-service devices (SSDs), are quickly becoming part of customers’ everyday lives (e.g., Sultan, 2015; Wünderlich et al., 2013). For example, the forecasted wearable market value for 2019 is currently estimated at approximately $25 Billion (CCS Research).
Extant SST frameworks do not, however, account for these customer SSDs. Studies in such smart service technologies and services remain scarce (Brasel and Gips, 2014; Wünderlich et al., 2013), while several researchers stress the need for more research on the topic (Ostrom et al., 2015; Wünderlich et al., 2015; Kunz et al 2018). Whereas researchers have acknowledged that there is some variability in SSTs (e.g. Meuter et al., 2000), and called for a more fine-grained classification of SSTs (Collier et al., 2014), a classification encompassing such new, personal technologies is still missing. A classification is useful in that it helps to organize phenomena into groups and thus, make them “amenable to systematic investigation and theory development” (Hunt, 2002, p. 222-3). However, previous research has been lagging behind in terms of classifying or characterizing SSTs, especially when considering the escalating technology advancements. A structured understanding of different types of customer SSD is important also from a practical, managerial point of view, since the technologies are still emerging and innovations rest upon the ability to comprehend the differences between existing SSTs. As technology evolves, SSTs will increasingly become more personal, more integrated in existing or emerging ecosystems, and are beyond the direct control zone of the developer or provider. Therefore, managers need further conceptual insight into the opportunities of different self-service technologies.

Based on this rationale, this study posits that customer SSDs need to be properly characterized and defined, not only to reveal the extent to which they are different from previously examined SSTs, but also to provide a theoretical basis for future work on the topic. In addition, the study suggests that a categorization of SSDs into different subgroups would be of high value for the service research community.

Therefore, the aim of this study is twofold: (1) to introduce and characterize a specific form of self-service technology (SST): customer self-service devices (SSDs), and (2) to propose and apply a classification scheme of SSDs to encourage future research. This paper introduces SSDs as customer-possessed and controlled smart service devices, aiming to solve problems from the customer’s perspective, often within completely new, customer-defined service processes and ecosystems. This study contributes to extant SST research with an expanded and more up-to-date framework, which also acknowledges customer-possessed SSDs. It thereby answers the call made by Wünderlich et al. (2015) to portray and study emerging smart services. By providing a characterization and a classification of four specific SSD types based on the (a) subject of act (self/other) and (b) nature of act (monitoring/acting), this study also stimulates future work on the topic.
The definition and categorization may further help managers in understanding how customers use their business offerings as means to engage in self-serving behaviour.

The remainder of this paper is organized as follows. The first section shortly discusses the extant literature related to technologies enabling customer self-service, i.e. self-service technologies (SSTs), after which we review the previous categorizations of SSTs. Then, we explain our methodology for analysing customer SSDs and for creating a new way of categorizing them. The next section proposes a categorization of four major SSD, after which we illustrate SSD features with data collected from companies offering SSDs, and provide a new categorization of SSDs. The paper concludes with the theoretical and managerial implications, as well as limitations and an agenda for future research build around the proposed SSD categories.

2. Emergence of self-service technologies

Self-service technologies, or SSTs, revolutionized customer service in that these technological interfaces enable customers’ to serve themselves, transforming the ways customers interact with the service supplier. The replacement of traditional “high-touch and low-tech” service encounters with “high-tech and low-touch” interfaces (Wang et al., 2013) enables customers to take part in highly flexible, convenient and often time saving self-serving behaviours (Bateson 1985; Bitner, 2001; Liljander et al., 2006; Meuter and Bitner 1998; Meuter et al., 2000). Simultaneously, the company is able to handle variations in the service demand without adjusting labour levels (Curran et al., 2003) and provide a more consistent service atmosphere (Hsieh et al., 2004), improving the quality, effectiveness and efficiency of service provision (Meuter et al., 2000; Rangarajan et al., 2007). In other words, SSTs have radically affected “how services are conceived, developed, delivered, and integrated” (Lin and Chang 2011, p. 426) in today’s service landscape. For example, different types of service innovation categories can either by themselves, or in combination, represent new service offerings enabled by technology, as they can: (1) be a new or substantially modified service concept, (2) offer a new client interaction channel, and/or, (3) make up a new service delivery system (Ark et al. 2003; den Hertog et al. 2010). In other words, while there is a diverse set of self-service technologies that is constantly evolving, the research in SSTs is lagging behind. In the following we will discuss how SSTs have been viewed in academic literature, and also provide direction as to where fresh perspectives are needed.
2.1. Company-controlled SSTs

Researchers have defined SSTs as “technological interfaces that enable customers to produce a service independent of direct service employee involvement” (Meuter et al., 2000, p. 50). Current examples include self-checkout at stores (Wang et al., 2017), self-check-in at airports (Liljander et al., 2006), book lending machines at libraries or vending machines in public spaces, and touchpad-based ordering systems in restaurants. SSTs are thus portrayed as alternative to traditional services, rather than as completely new types of services. So far, electronic services have been categorized according to their status for customers as core service or supporting service (Fassnacht and Koese, 2006), or their newness in comparison to existing (offline) services (Hofacker et al., 2007). Previous studies have, for example, explored company-owned technological devices or interfaces operationalizing the service encounter, when examining factors influencing consumer acceptance or adoption of SST (Curran et al., 2003; Curran and Meuter, 2005; Dabholkar, 1996; Liljander et al., 2006; Lin and Hsieh, 2006; Lin and Chang, 2011; Parasuraman and Colby, 2015). However, while doing important research in understanding consumer perceptions of SSTs and managerial applications of SSTs, research has not adequately continued identifying key elements that distinguish different SSTs from each other.

We argue the ownership and control of the SSTs is an important element when classifying and characterizing SSTs. This is justified when considering studies that have examined the varying degrees of customer control in the self-service setting (cf. Collier & Sherrell 2010). The majority of the studies addressing SSTs are cases where the company maintains or owns the interface of these SSTs. In such cases the company physically maintains and facilitates, for instance, the self-service desk at the airport or the ATM machine on the shopping street, or the electronic web shop on the Internet. In their categorization of SSTs, Meuter et al. (2000) acknowledge that some SSTs are also customer-owned, such as training or software services, but distinguish them through their interface, referring to TV/Video/CD in doing so. We argue that the extant SST literature thus lacks a thorough conceptualization and empirical examination of technology owned by the customer.

The division of SSTs into stand-alone and supporting services may be fruitful for service providers, who can consider which service elements are most amenable for self-service. For example, Disneyworld and its MagicBand wearable bracelet allows customers to load money on it to purchase items, pre-book rides and use it as a hotel room key
Similarly, badges worn to work can enable identification, tracing, and/or locating the wearer. In these cases, the ownership is not necessarily transferred, or the functionality of the device changes after ownership transfer. This division, however, is of limited use while studying customer-possessed SSDs, rather than company-owned SSDs, as done in this study, because the customer defines the way to use the service. The challenge with company-controlled self-service technologies is especially pronounced in the case of more advanced, smart and intelligent SST devices, which have emerged in line with the rapid and recent technological advancements.

2.2. Adaptable SSTs

From a practical point of view and also when reviewing more recent research, it becomes apparent that SSTs have evolved. For example, Ostrom et al. (2015), referring to Wünderlich et al. (2013) and Wünderlich et al. (2015) described changes in the service and technology landscape, stating that: “technology-enabled wearable devices, home appliances, cars, and so forth... enable the provision of smart services”. Based on Allmendinger and Lombreglia (2005), Wünderlich et al. (2015, p. 443) characterize these smart services as a special service type “that is delivered to or, via an intelligent object, that is able to sense its own condition and its surroundings and thus allows for real-time data collection, continuous communication and interactive feedback”. These services thus operate based on the IoT paradigm, which refers to various objects’ and human beings’, even animals’, ability to connect, store and share information on a 24/7 basis through different sensors and wireless technologies (Lee and Lee, 2015). Wünderlich et al. (2015) shortly discuss different types of such objects, like wearable devices targeted to elderly people, which can provide service by sending a signal to relatives if the wearer would, for example, fall or become ill in their own house. The authors do not, however, focus on how the customer is serving her/himself with the device, but rather on the different characteristics and value co-creation opportunities they offer. Similarly, Allmendinger and Lombreglia (2005) see smart services as pre-emptive, as they provide customers value from “removing unpleasant surprise from their lives” (p. 132), thus referring to what Normann (1991) proposed was the relieving function of services. However, many SSDs in fact enable the customer to engage in completely new self-service activities. While these new SSTs and activities are adaptable and pre-emptive, the focus is still very much on technology. In that respect they are seen in a similar way as the more classic SSTs.
Indeed, as the previous discussion indicates, many of the existing classification schemes of self-service technologies are focused on the technology characteristics and technological interface (cf. Fassnacht and Koese, 2006; Meuter et al., 2000), such as Internet desktop, mobile, interactive kiosk or other. Yet, these characteristics are of limited usefulness, as the interface and technology are constantly evolving, and it is extremely difficult to envision the development trajectory of such self-service technologies. Therefore, we recognise the need to discuss customer-owned devices more thoroughly from a self-service perspective, and propose that these customer-owned devices represent a new form of SST.

2.3. Customer-controlled SSTs

Research indicates a need to focus more on the customer’s use of the SST. For example, although mainly focused on the technological interface, Meuter et al. (2000) also suggested that self-services could be divided according to their use purpose into customer service, transactions, and self-help, which may be a useful way to understand the problems that SSTs help the customer solve. This focus on customer use is especially relevant as more advanced self-service technologies might fulfil multiple tasks – for example, a chip embedded in the hand of the customer can be programmed to open one’s front door, and even make payments. Therefore, we turn to research that emphasises the customer’s perspective of different (self)-services.

Where the first classifications of SSTs focused on the technological interface as controlled by the company (e.g. Meuter et al., 2000; Dabholkar, 1996), focusing on customer use of service may provide a useful starting point for classifying SSTs. Earlier service researchers have identified five dimensions in the context of technological services that provide a sound analytical framework to study such services (Dube and Helkkula, 2015; Heinonen, 2004; Gummerus and Pihlström, 2011). The main dimensions that characterize service use are: (1) service features and (2) customer use features. Service features refer to three specific dimensions: (a) the possession dimension relating to who owns the device, (b) the technical outcome dimension (Grönroos, 1984) explaining what the customer receives through the device, and (c) the functional dimension (Grönroos, 1984) describing the process of how this service is received. The customer use features, in turn, relate to the interaction between the customer and the company, and consist of the temporal (when) and spatial (where) elements of use. These five dimensions are equally important even though research has paid varying attention to
them. For example, recent research on SSTs underline the relevance of the place where
the SST is used. Collier et al., (2014) suggest that self-service technologies could be
divided into public self-service technology and private self-service technology. These
categories combine the public sphere vs. the customer sphere, as well as the degree of
interaction. Public SSTs, according to them, involves situations where other customers
are present and the customer may interact with them, and where the customer is under
time pressure to fulfil the task. SSTs used in the customer sphere typically involves single
customers, and customers can take time and return to the task(s) later. Hence,
interestingly, the authors acknowledge that there are at least two rough categories of
SSTs (public/private) that also influence customer service perceptions. In the
exploratory study we apply the five-dimensional framework to illustrate how SSDs differ
from the more traditional SSTS, thus also enabling us to derive a definition of SSDs.

Figure 1 summarises the emergence and existence of different types of self-service
technologies in a chronological timeline. Although the timeline is somewhat simplistic
and involves a broad representation of various technologies, it shows key technology
interfaces (above the line) and the corresponding empirical examples (below the line).
The timeline indicates three main eras of self-service technologies. The first era was
focused on company-controlled service technologies, with customers interacting with the
company at a distance. Customers had few opportunities to adapt the interface to specific
needs or situations. The second era with adaptable service technologies allowed the
customer more flexibility and adaptability, mainly in terms of temporal and spatial
convenience. The current era of customer-controlled service technologies has shifted the
power and influence towards the customer, since the smaller size of the technology
interfaces has become more personal, connected, and accessible. However, although it
may be useful as an overview of the different service technologies, the timeline does not
provide further opportunities for characterizing SSDs.

(Insert figure 1 here)

Due to the rapid advancements in technology, there is a clear challenge for service
researchers to provide sufficiently unique and applicable classifications of self-service
technologies. We therefore reflect upon the relevance and applicability of classification
schemes developed for traditional service contexts, to identify further issues to consider
when characterizing SSTs.
3. Service classification schemes

This section provides a brief overview of service classifications from the perspective of customer’s use of (self-) service. Each classification scheme has its focus areas, and provides different perspectives of technology infusion in service.

The traditional classification schemes focused on distinguishing services from products, emphasising industry-specific elements, or managerially relevant service characteristics (cf. Lovelock 1983; Bell, 1986; Shostack, 1977; Zeithaml et al., 1985). Furthermore, some classifications proposed an even more accentuated consumer perspective: Nelson (1970) differentiated between search, experience and credence goods, based on whether the consumers could assess quality before or after using the service (or as in the case of credence goods, not at all). Within industrial services, Boyt and Harvey (1997) suggested taking the customer perspective and classifying services based on their relative importance to the customer. They proposed characteristics such as essentiality, replicability and replacement rate to form a classification of elementary, intermediary and intricate services. This approach focuses on the centrality of the service to the customer, and may be useful in defining also the degree of risk and the consequences of eventual service failure.

More recently, researchers have suggested that the service act classification by Lovelock (1983) is adaptable for technological services (Gummerus and Lipkin, 2015; Wirtz et al., 2018). This seminal classification proposes that services can be divided according to the direct recipient of the service (whether the act is directed at people versus things) and the nature of the service act (whether the act is tangible or intangible (Lovelock 1983). Based on these dimensions, Lovelock identified four types of actions: (1) tangible actions to people’s bodies; (2) tangible actions to belongings; (3) intangible actions towards people’s minds; and (4) intangible actions towards intangible assets. Thus, intangibility of action is coupled with the intangibility of the object that the action is directed at. This classification is well aligned with technology-based service, where intangibility is a prominent aspect of service provision. Nevertheless, in order to create a typology that aids the service research and practice in making sense of both present and future SSDs, given that new SSDs are continuously emerging on the market, we need to pinpoint key elements that characterize SSDs. In the following, we will create a systematic classification of SSDs, which also considers devices yet to be introduced.
4. Methodology for creating a classification of SSDs

To provide a systematic and theoretically based definition and conceptualization of SSDs, we will start by comparing them with the more traditional SSTs. This first step, a comparison between SSDs and SSTs will provide researchers and managers with a structured view of SSDs, showcasing how they differ from other SSTs. We base this definition on academic and trade publications, as well as six interviews conducted with company representatives from technology industries.

4.1. Choice of case companies, interview design and analysis strategy

The case companies represent technology industries (robots, wearable technology, smart home appliances and other smart devices) offering various types of SSDs. To retain the respondents’ anonymity the companies are labelled A-G. We selected each company’s representative based on their ability to contribute to a more in-depth understanding of our researched concept (Burns and Grove, 2001). Utilizing a semi-structured interview guide we conducted in-depth interviews (McCracken, 1988), enabling the representatives to freely talk about the company’s business offerings, whilst simultaneously being able to probe (Richards and Morse, 2007) for interesting insights related to SSDs. To conceptualize SSDs and contrast them from traditional SSTs we focus on five broad dimensions of enquiry: What? How? When? Where? Who? Such question-word dimensions provide a sound analytical framework, and service researchers have previously acknowledged and applied similar dimensions in the context of technological services (Dube and Helkkula, 2015; Heinonen, 2004; Gummerus and Pihlström, 2011).

4.2. Analysis of findings

The data used to characterize SSDs were analysed through iterative and inductive procedures, using the guidelines of Corbin and Strauss (2008) and Spiggle (1994). The findings were structured in two steps, by using the service and customer use framework and Lovelock’s (1983) service classification. In the first step we structured the findings in two broad categories: Service features including possession, outcome and process (who, what how) and customer use features including temporal and spatial context (when and where). In the next step, we modified and applied Lovelock’s (1983) service classification. This modified version enabled a nuanced view on SSDs and deepened the insight on the service and customer use features in the previous step. We analysed 1) the subject of the service act (who), instead of ownership because devices can also be leased, and 2) the nature of the service act (how/what). In our classification, we integrate the
‘how’ and ‘what’ dimensions, since service outcome and delivery are interdependent. We do not, however, include the ‘when’ and ‘where’ dimensions, since these may vary extensively: SSDs span from home-based to portable devices, and can often be accessed anytime anywhere. However, although our initial classification does not capture these aspects, they are important to keep in mind whilst studying customer use evaluations, since technology evaluations vary depending on the use context (Gummerus and Pihlström, 2011; Robertson et al., 2016).

To accommodate the unique characteristics of self-service technologies, we make a number of assumptions. First, in relation to the subject of the act, rather than viewing the customer as a recipient of the act only, we adopt an emancipated view of the customer as subject, rather than a recipient of the service. This emancipated view of the customer is justified in the context of self-service technologies where customers are expected to perform service acts. Specifically, we differentiate between self and other-directed SSDs. The self-directed device refers to the customer or main user, whereas the other-directed devices may be embedded within a person (such as a family member) or belongings, where belongings can refer, in addition to physical objects such as a car or a home, even to pets. Second, we also make adjustments in relation to the nature of the act. Instead of distinguishing explicitly between intangibility and tangibility of the act as in Lovelock’s original scheme, we propose that the service activity consists of either monitoring or acting. Monitoring is often intangible in nature as it comprises for example sensing, data collection, and data storage, so that the user can afterwards view and analyse the collected data (although also the provider may get access to this data). Acting is more tangible as it entails performing physical deeds. We acknowledge that typically, in order to act, a device has to monitor first (such as adaptable clothing senses the body temperature), which makes the categories non-exclusive. In the following we substantiate these theoretical underpinnings with empirical illustrations and provide a nuanced characterization of self-service devices. This characterization can be used to further develop theory and conduct empirical studies on this topic (Hunt, 2002).

5. Findings

In this section, we will first discuss the self-service devices (SSDs) identified during the interviews, after which we discuss the SSD features. Then, we apply the proposed classification scheme of SSDs to the data. Customer self-service devices designed to facilitate self-serving behaviour include different types of wearables, virtual assistants,
robots and other similar smart devices. Examples include medical and health tracking wearables such as blood pressure meters and heart-rate monitors, life loggers, biometric identification devices, even artificial organs, could denote such customer-owned devices. Other types entail service robots, GPS systems in vehicles, or smart home appliances like home security and entertainment systems, smart refrigerators, coffee makers or heating systems. These customer-owned devices are conceptualized as self-service devices (SSDs). The above-presented SSDs represent uni-/bi-/tri-service devices, being specifically designed, build and programmed for one/few service purposes. For example, the blood pressure meter is designed to measure the user’s blood pressure, or the life logger is designed to track one’s activities in the form of steps taken and calories burned, and the smart refrigerator will help in monitoring its contents and assists in storage and preparation of food. The sensors embedded within these SSDs are often of high calibre, equipped with technology that enables them to perform the specific smart tasks.

There is also another possible type of SSD, that is, smartphones, laptops and tablets, as well as wearables such as smart watches and rings. Especially the three first devices are widely used among today’s consumers, and use of wearables have been growing steadily the recent years. In contrast to the above-presented devices, these devices embody more generic, multipurpose hubs containing many forms of service(s), rather a specific form/a few forms of self-service. They usually enable the customer to access, for example, the company’s website (e.g., e-banking, Webshop) through mobile applications (Dube and Helkkula, 2015). These devices thus operate as bridge between the more traditional SSTs and newer SSDs since the customer is able to connect to company-controlled interfaces with them (hence connecting to traditional SSTs with SSDs).

(Insert table 1 here)

Next, we will discuss the findings related to the service features (who, what, how) that characterize SSDs.

5.1. **SSD Service features**

Service features entail (a) possession (*Who*), (b) the service outcomes (*What*), and (c) the service process (*How*).

*Possession.* SSDs are possessed by the customer— not the company, and thus the control over these devices is shifted from the company to the customer. As a result, customers
will largely control, direct and monitor how they are serving themselves with the device through various activities. For traditional SSTs, the possession or ownership (Who) of the interface lies with the company who are responsible for its maintenance and development. This company-ownership means that the company is largely in control of the SST and the service (Dabholkar 1996; Fitzsimmons, 2003; Liljander et al., 2006). The company representatives (A-F) in the study frequently mentioned customer control. Specifically, they mentioned that companies have very little control over how customers actually decide to serve themselves with such devices, or serve themselves at all for that matter. The CEO of Company A illustrates this lack of company control by noting the following:

The biggest problem with bracelets is that after six months, they often get forgotten in a drawer. And the company cannot do anything about this. (Company A, CEO)

SSDs may, however, also be coupled with multiservice devices and thus, extend back to more traditional SSTs where the company possesses more control. For example, a wearable device may also include a smart phone mobile application, through which the company can better manage the customer’s experience of the SSD. As such, if wanting more control companies may need to consider combining their SSDs with a company owned interface.

Another implication of this ownership-feature is that many SSDs may also be shared or lent among customers. Although initially bought by one individual, this self-service can thus extend to encompass and serve a smaller community of customers, if the customer so wishes. For most personal wearables this aspect seems less likely, since a sports-watch or blood sugar meter has to be worn on the body and thus, also becomes confined to one customer at a time. However, different robots or similar devices may encourage customers to also share the device within smaller communities, for example in a neighbourhood. In such cases, the company may have to for example complement the SSD with other supporting services that are of a more individual nature, to further secure a steady flow of paying customers.

Service outcome. The service outcome dimension (What) is focused on the outcome benefit of the service. SSDs’ service provision largely revolves around solving problems defined by the customers. As the company representative from Company C notes, their activity bracelets and sports watches aim to “solve the customer’s problem”, which may be that customers do not know “What gets her moving” as stated on Company C’s
website, they want to reduce time spent immobile, have difficulties monitoring the pulse or heartbeat, or simply do not get the complete picture of total workout or activities throughout the day, which this type of technology easily enables them to do. In other words, customers are capable of choosing or tailoring the service outcome according to their own goals. As the CEO of Company E, an electrical installation company points out:

Smart home solutions help the customer to tailor different outcomes to fit their goals. For example, one can pre-specify different lighting solutions, such as the perfect party mode that one can switch on before the guests arrive. Or simply use morning versus evening lighting, or just use the standard lighting, whatever they wish. (Company E, CEO)

This is in contract to SSTs that primarily solve a company-defined problem (Meuter et al., 2000). The activities available are therefore typically restricted to pre-defined alternatives or functionalities, i.e. replacing or complementing customer-personnel interactions (Ding et al., 2007; Liljander et al., 2006; Lin and Hsieh, 2006; Meuter and Bitner, 1998), or improving service quality by offering the option to e.g. check in online to shorten queueing time at the airport. Although SSTs may also be more flexible and user-friendly for customers, they usually aim to increase the company’s efficiency in terms of reduced requirements of labour force (Curran et al., 2003) and improved quality of service provision (Meuter et al., 2000).

SSDs do not per se aim to replace any service personnel. Rather, the technology created around the device enables customers to “serve” themselves in completely new ways, or substantially improved ways in comparison to what was possible before the SSD was released on the market. As representatives of companies B and C noted, customers can, with the help of the sport watch or activity bracelet, track all daily activities, heartbeat, even the GPS location, to improve their physical performance or engage in various types of “quantified-self” activities to boost their ego, or look good in front of their peers. In line with this, the Sales manager of company D also highlights the social aspect of their wearable device design by claiming:

The device can be worn around the neck and the overall design is aimed at giving the ‘iPhone appeal’. This implies that the device looks desirable to the users and it attracts admiration from other social actors, such as friends. (Company D, Sales manager)

Consequently, the use purposes become very flexible in nature, as highlighted by several of the company representatives. The Director of Company B, for example, frequently
emphasized how customers use these devices based on their own wants and needs, and what type of service experience they are looking for.

This also means that the customers’ problems and needs related to the SSD are not always visible for the company. The company thus needs to find innovative ways of locating these problems and needs so that they can better help their customers in solving them.

*Service process.* The service process (How) with SSDs usually takes place through a smart device, as part of a completely new service system. This feature also enables the customer to embed the SSD in an ecosystem defined by them. In other words, the customer can decide how to integrate the activities performed by SSDs in other activities. For example, the customer can share specific information or performance with their friends or post data in social networking sites to communicate with others, or transfer performance data about one’s activities for weight management in a separate app. The service process of traditional SSTs is usually embedded in the company’s existing service ecosystem and fulfils a function within it, such as a self-service check-in through a touch screen placed at the airport or the mobile check-in app on a smart phone, and these processes are part of the larger flight service process. Similarly, the web shop represents only a part of the shopping experiences, which also includes the delivery of the goods to the customer’s home. Often, the customer may also get support (e.g., staff at the airport, shopping mall, online interactions over website) if not able to follow through with the self-service (Meuter *et al.*, 2000). This feature makes it easier for the company to influence the service process from start to finish, and enable faster service recovery processes during other service sequences (e.g., security check-in, flight, arrival etc.), if something would go wrong during for example the self-service check-in. As such, the value of SSDs largely depends on the degree of compatibility with users’ other resources, skills and motivations. On this note, the Director of Company B said that their offerings become more or less integrated into their customers lives, much based on what type of activities the customer wishes to engage in.

The company may find it difficult to actually form and impact the service process beyond the technical qualities of the device. However, in line with studies (e.g., Akesson *et al.*, 2014) that indicate that customers enjoy being in control of their own experiences, especially with different types of SSTs, this increased customer control may actually benefit both the company and the customer, giving rise to happier and more loyal
customers. To achieve this outcome, it is nonetheless important that the technical qualities function as intended. For example, as Company C noted, the number one source of dissatisfaction with the device experience of a sports-tracking device was due to the GPS failing to measure the distance accurately.

The process dimension of service is also stressed upon in the case of Company D’s glucose measuring instrument. The competitive advantage of the device is that it presents the glucose readings in more understandable and graphic ways, as compared to other traditional glucose instruments. This is especially useful for young users, such as children, who may have difficulties understanding complex statistics:

The meters offer something different from what already exists in the market. The difference lies in the design of the device, colour displays, touch display and even in display of glucose levels. Instead of showing just numbers or graphs, the company uses animations with happy and sad faces to show the blood glucose levels. So anyone can easily understand whether the glucose levels are good for health or not. (Company D, Sales manager)

5.2. SSD Customer use features

This section characterizes SSDs based on customer use features. The temporal context (When) and spatial context (Where) of customer use distinguish SSDs from other self-service technologies. Although the temporal and spatial contexts are interdependent and partly overlapping, for analytical reasons they are here covered separately.

Temporal context. The temporal context (When) is perhaps the dimension where SSDs are most alike SSTs, since both aim to offer the customer constant access to the underlying service. SSTs with a place-bound interface offer limited temporal access for the customer and are dependent on when the facilities are accessible, whereas others operating through websites or mobile applications are more temporally available.

However, it can still be generally argued that SSDs are even more temporally flexible than SSTs, especially since they do not rely on some specific place-bound interface, or a company-operated website, albeit this may come as a complement to the device. The customer is thus not bound to any company-defined temporal restrictions, such as maintenance breaks or use limitations (such that can exist in e.g. self-service gasoline pumps or online banking services). To illustrate, the customer use of a smart jogger-band is not dependant on any company induced temporal restriction and the customer can use the band for jogging any time of the day, as noted by Companies B and C. As customers
can access SSDs constantly, they offer means for companies to increase customer engagement, for example by further sharing their user experiences online or connecting with the company on a 24/7 basis.

Spatial context. In terms of the spatial context (Where) of SSDs is dependent on the customer’s own location and environment, rather than the location defined by the company. Traditional SSTs are predominantly confined to the company--designated environment (e.g., airport, retail shop, webpage, mobile application) or some other specific context (e.g. mall, shopping street). The use environment for SSDs however extend to the customer’s own life world as defined by the customer, such as customers’ home or workplace, or mobile when moving between places. Naturally, those SSDs that are bound to a place, such as smart home devices (for example smart refrigerators or saunas), are only available physically in the designated location, but can often be accessed and managed from distance.

To understand how SSDs fit into customers’ wider life worlds, companies need to understand the customer’s processes and activities, also those that are not directly related to the core service offering. The representatives from companies B, C and F all noted that it is vital for the company’s survival to treat the customer as the number one actor, and the company merely as a secondary actor in service provision. The Senior Manager of Company F, for example, stressed the importance of always starting with the customer as the core unit of analysis. This may even lead to finding new service features, which could be incorporated into the SSD:

For example, we realized that many customers listen to music when they go out for a run, and it is very annoying to carry the phone with you as they are often quite big and you use slim running clothes. We wanted to make technology easier and thus incorporated music directly into the device...and that is the underpinning premise, i.e. that everything starts with the customer. (Company F, Senior Manager)

Such an approach also concurs with recent discussions around the importance of understanding customers and their ecosystems (See Heinonen et al., 2010; Heinonen and Strandvik, 2015).

5.3. Nature and subject of self-service devices

We propose, drawing on services being acts or deeds (Rathmell, 1966), and Lovelock’s (1985) classification of services, that the baseline for categorizing services is the type of
act performed. Whereas Lovelock (1985) suggested that the nature of acts involves either tangible or intangible, referring to whether physical manipulation is entailed (tangible) or not (intangible), we however propose that the act can be divided into monitoring versus acting, where monitoring refers to deploying information, one of the main tasks of information technology in general, and acting captures both tangible and intangible manipulation. In the second dimension of service, we follow the original classification of Lovelock, suggesting that self-service devices can be divided into those where the object is oneself, and those where someone/something else is subject to action. We combine the two dimensions – subject of the act and nature of the service act – in a two-by-two matrix to categorise different SSDs (see Figure 2).

(Insert figure 2 here)

This classification concentrates on what the technology does (monitors/acts) and what/who is the subject of this “doing”. We argue that this particular framework is useful in depicting a broad array of potential future SSDs. The classification will also help researchers to focus on different types of SSDs in future research. In the last section, we use this scheme to reveal future research avenues and priorities.

**Monitoring – self**
This category of SSDs include applications that allow users to measure, control and evaluate their performance and activity. It involves self-measurement of well-being and health, such as monitoring heart rates or blood glucose levels, evaluating the performance in different sports activities, keeping track of sleep rhythms, or administering the use of time, money or other resources. The devices can be tiny sensors in everyday personal objects, such as clothes or artificial implants. The SSDs help users to perform better and influence their well-being and social relationship.

**Acting – self**
This category of SSDs involves personal devices that are embedded in other personal gadgets or human parts. Examples include artificial organs, automatic insulin pumps or robotic arms that provide essential support in the user’s everyday life.

**Monitoring – others/belongings**
A third type of SSDs is devices that enable the monitoring of others/belongings. Examples of such devices include home alarm systems, weather sensor networks and
security applications, as well as wearables for dogs that help the owner track the dog’s heartrate, activity level and location. These types of devices provide control over others or belongings. The devices can also send automatic alarms to the owner, for example if maximum or minimum temperatures are exceeded or utilities are running out.

**Acting – others/belongings**

SSDs can also enable making actions and decisions on others or belongings. These devices include smart connected applications with sensors and connections that provide necessary information to the user to make an informed decision. For example lighting sensors and appliances can be used to remotely turn on and off the lights and advanced energy management systems provide the user with the means to control heating and indoor temperatures.

### 6. Discussion

The aim of this paper was to introduce and characterize the concept of customer self-service devices (SSDs). Given the rapid technological developments in today’s marketplace, the findings are of relevance for service researchers and practitioners alike, and hold several theoretical and managerial implications. SSDs differ substantially from earlier self-service technologies in terms of both service features (Who, What and How), as well as customer use features (When and Where). Based on the characterization, we define customer SSDs as *customer-possessed and controlled smart service devices, aiming to solve problems from the customer’s perspective, often within completely new, customer-defined service processes and ecosystems. They are not confined to the company-defined environment, and customers may use them wherever and whenever they so wish.* Hence, in comparison to SSTs, SSDs are more customer-oriented and independent of the servicescapes controlled by the firm.

#### 6.1. Theoretical implications

The first contribution to extant service, self-service and technology literature is the characterization and definition of the SSD concept. Previous service research (e.g., Dabholkar and Bagozzi 2002; Giebelhausen et al., 2014; Meuter et al., 2000) has largely focused on company-owned SSTs, although customers increasingly use technology on their own, in their personal environments. The concept of SSD adds with a more contemporary outlook of SSTs and takes into account emergent service technologies (such as smart home solutions, wearables, robots and other smart devices), which belong
to the phenomenon of IoT (Lee and Lee, 2015), smart services (Ostrom et al., 2015; Wünderlich et al., 2013; Wünderlich et al., 2015) and wearable technologies (Sultan, 2015). These SSDs have altered the ways in which customers are capable of serving themselves beyond the control and visibility of the service provider. As such, this paper also answers the call made by Wünderlich et al. (2015) to study and portray such services to advance future work in the service field and contributes to the emergent field of service technologies (Kunz et al., 2018). In the future, not only will these service technologies become more abundant, but also more connected to existing service systems, adding new monitoring and/or acting capabilities, and more people/things to be connected.

The characterization including the literature review and the empirically illustrated service and customer use features aid in systematically clarifying what SSDs are, and how they differ from the more traditional SSTs. The introduction of SSDs as a complement to SSTs also demonstrates the scope of service technologies. We encourage researchers to acknowledge these SSDs as a separate form of SST and to further examine the future development trajectory of different kinds of service technologies.

Second, the classification scheme of SSDs adds with a useful typology, which goes beyond mere application areas, and provides researchers and managers with a theoretical framework for understanding different SSD types. Thus, it offers a way to distinguish SSDs from each other (Hunt, 2002). The nature of act, unlike Lovelock’s original dimensions of intangible and tangible acts, was here replaced by “monitoring” and “acting”. Monitoring is an important function that enables the following of both positive and negative development longitudinally, but also the identifying of deviations from the norm. The subject of act, in turn, reveals whether the service is directed at the self or others. Consequently, it also uncovers how the buyer-user roles are challenged, when, a new category of the object of act is added, and since the person/being/belonging that is monitored or acted upon may not even be aware of the activity performed. With the help of this framework researchers can conduct much fruitful future work on the topic. In conclusion, the proposed classification scheme has a broad application domain. Rather than being focused on the technology interface, the proposed classification scheme being focused on abstract dimensions enables a broader view of the future trajectory of SSDs than traditional SST classification schemes.
6.2. Managerial implications

This study also gives rise to several managerial implications. As these new types of technology-based services are likely to become more widespread and extend the current self-service options available, marketers need to consider the opportunities and challenges of SSDs. As the comparison of SSTs and SSDs and table 2 illustrated, companies may (1) need to complement SSDs with additional service features to secure more control over the service and a steady customer flow. Moreover, as the customer problems are not always visible for the company, companies need to (2) find innovative ways of identifying and tracing these problems. Similarly, von Koskull and Strandvik (2014) posit that it is important for service companies to also locate the problems and needs that customers may not be able to express directly to the company, in order to help and serve their customers in the best possible way. One possible way may be to offer incentives for customers to keep contact with the provider. Companies should also (3) make sure that the technical features of the SSD meet the customer requirements and resources, as this is an important feature affecting both the service process and outcome. Managers should also use these features combined with more traditional SSTs (e.g., website, mobile application) to (4) increase customer engagement with the brand, as well as among customer groups and communities. Finally, the company needs to (5) develop a more in-depth understanding of the customer’s processes and activities, also those that are not directly related to the core service offering. In line with previous studies (Heinonen et al., 2010; Heinonen and Strandvik, 2015) this study thus posits that companies need to gain a thorough understanding of customers’ experiences, processes and activities, and to examine how they integrate different SSDs into their everyday lives. In doing so, the company will also be able to better support customers’ experiences and activities with such self-service technologies.

Moreover, the service classification reveals future areas where SSDs may become more prominent. By distinguishing SSDs depending on whether they are directed at the self or at other beings/belongings, the framework raises important questions about control and ethicality. For example, managers need to consider the extent to which service offerings should enable the monitoring of children or people with cognitive impairment. Furthermore, an important issue relates to who owns and controls the data collected through monitoring, if the subject of the service is not the customer him/herself. Security issues are also paramount in cases of acting to make sure no external parties are able to tamper the SSDs. The division between monitoring and acting further reveals that
customers are often willing to pay for services that enable data collection and visualization in addition to the more traditional “acts or performances” offered by the service provider.

6.3. Future research and limitations

As with other studies, this paper also entails some limitations. First, the empirical data used to illustrate SSDs included purposeful sample of representatives from six technology companies. Future research would thus benefit from incorporating a greater number of companies and industries to gain a more in-depth understanding of the topic. Nonetheless, we posit that this study makes a significant contribution to the service and marketing literature, highlighting the nature of SSDs and how they differ from the more traditional SSTs. We encourage future research to examine all of these features (service and customer use features) more in-depth, and to study whether they may be applicable to other SSDs across different service industries.

The definition and characterization of SSDs provide a platform to uncover issues to be considered in future research. As emphasised in the discussion, we encourage researchers to study all four proposed SSD types, by focusing on their service features and usage context. To stimulate such research, we next provide a set of possible future research directions within each SSD category. Table 2 includes a summary of these research directions together with empirical examples.

(Insert table 2 here)

One avenue for future research is related to self-monitoring SSDs. Specifically, future research needs to address ethical issues related to data management and privacy. Who owns the data? How can the data be used efficiently to provide sufficient support for the customer, but still without normative diagnostics and directions? We also recommend future research to investigate the motivations and benefits of self-monitoring by SSDs for customers. The negative effects of SSD monitoring, such as the perception of being under surveillance, need further investigation. Another avenue for future research is focused on SSDs that enable acting on the customers themselves. This SSD category is the most growing area for wearable devices. Further research is needed to investigate the extent and integration of SSDs such as sensors on customers’ bodies. How can the technology be seamlessly linked to customers? A third area for future research is related
to monitoring SSDs on others or belongings. Further research is needed to find solutions to embed personal sensors in automated vacuum cleaners and robotic coffee makers that require little input from the customer. Ethical issues related to data flow from the user to the developer require further exploration. A final avenue of further research is related to acting on others with SSDs. This relates to the growing interest in the field of IoT (Lee and Lee, 2015), where such SSDs ‘talk’ and ‘act’ on each other for systemic value creation. Such IoT enabled SSD systemic and connected value creation needs further research. On a systemic level, we further suggest researchers to investigate the actor systems (two-actors or more) that collectively use SSDs for mutual value creation. For example, mother and baby collectively use the baby monitor; however, more complex SSD systems with multiple actors also need to be investigated.
References


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<table>
<thead>
<tr>
<th>Company controlled service technology</th>
<th>Adaptable service technology</th>
<th>Customer-controlled service technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone/Interactive Voice Response</td>
<td>Online service</td>
<td>Social networking</td>
</tr>
<tr>
<td>Interactive kiosks</td>
<td>Mobile service</td>
<td>Wearables</td>
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<tr>
<td></td>
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<td>Quantified self</td>
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<tr>
<td>Before</td>
<td>2000s</td>
<td>2010s</td>
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<td>1970s</td>
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<td>1990s</td>
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<tr>
<td>2000s</td>
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<td>Internet of Things</td>
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<tr>
<td>2010s</td>
<td></td>
<td>Smart devices</td>
</tr>
<tr>
<td>2020s</td>
<td></td>
<td>Sensors</td>
</tr>
</tbody>
</table>

- Before 1970s
  - Telephone banking
  - Dial-Up internet
  - Vending machines

- 2000s
  - Self-scanning
  - Online banking
  - Electronic self-ordering
  - Online entertainment

- 2010s
  - Medical devices
  - Mobile banking
  - Activity trackers
  - Home security devices

- 2020s
  - Smart clothing
  - Voice-controlled devices
  - Video on demand

Figure 1 Development of different service technologies
### Subject of Act

<table>
<thead>
<tr>
<th>Nature of Act</th>
<th>Self</th>
<th>Others/belongings</th>
</tr>
</thead>
</table>
| Monitoring    | Self-measurement | Control over belongings  
|               |                  | locating, monitoring, alerting |
| Acting        | Adaptable clothing  
|               | Artificial organs  | Operating robots  
|               |                  | Vacuum cleaners  
|               |                  | Transactional chips |

*Figure 2 Subject of act versus Nature of act in SSDs*
### Table 1  Service features and customer use features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Company-maintained SSTs</th>
<th>Customer SSDs</th>
<th>Implications for SSDs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Service Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Possession - Who</strong></td>
<td>The company owns the technology and is mostly in control over the service. Example: Supermarket checkout.</td>
<td>The customer owns or possesses the device and is mostly in control of the service. Example: Interacting robots.</td>
<td>Can be shared, lent or rented. Companies may need to complement SSDs with additional service features to secure more control and steady customer flow.</td>
</tr>
<tr>
<td><strong>Outcome - What</strong></td>
<td>Aims to solve a problem defined by the company, e.g. customer service, transactions, self-help, often by replacing service personnel or increasing service quality. Example: Information touchscreens at shopping centres.</td>
<td>Aims to solve often multiple problems defined by the customer by offering a completely new service, or replacing an old service Example: Smartwatches</td>
<td>Use purposes can be flexible such as instant monitoring versus long-term monitoring, private/public. Can meet multiple ends, e.g. surveillance, improving performance, sharing, ego boosting. The customer problems are not always visible for the company, so companies need to find ways to locate these properly.</td>
</tr>
<tr>
<td><strong>Process – How</strong></td>
<td>Service provision takes place through Internet, mobile phones, service kiosks or touch screens as part of an existing service system. Easier for the company to influence the service process Example: Mobile banking.</td>
<td>Service provision takes place through multiple intelligent devices often as part of a new service system. Difficult for the company to influence the service process. Example: Sport trackers.</td>
<td>Value of device largely depends on degree of compatibility with users’ other resources, skills and motivations. Companies need to make sure that the technical qualities of the SSDs function without problems.</td>
</tr>
</tbody>
</table>
## 2. Customer Use Features

| Temporal Context – When | Use temporally confined to when a customer interacts with a specific interface or environment such as a store, webpage, mobile application etc. | Can often be used whenever the customer wants to, confined to the interface on the device *per se*. Can also be used automatically. | Availability/access constant
| | Example: Online shopping. | Example: Car GPS system. | Companies should utilize this feature as a means to increase customer engagement. |
| Spatial Context – Where | Company-related and staged environment (e.g. airport, retail shops, webpages, mobile applications) | The customer’s own life world | Carried along or existing in the customer environment, often visible to other users, becomes part of life-world. |
| | Example: Check-in at airport | Example: Smart-home services. | Companies need to understand the customer’s processes and activities, also those that are not directly related to the core service offering |
Table 2  Future research directions of customer SSDs

<table>
<thead>
<tr>
<th>SSD Category</th>
<th>Future research directions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monitoring – Self</strong></td>
<td>How do consumers use data derived from self-monitoring?</td>
</tr>
<tr>
<td></td>
<td>What are the positive/negative outcomes of self-monitoring?</td>
</tr>
<tr>
<td></td>
<td>How can consumers be encouraged to utilize the data to achieve other desirable outcomes such as improving wellbeing?</td>
</tr>
<tr>
<td><strong>Acting – Self</strong></td>
<td>To what extent should customers be given control of these SSDs? (as they may not be the expert in monitoring them)?</td>
</tr>
<tr>
<td></td>
<td>How can SSDs be seamlessly embedded in customers’ lives to support their tasks and activities?</td>
</tr>
<tr>
<td></td>
<td>How can SSDs make customers’ processes more efficient and enjoyable?</td>
</tr>
<tr>
<td><strong>Monitoring – Others/belongings</strong></td>
<td>To what extent can monitoring be automated, e.g. is it desirable to only report anomalies?</td>
</tr>
<tr>
<td></td>
<td>When should customers engage in constant monitoring?</td>
</tr>
<tr>
<td></td>
<td>What are the ethical implications of monitoring others (one’s employees, children or elderly relatives)?</td>
</tr>
<tr>
<td><strong>Acting – Others/belongings</strong></td>
<td>How should the firm integrate acting SSDs into a greater service system?</td>
</tr>
<tr>
<td></td>
<td>How can we best study how customers integrate these devices into their own ecosystems?</td>
</tr>
<tr>
<td></td>
<td>How can SSDs support customers in making more informed decisions?</td>
</tr>
</tbody>
</table>
As megatrends shape our society and markets, the business landscape is also changing fast. Technological innovations, demographic movements and the rise of the individual are disrupting the ways in which businesses offer service, but also how customers serve themselves. Whereas traditional service provision primarily occurred in the firm’s environment on the firm’s terms, today’s customers often select and experience offerings in their own ecosystems beyond the firm’s visibility and control. For firms to be competitive and research to be relevant, it has never been as important to understand what goes on in this customer ecosystem, and how it shapes the customer’s experiences with offerings.

Even though marketers and researchers increasingly acknowledge the importance of the customer and her context, most studies have focused on exploring how firms create customer experiences during isolated touch points, or how customers co-create experiences in service ecosystems. This thesis argues that such studies only marginally reflect issues related to customers in their own settings. Instead of focusing on the firm’s actions or service interactions, we should study how customers involve providers in their own ecosystems. This customer-dominant lens expands the view of the customer and helps to illuminate what goes on beyond the firm yet plays a key role in how offerings resonate with customers.

This thesis aims to identify how customers’ ecosystems shape customers’ experiences with smart self-service. The thesis includes three studies utilizing various methods and qualitative data from a smart self-service context. The collective findings reveal how the customer’s ecosystem plays a key role in shaping her experiences with smart self-service, through its actors and actor constellations. The first study identifies and clarifies different individual-level perspectives and contextual lenses on customer experience formation. The sense-making-based perspective and customer-ecosystem lens emerge as especially suited to generate a deeper understanding of experiences in customers’ ecosystems. The second study conceptualizes and illustrates empirically how actors within and beyond the focal offering – in various constellations – shape customer experiences. The third study introduces a smart self-service typology and classification.

This thesis contributes to the service and marketing literature by conceptualizing the elements of customer experience formation, customer ecosystems and customer self-service devices. Managers should aim to locate, monitor and join the customer’s life to better understand how experiences emerge in the customer ecosystem. Such insights can be used to predict long-term customer behavior and design offerings that become embedded in customers’ lives.