Understanding service ecosystem dynamics: a typology

Nabila As'ad and Lia Patrício
Faculty of Engineering, University of Porto, and INESC TEC, Porto, Portugal
Kaisa Koskela-Huotari
Department of Marketing and Strategy, Stockholm School of Economics, Stockholm, Sweden, and
Bo Edvardsson
Service Research Center-CTF, Karlstad University, Karlstad, Sweden

Received 24 July 2023
Revised 18 December 2023
6 March 2024
25 March 2024
Accepted 26 March 2024

Abstract

Purpose – The service environment is becoming increasingly turbulent, leading to calls for a systemic understanding of it as a set of dynamic service ecosystems. This paper advances this understanding by developing a typology of service ecosystem dynamics that explains the varying interplay between change and stability within the service environment through distinct behavioral patterns exhibited by service ecosystems over time.

Design/methodology/approach – This study builds upon a systematic literature review of service ecosystems literature and uses system dynamics as a method theory to abductively analyze extant literature and develop a typology of service ecosystem dynamics.

Findings – The paper identifies three types of service ecosystem dynamics—behavioral patterns of service ecosystems—and explains how they unfold through self-adjustment processes and changes within different systemic leverage points. The typology of service ecosystem dynamics consists of (1) reproduction (i.e. stable behavioral pattern), (2) reconfiguration (i.e. unstable behavioral pattern) and (3) transition (i.e. disrupting, shifting behavioral pattern).

Practical implications – The typology enables practitioners to gain a deeper understanding of their service environment by discerning the behavioral patterns exhibited by the constituent service ecosystems. This, in turn, supports them in devising more effective strategies for navigating through it.

Originality/value – The paper provides a precise definition of service ecosystem dynamics and shows how the identified three types of dynamics can be used as a lens to empirically examine change and stability in the service environment. It also offers a set of research directions for tackling service research challenges.

Keywords Service ecosystems, Service ecosystem dynamics, Self-adjustment, System dynamics, Feedback loops, Leverage points, Service-dominant logic

Paper type Conceptual paper

The authors would like to thank Professor Jay Kandampully, the editor of the *Journal of Service Management,* and the reviewer team for their constructive guidance in moving this work forward. Nabila As'ad was supported by funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie Grant (642116); the ERDF—European Regional Development Fund through the Operational Programme for Competitiveness and Internationalization—COMPETE 2020 Programme, the National Funds through the Portuguese funding agency, FCT—Fundação para a Ciência e a Tecnologia (POCI-01-0145-FEDER-029725); Kaisa Koskela-Huotari was supported by Jan Wallander and Tom Hedelius foundation research grants (W18-0013 and P22-0059). We have no potential conflicts of interest.

Journal of Service Management
Vol. 35 No. 6, 2024
pp. 159-184
Emerald Publishing Limited
1757-5818
DOI 10.1108/JOSM-07-2023-0322

Introduction

In the turbulent service environment marked by disruptions like climate change and innovations such as smart technologies (McKinsey, 2020), service firms struggle to navigate change while maintaining their daily operations. A prime example is the shift toward carbon neutrality, where fossil-fueled energy still co-exists with renewables while the latter is unable to fully meet energy needs (BP, 2022). Simultaneously, innovations like smart-home energy management and solar power reshape how energy is generated, distributed and consumed; yet engaging customers in sustainable energy services remains challenging (Gonçalves and Patrício, 2022). Such interplay between stability and change has led to calls for a systemic understanding of the service environment as a set of dynamic service ecosystems (Field *et al.*, 2021).

The conceptualization of a service ecosystem as "relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Vargo and Lusch, 2016, pp. 10–11) emphasizes self-adjustment as one of its defining characteristics. On the one hand, self-adjustment refers to the ecosystem's inherent ability to regulate itself by (re-)arranging its components through coordination by institutional arrangements (Lusch and Vargo, 2014; Vargo and Lusch, 2018). On the other hand, self-adjustment refers to the process through which a service ecosystem adapts to changing conditions, ensuring its viability and promoting innovation (Mele *et al.*, 2023). Self-adjustment, therefore, plays a pivotal role in the dynamics of a service ecosystem, but a more precise understanding of what these dynamics entail is still lacking.

Service ecosystem dynamics are often discussed in relation to intentional efforts of actors in shaping ecosystems (e.g. Carida' *et al.*, 2022; Nenonen *et al.*, 2018). Some studies emphasize service ecosystems' stability and resistance to change, attributed to shared institutional arrangements (Beirão *et al.*, 2017), while others underscore their proneness to radical changes (Kleinaltenkamp *et al.*, 2018). Previous studies, therefore, point to the potential co-existence of various dynamics, occurring simultaneously or at different points in time. Despite previous research associating these dynamics with service ecosystem behaviors (Barile *et al.*, 2016; Meynhardt *et al.*, 2016), a nuanced understanding of how and why such different dynamics unfold remains incomplete. Gaining this understanding is crucial for both service researchers and managers seeking to navigate stability and change in the service environment comprising multiple service ecosystems.

This paper advances the understanding of service ecosystem dynamics through a typological style of theorizing (Cornelissen, 2017; Jaakkola, 2020), examining service ecosystem literature through the lens of system dynamics (Forrester, 1961, 1969; Meadows, 1997, 2008). We start by systematically reviewing service ecosystem literature to map the current understanding of service ecosystems and use the insights from system dynamics to abductively develop the typology. Drawing on system dynamics, we first offer a more precise definition of service ecosystem dynamics *as the behavioral patterns of service ecosystems over time*. Then, we identify two *explanatory dimensions* that differentiate *three analytical types* of service ecosystem dynamics.

We make a threefold contribution to service research, particularly to the literature on service ecosystems. First, we provide a precise definition of service ecosystem dynamics. This definition implies that the interplay between change and stability in the service environment can be analytically viewed as the service ecosystems' behavioral patterns over time. Second, we delineate two explanatory dimensions: (1) the alternating dominance of adaptation and coordination in self-adjustment processes and (2) the varying leverage of intervention points. By delving into these dimensions, we uncover the underlying mechanisms of self-adjustment and shed light on the feedback loops that support the coordination and adaptation of service ecosystems. Third, based upon the two dimensions, we differentiate three analytical types of service ecosystem dynamics: reproduction as the stable behavioral pattern within existing institutional arrangements; reconfiguration as the unstable behavioral pattern leading to institutional change; and transition as the disrupting, shifting behavioral pattern, that results in the service ecosystem to be viewed as qualitatively new. Finally, we derive a set of research questions and managerial implications on how our typology provides a lens for understanding and navigating profound changes in the service environment. This study offers service researchers a systematic approach to understand the nuanced dynamics of service ecosystems and forms a basis for future research. It also provides actionable insights for practitioners, empowering them to strategically adapt to and leverage desired changes within service environments.

Research design: typological style of theorizing

The conceptual methodology of this paper follows a typological style of theorizing (Cornelissen, 2017; Jaakkola, 2020). Table 1 summarizes our theorization process, starting with a systematic review of our domain theory, which is then examined through the lens of system dynamics (Forrester, 1961; Meadows, 2008) as our method theory (Jaakkola, 2020), for the development of a typology of service ecosystem dynamics. A typology is a conceptually derived interrelated set of *types* (Doty and Glick, 1994). It enables a multidimensional understanding of phenomena, considering types of things and how they are different and relevant for analytical purposes (Jaakkola, 2020; MacInnis, 2011).

Our method theory—system dynamics—is a stream of systems theory with a long tradition in explaining the varying behaviors of dynamic systems by shedding light on their multiple reinforcing (positive) or balancing (negative) feedback loops (Forrester, 1961, 1969; Meadows, 1997, 2008). Reinforcing loops exacerbate change within system towards its growth or decline, while balancing loops dampen the influence of any changes in the system, creating stability and equilibrium (Sterman, 2000, 2001). Through a complex interplay of multiple feedback loops, systems restructure themselves (i.e. self-organize) and create new structures, which results in system dynamics (Meadows, 2008). As feedback is also a core enabler of self-adjustment in service ecosystems (Vargo and Lusch, 2018), the system dynamics literature is uniquely positioned to inform the dynamics of service ecosystems, offering additional conceptual tools to understand the processes through which varied system behaviors might arise.

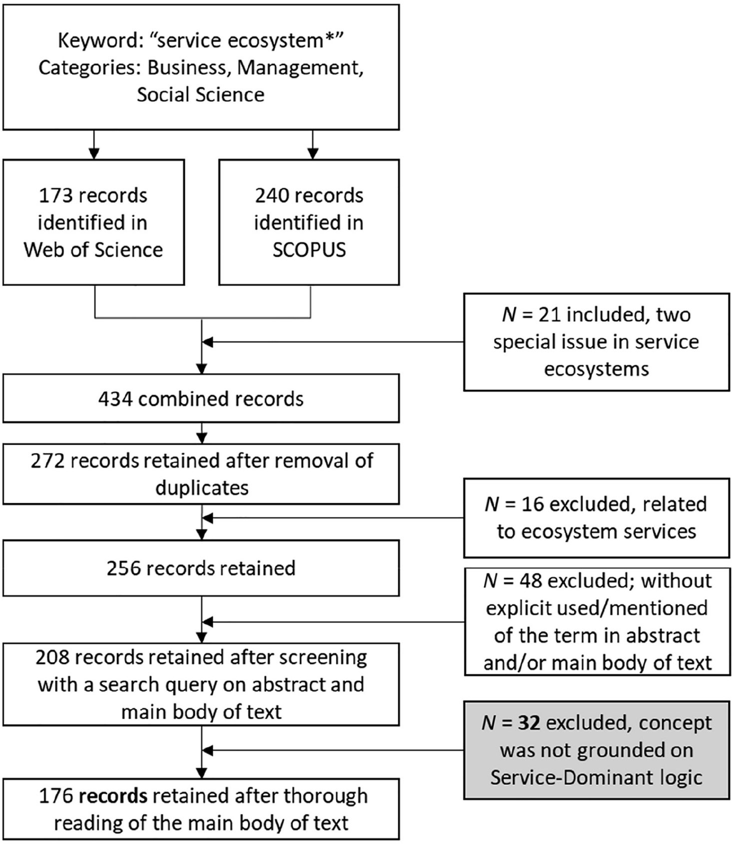
Typological style of theorizing			
Research design phases	Phase 1: literature search and selection	Phase 2: literature analysis and identification of explanatory dimensions of service ecosystem dynamics	Phase 3: derivation of a typology of service ecosystem dynamics
Domain theory		S-D logic-grounded service ecosystems literature	
Method theory	–	System dynamics	
Results	176 articles	Multi-level coding structure resulting in two aggregated dimensions	Three analytical types of service ecosystem dynamics
References for research design	Booth *et al.* (2016)	Charmaz (2006) Gioia *et al.* (2013) Dubois and Gadde (2002) Cornelissen (2017), Jaakkola (2020)	Gioia *et al.* (2013) Dubois and Gadde (2002) Cornelissen (2017), Jaakkola (2020)

Source(s): The above table was created by the authors

Table 1. Conceptual research design: phases and results

Phase 1: literature search and selection

An initial mapping through a systematic review (Booth *et al.*, 2016) of service ecosystem literature grounded in S-D logic (the domain theory) formed the conceptual basis for our typology development. The systematic search was conducted on the SCOPUS and ISI Web of Science databases, using the keyword *service ecosystem** in the titles, abstracts and authors' keywords of the articles, following the process depicted in Figure 1. We further applied filters to include only peer-reviewed articles written in English within the business, management and social science categories. This initial search resulted in 173 and 240 articles, respectively. We included relevant special issues on service ecosystems but removed duplicates. We further carried out two query searches eliminating: 16 articles mentioning ecosystem services in their abstract, since this term relates to ecological studies; and 48 articles that did not explicitly mention or significantly use the service ecosystem concept in their main body of text. To ensure the relevance of articles to study objectives (Booth *et al.*, 2016), two co-authors thoroughly read the main body of texts of the remaining articles to assess their theoretical grounding until reaching an agreement. This process resulted in the exclusion of 32 articles since their conceptualization of service ecosystem was not grounded on S-D logic but on business and strategy (24) or Information Systems literature (8). In the end, this process resulted in 176 articles published or available through online-first between 2011 and 2020 (see Web Appendix).

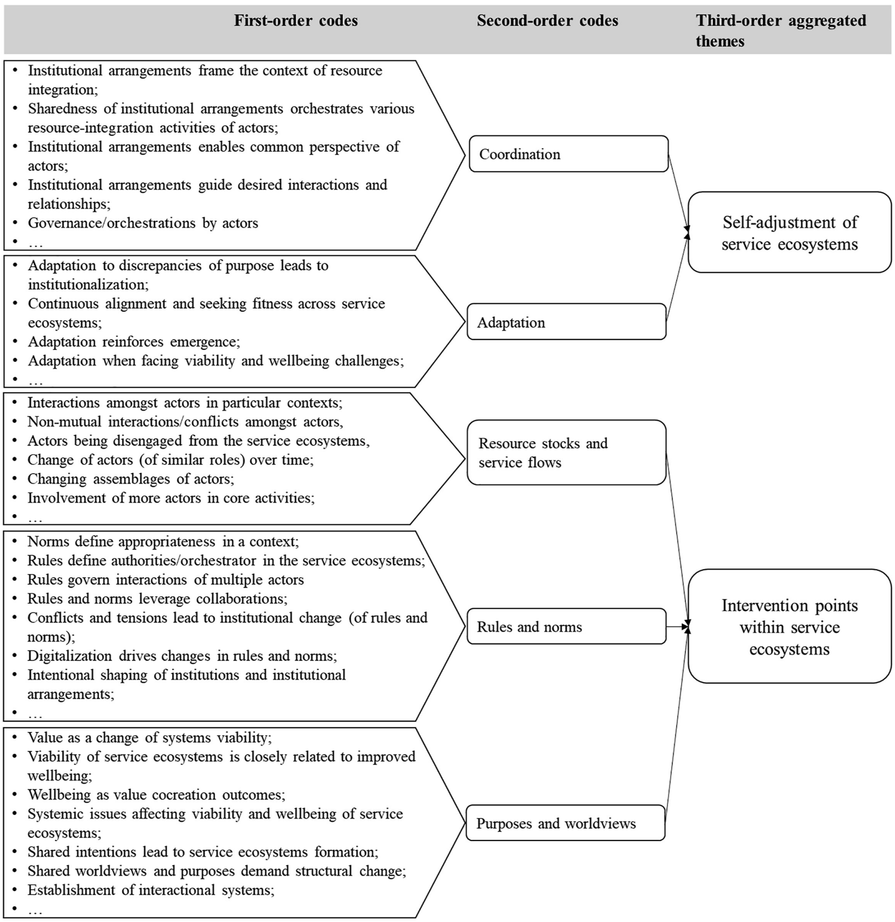


Source(s): The above figure was created by the authors

Figure 1.
Literature search and collection

Phase 2: literature analysis and identification of explanatory dimensions

The coding process of these 176 articles in NVivo 12 involved three stages of open, axial and theoretical coding (Charmaz, 2006; Gioia *et al.*, 2013). Each of these coding stages was complemented with rounds of team discussions to reduce subjectivity biases (Gaur and Kumar, 2018). Our analysis started with *open coding*, we first adopted codes close to the terms used in the articles to best capture the meanings of the respective segment in the articles, opening ourselves to discover new insights on the functioning of service ecosystems that may emerge (Charmaz, 2006). This process resulted in a large number of codes (i.e. more than 100 codes) and as such, during the several coding iterations that followed in this first stage, we further grouped similar codes into first-order codes (left side of Figure 2). Then, in *the axial coding*, we sought for similarities and differences among the first-order codes. Here, we compared these codes while continuously challenged ourselves to think how these codes are related while also bring the analysis to a more abstract level to better understand "what's going on here" (Charmaz, 2006; Gioia *et al.*, 2013, p. 20). This process resulted in the second-order codes.



Source(s): The above figure was created by the authors, inspired by Gioia *et al.* (2013)

Figure 2. Coding structure of prior academic literature on service ecosystem

Lastly, we proceeded to *theoretical coding* to integrate the second-order codes into a coherent theory. To help us in making sense of the interrelatedness of these codes, we went to system dynamics literature—particularly, the two concepts of feedback loops and leverage points (Forrester, 1961, 1969; Meadows, 1997, 2008; Sterman, 2001). Here, we applied the analytical frame of system dynamics to abductively analyze our codes: we reconciled, grouped and regrouped the codes by constantly going back and forth between system dynamics literature and our codes (Dubois and Gadde, 2002). In parallel, to strengthen the overall coherence of how service ecosystems behave, we also compared and reconciled these insights from system dynamics literature with our second-order codes (middle side of Figure 2), further refining these second-order codes until no more codes emerge (Gioia *et al.*, 2013). Ultimately, we identified two aggregated themes, as seen on the right side of Figure 2: (1) self-adjustment of service ecosystems and (2) intervention points within service ecosystems, which we identified as the two explanatory dimensions that explain the variation in service ecosystem dynamics. The reconciliations that resulted from this data analysis process are discussed in the next section (Table 2 and Table 3, respectively).

Phase 3: derivation of analytical types

In our third stage, we used the two interdependent dimensions resulting from literature analysis (i.e. the aggregated themes in Phase 2) to examine extant literature. This process led to the identification of three analytical types of service ecosystem dynamics: reproduction, reconfiguration and transition. To contextualize the typology, we applied it to three service ecosystems to illustrate how it can enable a more nuanced understanding of how the different types can co-exist and explain service ecosystem behaviors in the profoundly changing service environment.

Understanding service ecosystems through the lens of system dynamics

System dynamics characterize systems functioning as "a pattern of behavior, unfolding over time" (Sterman, 2000, p. 90). Building on this conceptualization of system dynamics (Forrester, 1961, 1969; Meadows, 1997, 2008), we define service ecosystem dynamics as *the behavioral patterns of service ecosystems over time*. These behavioral patterns are emergent and arise from the interactions of system components but cannot be reduced to them (Forrester, 1961; Sterman, 2000). System dynamics further sheds light on how the variance of the two aggregated themes identified in service ecosystems literature (right side of Figure 2) explains service ecosystem dynamics: service ecosystem dynamics involves *self-adjustment process* that affect and are affected by *the intervention points* within service ecosystems. In the remaining of this section, we explain these two dimensions in more detail and how their variance explains the emergence of varying service ecosystem behaviors over time.

Alternating dominance of adaptation and coordination in self-adjustment

According to system dynamics, the emerging system behaviors "depend on which feedback loops are dominant" (Mingers, 2000; Sterman, 2001, p. 21). To understand the influence of such varying dominance of feedback loops on service ecosystem dynamics, Table 2 reconciles the key insights in system dynamics with the concepts in S-D logic service ecosystem literature that emerge from our literature analysis.

Self-adjustment in service ecosystems appears similar to self-organization in system dynamics (Meynhardt *et al.*, 2016); self-organization represents the system's ability to structure and restructure itself, generate new structure and learn (Meadows, 2008). Self-organization relies on complex interplays of multiple feedback loops within the system (Forrester, 1969). While balancing loops counteract change to balance the system,

Concepts in system dynamics Forrester (1961), (1969), Meadows (2008), Sterman (2000), (2001)	Concepts in service ecosystem literature	Description	Selected key references	Service ecosystem dynamics (this paper)
Self-organization	Self-adjustment	The service ecosystem's ability "to arrange and rearrange its components without an external or other overall governance mechanism" enabled by its institutional arrangements	Vargo and Lusch (2018), p. 17	Self-adjustment
		"The process a service system performs to adapt to changing conditions to remain viable or improve its viability."	Mele *et al.* (2023), p. 2	
Balancing (negative) feedback loops	Coordination	Coordination in self-adjustment process is dominated by balancing feedback loops, leading to stability and lack of change within the service ecosystem	Edvardsson *et al.* (2014), Tronvoll, (2017), Vargo and Lusch (2016)	Coordination
Reinforcing (positive) feedback loops	Adaptation	Adaptation in self-adjustment process is dominated by reinforcing feedback loops, leading to instability and change within the service ecosystem	Frow *et al.* (2019), Mele *et al.* (2023), Razmdoost *et al.* (2019), Vargo *et al.* (2023)	Adaptation

Source(s): The above table was created by the authors

Table 2.
Reconciling system dynamics and service ecosystem literature on self-adjustment

reinforcing loops accumulate "whatever is happening in the system" and can lead to system's high instability (Mingers and White, 2010; Sterman, 2001, p. 17). Using the system dynamics lens, we relate the dominance of the type of feedback loops to the coordination and adaptation mechanisms in service ecosystems, with self-adjustment in service ecosystems involving the interplay between these two mechanisms. The influence of these coordination and adaptation mechanisms feed back to the service ecosystem, resulting in the service ecosystem's behavior (dynamics). Such system-wide behaviors may be reflected in actors' actions of integrating resources, but the system-wide behaviors are not reducible to the actors' behavior.

First, the domination of balancing feedback loops corresponds to the coordination mechanism. In service ecosystems, existing institutions and institutional arrangements orchestrate actors' resource integration (Vargo and Lusch, 2018), providing feedback that balances and counteracts change in the service ecosystem, for instance, by framing "acceptable" interactions among actors (e.g. van Tonder *et al.*, 2020) and "expected" value (e.g. Gambarov *et al.*, 2017).

Second, the dominance of reinforcing loops corresponds to the adaptation mechanism. Adaptation may happen in response to disturbances and change as actors struggle to maintain the viability of the system (Frow *et al.*, 2019; Mele *et al.*, 2023). That is, actors learn from their past interactions and relationships, then adapt their resource integration to conform to new or changing contextual conditions over time, fulfilling their purpose of ensuring their well-being and viability (Razmdoost *et al.*, 2019). However, reinforcing loops of individuals pursuit of viability may also lead to negative unintended consequences at a collective level. This is the case of over-exploitation of natural resources such as fishing banks, where falling catches per unit of fishing lead to more fishing (reinforcing loop), generating a vicious cycle that may threaten the ecosystem's viability. On the positive side, the continued efforts of actors adapting to resource scarcity were key to ensuring system viability during the COVID-19 pandemic (Finsterwalder and Kuppelwieser, 2020). In addition, Vargo *et al.* (2023) argue that the dominance of reinforcing feedback loops can lead to repeated instances of the same emergent outcome, allowing for the formation and diffusion of novel patterns in a service ecosystem enabling adaptation. The instability amplified by the dominating influence of reinforcing loops may lead to institutionalized change at the system-level over time, such as new privacy regulations in the healthcare service ecosystem (Botti and Monda, 2020).

Viewed from the lens of system dynamics, if most of the resource-integrating actors act according to existing institutional arrangements (balancing loops), we can observe a dominance of the coordination mechanism (Edvardsson *et al.*, 2014). However, if more and more actors start changing their resource-integrating practices, namely to reduce the gap between their actual and desired purposes (reinforcing loops), an adaptation mechanism may become dominant, so that new practices and institutions eventually emerge (Akaka *et al.*, 2012; Taillard *et al.*, 2016). As exemplified by the profound transformation undergoing the mobility ecosystem (Wieland *et al.*, 2017), electric cars have been built for human transportation as early as the 1880s, but this disruptive transformation did not spread and give rise to a new transportation ecosystem. The emergence of a new electric mobility ecosystem more recently unfolded through the interplay of coordination and adaptation within self-adjustment processes of the mobility ecosystem and its adjacent systems (e.g. electric cars and charging systems). Fostered by the increasing awareness of climate change and the rising of hybrid cars, which institutionalized favorable outlooks on electric vehicles, an electric mobility ecosystem was gradually made available. Therefore, service ecosystem dynamics unfold (sometimes in long and complex processes) as the service ecosystem self-adjusts through the interplay of coordination and adaptation mechanisms.

Varying leverage of intervention points in service ecosystems

According to system dynamics, a system includes several intervention points that differ in their leverage to influence the system's behavior (Abson *et al.*, 2017; Meadows, 1997, 2008). In other words, while changes in some intervention points only have shallow leverage in how the overall system behaves, changes in others have much deeper leverage and can induce more profound system changes and managerial responses. Table 3 summarizes how intervention points from system dynamics literature can be connected with the service ecosystem lexicon.

According to system dynamics, stocks and flows are fundamental components of all systems (Forrester, 1969; Sterman, 2000). *Stocks* represent the accumulation of resources that change over time through *flows* (Meadows, 2008). Through this lens, some of the important stocks in service ecosystems can be made out of operand resources (e.g. raw materials) but also of resource-integrating actors understood as an accumulation of operant resources like skills or knowledge. These stocks change over time, through reciprocal *flows* of service exchange and applied resources move from one actor to another (Vargo and Lusch, 2004).

Concepts in system dynamics Meadows (1997, 2008)		Concepts in service ecosystem literature	Description	References	Service ecosystem dynamics (this paper)
Shallow-Leverage Intervention Points	Stocks and flows	Resources	Any substance, idea or thing, contributing to the realization of actors' or systems' desired outcomes	Koskela-Huotari and Vargo (2016)	Resource stocks and service flows
		Resource-integrating actors	Actors are agents or resource integrators, whose actions and perceptions are guided by institutional arrangements	Tronvoll (2017), Vargo and Akaka, (2012), Vargo and Lusch (2016)	
		Service (-for-service) exchange	*The process* of actors applying their resources for the benefit of another actor (or themselves)	Vargo and Lusch (2004)	
Medium-Leverage Intervention Points	Structure or the rules of the system	Rules and norms of resource integration and value cocreation	The actor-generated and often relatively taken-for-granted rules and norms that guide how value is cocreated through resource integration and service-for-service exchange	Baron *et al.* (2018), Edvardsson *et al.* (2018), Koskela-Huotari *et al.* (2016), Vargo and Lusch (2016)	Rules and norms
Deep-Leverage Intervention Points	Purpose and paradigm	Shared purpose(s)	Emerging purpose based on mutual value creation, so that the ecosystem and its sub-system(s) can strive for long-term viability and wellbeing	Barile *et al.* (2016), Storbacka *et al.* (2016), Taillard *et al.* (2016), Wieland *et al.*, (2012)	Purposes and worldviews
		Shared worldview(s)	Mental models (assumptions and beliefs) that provide logical coherence in guiding actors' perceptions and judgments of the world	Banoun *et al.* (2016), Frow *et al.* (2019), Lusch and Nambisan (2015)	

Source(s): The above table was created by the authors

Table 3. Reconciling system dynamics and service ecosystems literature on intervention points

Hence, flows refer to the "movement" of resources through service exchange within service ecosystems. In the system dynamics literature, stocks and flows are identified as components with shallow leverage, as they induce only minor changes in system behavior (Abson *et al.*, 2017; Meadows, 2008). In other words, replacing resources with similar types of resources will not induce significant changes to the overall ecosystem. This is the case when home heating systems are replaced with identically new ones. *Without* other major changes in the functioning of the system or consumer practices, this change in one of the integrated resources will not make any significant difference in the behavior of the service ecosystem.

System dynamics literature also identifies the system's *structure* or *the rules* that define its overall behavior as an important component. The system's structure has a deeper leverage on system dynamics than stocks and flows, as it defines its functioning and responses (Meadows, 1997, 2008; Sterman, 2000). This means that if encountering a particular trigger (e.g. lack of resources), the system responds with a behavior that is inherent to its structure (e.g. replacement of the resources according to system rules). In a service ecosystem, these structures are institutional arrangements, denoting the assemblages of multiple institutions that guide resource integration and value cocreation (e.g. Baron *et al.*, 2018; Edvardsson *et al.*, 2018; Vargo and Lusch, 2016). These institutions can be seen as comprised of regulative, normative and cultural-cognitive pillars (Scott, 2014). Moreover, all institutions are nested in another set of institutions (Ostrom, 2015), such as the case of energy production operational rules (*how* energy is produced), which are nested in constitutional, deeper-level rules (the importance of environmental concerns for society).

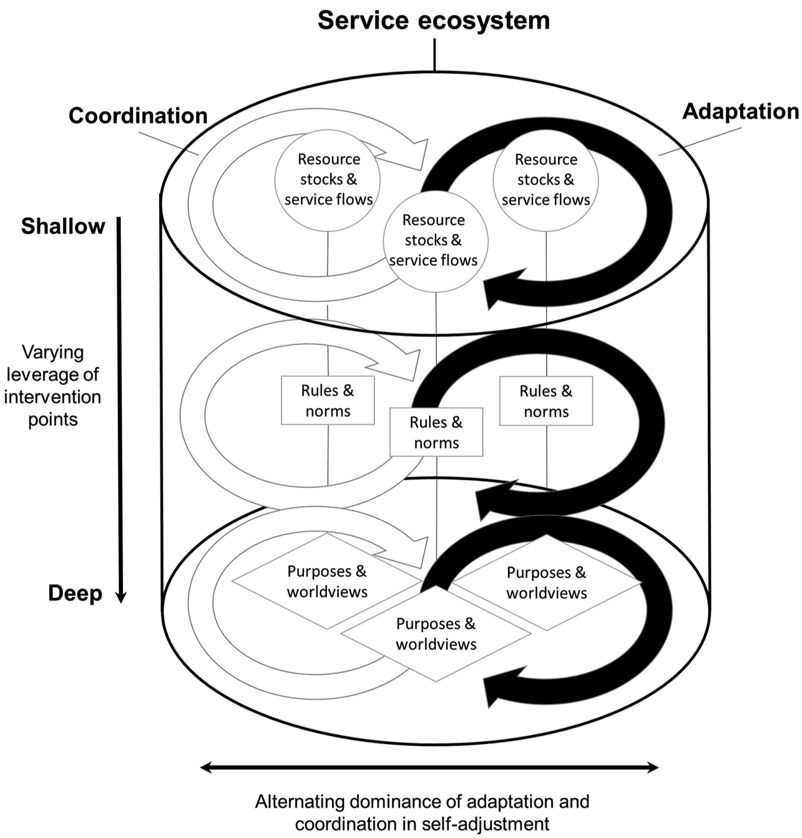
By informing the service ecosystem lexicon with system dynamics and considering the nestedness of institutions, we connect the system structure, representing components with medium leverage in system dynamics, to the regulative and normative pillars within service ecosystems (i.e. rules and norms, Scott, 2014). If rules and norms change within service ecosystems, for example, through institutional work, this can lead to service ecosystem transformation, resulting in the ecosystem exhibiting a different behavior (e.g. Baron *et al.*, 2018; Koskela-Huotari *et al.*, 2016). For instance, the introduction and institutionalization of new energy regulations can induce energy providers to adjust their practices, e.g. integrating photovoltaic solutions for solar energy production into their offerings due to the Europe Climate Law regulation. Hence, changing components with medium leverage in a service ecosystem may generate deeper service ecosystem transformation. For example, households are now able to produce solar energy and redistribute it back to the grid, changing the consumption and production patterns of the service ecosystem.

Finally, the system dynamics literature identifies the system's *purpose* and underlying *paradigm*—the mindset out of which the system arises. Purpose and paradigm can also be viewed as institutions, but using Ostrom's (2015) perspective, they can be viewed as the deepest-level of rules, which are more difficult and costly to accomplish and are also the components that have the deepest leverage to the system's behavior (Abson *et al.*, 2017; Meadows, 1997, 2008). In a service ecosystem, the overall purpose is value cocreation for engaged actors (Vargo and Lusch, 2016), such that the ecosystem strives for its long-term viability and well-being (Barile *et al.*, 2016; Frow *et al.*, 2019). However, due to the contextual nature of value perceptions (Vargo and Lusch, 2016), actors within the service ecosystem may have their own, somewhat unique value cocreation purposes (Beirão *et al.*, 2017), which may not always align with the shared purpose of the ecosystem (Mele *et al.*, 2018). In the energy service ecosystem, the transition toward sustainable energy involves a fundamental shift of purpose: from cost-effective, high-performance energy to sustainable and carbon-free energy (Markard *et al.*, 2020).

Paradigm in service ecosystems, on the other hand, refers to the shared worldviews or the common understanding among actors (Banoun *et al.*, 2016; Frow *et al.*, 2019). A worldview consists of assumptions and beliefs, constituting "*the deepest level* since it rests on preconscious, taken-for-granted understandings" (cognitive pillar of institutions; Scott, 2014, p. 74, emphasis added). A shared worldview is, therefore, crucial to ensure the ecosystem's viability and well-being, as it provides a common "frame of reference" (Scott, 2014, p. 74) to which the service ecosystem is redirected (i.e. the shared purpose). The transition toward sustainable energy also requires a shift of worldview: namely, from fuel-energy sources and passive consumers to renewable, carbon-free energy sources and proactive, engaged consumers who manage their own integrated energy production and consumption (Gonçalves and Patrício, 2022). These changes have a deep impact on the service ecosystem, also leading to changes in other components like energy resources (from carbon to renewable), actors and respective roles (from consumers to prosumers) and the institutionalization of new rules and norms (new energy regulatory framework).

Explanatory dimensions of service ecosystem dynamics

To gain a deeper understanding of service ecosystem dynamics, we have drawn upon system dynamics literature to outline the two explanatory dimensions of service ecosystems' behavior patterns over time. An overview of the dimensions is given in Figure 3. First, the figure illustrates that within the self-adjustment process of a service ecosystem, multiple feedback loops come into play. The arrow at the bottom of the figure signifies that the



Source(s): The above figure was created by the authors

Figure 3. Explanatory dimensions of service ecosystem dynamics

dominance between adaptation (reinforcing feedback, depicted as black loops) and coordination (balancing feedback, represented by white loops) can vary. Second, the figure shows how the coordination and adaptation mechanisms in self-adjustment may impact various intervention points (i.e. resource stocks and service flows, rules and norms and purposes and worldviews) within service ecosystems. The downward arrow at the left-hand side of the figure indicates that intervention points differ in their leverage, ranging from shallow to deep. Taken together, the variation of these two explanatory dimensions creates the conditions for the behavioral patterns exhibited by a service ecosystem.

Typology of service ecosystem dynamics

Using the two dimensions discussed above—the alternating dominance of adaptation and coordination in self-adjustment processes and the varying leverage of intervention points—we analytically distinguish three types of service ecosystem dynamics: (1) reproduction, (2) reconfiguration and (3) transition. The dynamics and their characteristics are summarized in Table 4. Because service ecosystems are nested (Barile *et al.*, 2016; Koskela-Huotari and Vargo, 2016), different dynamics may co-exist with a large-scale service ecosystem comprising multiple smaller-scale service ecosystems. In other words, when the analysis zooms out to the containing service ecosystem, there may be an interplay of multiple behavioral patterns within that service ecosystem.

Reproduction

The first type of service ecosystem dynamics refers to a behavioral pattern of a service ecosystem in which existing institutional arrangements are re-enacted. In this type of dynamics, the behavior of the service ecosystem can be characterized as stable, as changes

Table 4. Typology of service ecosystem dynamics

	Reproduction	Reconfiguration	Transition
Description	A stable behavioral pattern in which existing institutional arrangements are continually reenacted; changes do not lead to institutional change	An unstable behavioral pattern in which some elements of the existing institutional arrangements are challenged and institutional change occurs	A disruptive, shifting behavioral pattern leading the service ecosystem to be intersubjectively perceived as a qualitatively new
What changes in the service ecosystem	Components with shallow leverage (e.g. similar types of actors and/or resources affecting the resource stocks)	Components with medium leverage (e.g. rules and norms)	Components with deep leverage (e.g. purposes and worldviews)
How self-adjustment process of the service ecosystem unfolds	Coordination-dominated self-adjustment, in which changes are more likely to be counter-acted by the balancing feedback loops	Neither coordination nor adaptation dominates self-adjustment	Adaptation-dominated self-adjustment, in which changes are more likely to be amplified to system-level change by reinforcing feedback loops
Relevant references	Akaka *et al.* (2015), Beirão *et al.* (2017), Breidbach and Brodie (2017), Damacena *et al.* (2018)	Chandler *et al.* (2019), Kleinaltenkamp *et al.* (2018), Koskela-Huotari *et al.* (2016), Siltaloppi *et al.* (2016), Vargo *et al.* (2015)	Banoun *et al.* (2016), Buhalis *et al.* (2019), Frow *et al.* (2019), Simmonds and Gazley (2018), Taillard *et al.* (2016)

Source(s): The above table was created by the authors within the ecosystem only minimally affect its overall functioning (Abson *et al.*, 2017; Meadows, 1997, 2008) and the structure (i.e. institutional arrangements) is not affected. Hence, we call this type of service ecosystem dynamics as *reproduction*.

Reproduction dynamics are characterized by changes in components with shallow leverage, such as *stocks* of resource-integrating actors and their resources (i.e. resource stocks), as well as the *flows* of service exchange (i.e. service flows) within the service ecosystem. This type of dynamics is predictable because even if actors or resources leave the system, they get replaced with similar ones, so the activities carried out remain unchanged. For example, wedding ceremonies are re-enacted similarly, usually with familiar symbols (e.g. flowers, formal clothing, presents), even though they involve different actors (e.g. couple, guests), so the service process relies on the same institutional arrangements (Damacena *et al.*, 2018).

Changes of similar types of actors, resources and service flows do not affect the existing institutional arrangements—another example is the reenactment of food and dining activities (Akaka *et al.*, 2015). This means that, actors' reenactment of existing institutional arrangements (through balancing loops) ensures predictable and coherent reproduction of the service ecosystem over time (Akaka *et al.*, 2015; Beirão *et al.*, 2017; Breidbach and Brodie, 2017); hence, in this type of dynamics, coordination dominates the self-adjustment process. Discrepancies may arise if the actors' purposes and resource integration activities are not aligned (Prior, 2016), resulting in more actors to adapt distinct activities (reinforcing loops) that are not in tune with existing institutional arrangements. But those activities are not becoming institutionalized as social norms or rules, as the coordination-dominated self-adjustment of the service ecosystem bounces back the pressure through balancing feedback loops, which, again, maintain the existing institutional arrangements of the ecosystem. This was the case with the development of electric cars in the late nineteenth century, which despite being radically different, did not diffuse to generate major changes in the transportation service ecosystem.

Reconfiguration

The second type of service ecosystems dynamics pertains to a behavioral pattern that is characterized by instability and includes institutionalized change of rules and norms (i.e. components with medium leverage within the service ecosystem (Abson *et al.*, 2017; Meadows, 1997, 2008)). However, although rules and norms change and the components within service ecosystem are reconfigured following these changes (Koskela-Huotari *et al.*, 2016; Razmdoost *et al.*, 2023), this reshaping behavior of the service ecosystem takes place within its existing purpose and worldview, which remains stable. Following these characteristics of the service ecosystem, we label this type of dynamics as *reconfiguration*.

Reconfiguration dynamics entails self-adjustment processes of the service ecosystem in which neither coordination nor adaptation clearly dominate. Actors may encounter discrepancies that lead them to repeatedly undertake new activities so to achieve desired outcomes (reinforcing loops), while supporting the purposes and worldviews of their corresponding systems (Razmdoost *et al.*, 2019). The domination of the reinforcing loops may also increase when actors partake actions to change of rules and norms of the service ecosystem, such as reconfiguring their ecosystem boundary when being confronted by the conflicting rules and norms in the service ecosystem (Razmdoost *et al.*, 2023). The increasing dominance of such reinforcing loops may lead to institutionalization of these new activities (adaptation mechanism), but the unchanged ecosystem purpose may also balance such reinforcements over time (coordination mechanism). Thus, the alteration or addition of rules and norms gradually become solidified in the newly reconfigured institutional arrangements of the service ecosystem over time (Kleinaltenkamp *et al.*, 2018; Koskela-Huotari *et al.*, 2016;

Razmdoost *et al.*, 2023), hence reconfiguration dynamics. The evolution of the healthcare service ecosystem illustrates this reconfiguration dynamics: while the central purpose remains the wellbeing of societies and the viability of the ecosystem, healthcare practices and the underpinning rules and norms have been gradually changing from a clinical-centered approach to a people-centered approach, considering the whole network of formal and informal care (Patrício *et al.*, 2020).

Transition

The third type of service ecosystems dynamics refers to a disrupting, shifting behavioral pattern, which leads the service ecosystem to become inter-subjectively perceived as qualitatively different or new. This type of dynamics is characterized by the changes to the deepest leverage points in a service ecosystem: its purposes and worldviews (Banoun *et al.*, 2016), as the viability and wellbeing of the service ecosystem are challenged to the extent that the existing purposes or worldviews cannot suffice (Frow *et al.*, 2019). The institutionalized change of worldview and purpose implies a new functioning of the whole service ecosystem, which, in turn, leads to the emergence of a qualitatively different or new service ecosystem (Abson *et al.*, 2017; Meadows, 1997, 2008); hence we term this type *transition* dynamics.

Transition dynamics involves the domination of adaptation mechanism in the self-adjustment of the service ecosystem. As coordination in the form of existing purpose and worldview cannot suffice to ensure well-being and viability of the ecosystem, actors continue to survive by gradually defining new worldviews (reinforcing loops)—such as, through conversations around the recurring ecosystem's challenges and the need for a qualitatively new service ecosystem (Taillard *et al.*, 2016). Over time, new shared knowledge and understandings become established among these actors, implying the domination of adaptation mechanism in reinforcing the deepest level of institutional change, in the form of altered worldviews (Banoun *et al.*, 2016; Frow *et al.*, 2019), which further solidified a new purpose of the service ecosystem (Simmonds and Gazley, 2018). Through this self-adjustment process, a qualitatively different service ecosystem emerges, as seen intersubjectively from the lens of its actors. This is the case in the energy service ecosystem, as climate change challenges the viability of the whole planet, multiple actors foster the production of low-carbon electricity and a decentralized production system, further resulting in the form of a sustainable energy system whose main goal is to foster low carbon energy (Kieft *et al.*, 2020).

Three illustrative applications of service ecosystem dynamics typology

To show how the typology of service ecosystem dynamics can shed light into the understanding of stability and change within the service environment, we applied the analytical lens of the typology to understand what's happening in three service ecosystems—tourism, healthcare and energy (Table 5). We developed this contextualization based on literature and business press articles. This contextualization also highlighted the nestedness nature of service ecosystems: although one type of behavioral pattern may be more prominent, different types of dynamics may co-exist within the focal ecosystem under study.

Returning to reproduction dynamics in the tourism service ecosystem: In the face of health and safety concerns raised by COVID-19, governments across the globe implemented several legislative amendments that drastically reduced travelling (reinforcing loops towards the decline of the tourism ecosystem). While the initial reaction of the tourism service ecosystem was the reduction of activities (resource stocks and service flows) such as the reduction of number of travels and activities in shared spaces, the externally imposed legislative changes also triggered variations in the components with medium leverage within the ecosystem, e.g. hygiene and safety rules (reinforcing loops to regain growth of the tourism ecosystem). Hospitality providers who complied with such rules gained customers' trust, further

	Reproduction in tourism	Reconfiguration in healthcare	Transition in energy
Explaining change and stability in service environment through the lens of service ecosystem dynamics	Returning to reproduction, after a temporary reconfiguration during the COVID-19 pandemic	Reconfiguration toward people-centered integrated care, while maintaining the core purpose and worldview	Transition toward a qualitatively new sustainable energy ecosystem
What changes or remains stable within the service ecosystem (intervention points)	Externally imposed changes in components with medium leverage, such as hygiene and safety rules and norms during a COVID-19 pandemic, while the fundamental purpose and worldview of co-creating pleasant tourism experiences were maintained; hence, the reconfiguration dynamics. Despite calls for rethinking tourism sustainability and the need for a sustainable tourism ecosystem, we witnessed a return of tourism ecosystem to reproduction dynamics after the pandemic eased. That is, it returned to the reenactment of previous tourism activities (e.g. inviting more flights and tourists), since new hygiene and safety rules and norms were not institutionalized.	Changes in the components with medium leverage, in the forms of rules, norms and practices that meet the approach of people-centered care. Components with deep leverage, such as health system purpose to improve, maintain or restore the health of individuals and their communities, as well as deeply held humanistic worldview (Hippocratic oath), remain stable.	Changes in points with deep leverage, such as system purpose and fundamental worldview about electricity production and the proactive role of different actors beyond the utility firm. These changes have a deep impact on the energy service ecosystem, as well as cascading changes throughout the other intervention points, such as energy resources (from carbon to renewable), actors and their roles (from consumers to prosumers) and the institutionalization of new rules and norms (new energy regulatory framework).

(*continued*)

Table 5.
Applying the typology of service ecosystem dynamics as an analytical lens

	Reproduction in tourism	Reconfiguration in healthcare	Transition in energy
How self-adjustment unfolds in the service ecosystem	A momentary, continuous interplay between adaptation (through new hygiene and safety rules) and coordination (fundamental purpose and worldview of cocreating pleasant tourism experience) mechanisms, leading to instability in the ecosystem over time as it reconfigures itself while preserving its core functioning. But, when the pandemic pressure fades out, the influence of adaptation eases out (less and less actors integrate resources in ways that align with the COVID-19 hygiene and safety rules) and coordination (pre-pandemic institutional arrangements) becomes dominant again in this interplay.	Continuous interplay of adaptation (through the introduction of new norms, rules and practices related to people-centered care) and coordination (the existing healthcare purpose and worldview that emphasize humanistic healthcare and wellbeing) over time. New norms, rules and practices (e.g. new practices using innovative and smart technology) may emerge over time as adaptation mechanism dominates, but the extend of actors adapting to such changes still occur within the frame of the healthcare's unchanged purpose and worldview (coordination gains dominance).	Adaptation-dominated self-adjustment that gradually enables a disruptive, shifting behavior as the ecosystem actors qualitatively view a carbon-neutral, sustainable energy ecosystem as different from the unsustainable energy ecosystem within the containing energy service ecosystem. Yet, within the containing energy service ecosystem, some are still qualitatively viewed as the previous unsustainable energy ecosystems that manifest a coordination-dominated self-adjustment, grounded on previous institutional arrangements (economy of scale purpose and energy as a commodity worldview), such as by maintaining fossil energy while there is not enough renewal production capacity.

Table 5.

Source(s): The above table was created by the authors

stimulating the other actors to comply with the hygiene and safety rules and norms (reinforcing loops as more and more actors adapting to the intervention points with medium leverage). Meanwhile, components with deeper leverage like the fundamental purpose and worldview of co-creating relaxed and pleasant experiences were maintained (balancing loops). Thus, viewed from the lens of the typology, the service ecosystem exhibited reconfiguration dynamics during the pandemic: a momentary, continuous interplay of the adaptation to the hygiene and safety rules and norms to face the new context, with coordination based on existing purpose and worldview to keep the operations ongoing (WTTC, 2020).

Yet, as the pandemic pressure faded out and many countries gradually lifted their restrictions, the ecosystem returned to pre-pandemic reenactment of tourism activities of cocreating pleasant experiences, without the mandate to adhere to the hygiene and safety rules; hence the service ecosystem exhibits a reproduction dynamic. That is because the COVID-19 hygiene and safety rules and norms were not deeply institutionalized as the existing purpose and worldview of cocreating pleasant experiences—which remained unchanged—counteracted any influence of those rules and norms (coordination mechanism bounced back the ecosystem to its prevailing rules and norms). Thus, viewing tourism service ecosystem through the lens of service ecosystem dynamics shows how, even in the face of strong turbulence such as COVID-19, if adaptation of new rules and standards does not become institutionalized and components with deeper leverage (purpose and worldview) remain unchanged, the service ecosystem may return to reproduction dynamics of reenacting the "business as usual," even if that may not be desirable from a sustainability perspective (Sigala, 2020).

Reconfiguration dynamics in the healthcare service ecosystem: In the past years, multiple actors including patients, their families and healthcare practitioners have gradually shifted toward people-centered and integrated rules, norms and practices (reinforcing loops as more and more actors adapting to the new approach and practices), implying changes in the medium intervention points within the ecosystem.

While some elements within the institutional arrangements of the healthcare service ecosystem (people-centered and integrated rules and norms) are changing through the reinforcing influence of adaptation mechanism, coordination also influences self-adjustment over time: the deeper leverage components remain the same. The fundamental worldview of healthcare practitioners grounded in the ancient Hippocratic Oath (WHO EURO, 2022) and the mindsets and purpose (improve, maintain, or restore the health of individuals and communities) underlying how actors within this service ecosystem work remain the same; thereby serving as balancing loops. For example, healthcare practitioners can adapt to new norms, rules and practices of using smart technology to monitor patients, but the extent to which these norms, rules and practices are implemented is within the frame of the healthcare ecosystem's unchanged purpose and worldview (Mele *et al.*, 2023). Hence, viewing change and stability in the healthcare ecosystem through the lens of service ecosystem dynamics highlights that: although the ecosystem is gradually changing its rules and norms as part of its transformation over periods of time, it is also maintaining its institutionalized purpose and worldview, without a clear domination of adaptation or coordination in its self-adjustment process.

Transition dynamics in the energy service ecosystem: Climate change has challenged the viability of the energy ecosystem worldwide, fueling a conflicting interplay amongst multiple worldviews and purposes within it. These conflicts have become more disruptive as the energy ecosystem's resource potential is challenged, leading to a long-term adaptation stretch that involves significant changes in its purpose and worldview—that is, the adaptation mechanism significantly dominates the self-adjustment process through the reinforcing influence of society's increasing concerns regarding climate change (Markard *et al.*, 2020). This has generated multiple reinforcing feedback loops as incremental changes are not enough. These multiple reinforcing feedback loops activate an adaptation mechanism, further leading to changes in the deepest leverage points of the energy service ecosystem, also leading to an interplay of cascading changes throughout the other intervention points, such as energy resources (from carbon to renewable), actors and respective roles (from consumers to prosumers) and the institutionalization of new rules and norms (new energy regulatory framework). Such profound and cascading changes, in which adaptation dominates their self-adjustment, lead actors to envision such an ecosystem as a qualitatively new carbon-neutral, sustainable energy ecosystem.

Still, whereas transition dynamics (sustainable energy production systems) could be analytically seen as prominent in the containing energy service ecosystem, reproduction dynamics (unsustainable energy production systems) still need to co-exist within the containing ecosystem (Kieft *et al.*, 2020). This is the case of some fossil-fueled electricity production systems to secure energy supply during winter times (Matalucci, 2021), so the whole energy ecosystem avoids collapsing during the reinforcement of the adaptation mechanism over time. Thus, using the typology to examine the energy ecosystem also advances our understanding of the co-existence of multiple behavioral patterns within nested service ecosystems.

Implications and future research directions

By using system dynamics to inform the service ecosystem concept, this study makes a threefold contribution to service research by offering (1) a more precise definition of service ecosystem dynamics; (2) two explanatory dimensions of these dynamics; and (3) a typology of three distinct types of service ecosystem dynamics. In this section, we detail these contributions and discuss their research and managerial implications.

First, the integration of service ecosystem and system dynamics literature offers a more precise definition of service ecosystem dynamics *as the behavioral patterns of service ecosystems over time*. This definition of service ecosystem dynamics implies that the interplay between change and stability in the service environment can be analytically viewed as varying behavioral patterns of service ecosystems, advancing the systemic understanding of the service environment (Field *et al.*, 2021). This understanding further clarifies that the turbulent service environment experienced by actors is an emergent system-level outcome, which manifests itself as the service ecosystem's behavioral pattern over time. This means that the interactions between service ecosystems and their components—which are arranged and rearranged throughout self-adjustment—unfold not at a discrete moment of time but rather in continuous, interconnected phases over time (Banoun *et al.*, 2016; Ordanini and Parasuraman, 2012). As such, this study also advances the study of emergence in service ecosystems (Vargo *et al.*, 2023) by further integrating core concepts from system dynamics literature, such as feedback loops and leverage points, into a more precise understanding of service ecosystem dynamics.

Second, building upon this integration, this paper delineates two explanatory dimensions of service ecosystem dynamics. Recent research highlights both "minor or potentially major changes to the ecosystem" (Polese *et al.*, 2021, p. 27) and argues that shaping institutional arrangements can induce long-lasting transformation in service ecosystems (e.g. Vink *et al.*, 2021). Institutions and institutional arrangements are central concepts in S-D logic, but extant research has been considering all types of institutionalized social structures having the same level of influence on the systems' behaviors. By reconciling the S-D logic with the concept of leverage points in system dynamics, we unravel how different kinds of institutions (e.g. rules vs worldviews) have varying leverage to the system's behavior. Such reconciliation further enables us to contribute to S-D logic by delineating the varying leverage of intervention points within service ecosystems—from shallow to deep leverage—and how changes in the different intervention points lead to different types of dynamics.

Moreover, while self-adjustment is considered a key characteristic of service ecosystems (Mele *et al.*, 2023; Vargo and Lusch, 2018), the current discussion lacks an explanation of how self-adjustment may lead to distinct service ecosystem dynamics. Our delineation advances the understanding of how self-adjustment involves the interplay of multiple coordination and adaptation mechanisms in service ecosystems and how their varying dominance leads to different types of behavioral patterns.

Third, the paper contributes by differentiating three types of service ecosystem dynamics within service ecosystems: reproduction as the stable behavior enacting existing institutions and institutional arrangements; reconfiguration as the increasingly unstable behavior leading to and resulting from institutional change; and transition as the disrupting, shifting behavior of the service ecosystem and making it to be perceived as qualitatively new. While former studies have discussed the dynamics of service ecosystems in connection to their systemic behavior (e.g. Barile *et al.*, 2016; Meynhardt *et al.*, 2016), this typology advances a more nuanced understanding of how and why the different behavioral patterns (dynamics) within service ecosystems unfold. Our typology also highlights how multiple dynamics can co-exist and evolve in nested service ecosystems over time and their implications for understanding the change and stability occurring in different service ecosystems such as tourism, healthcare and energy.

Research implications and future research

The threefold contribution provides important implications for addressing key service research challenges and provides a ground for future research, specifically on designing sustainable service ecosystems. Service researchers and practitioners have been called to tackle large-scale problems (Ostrom *et al.*, 2021) and to design sustainable service ecosystems with significant transformative impact (Field *et al.*, 2021).

By delineating two dimensions that explain service ecosystem dynamics, this typology informs how to intentionally influence and support service ecosystem transformation toward sustainable pathways and, in doing so, it directly responds to calls on expanding service ecosystem design (Vink *et al.*, 2021). Future research should examine the self-adjusting processes and intervention points in service ecosystems in different contexts (e.g. healthcare, transportation, energy and hospitality). This understanding can provide important insights on how to enable or hinder transformation in service ecosystems by activating adaption or coordination processes and by acting upon different leverage intervention points. The inquiry toward more socially fair, sustainable service ecosystems (Boenigk *et al.*, 2021) requires foundational rethinking toward a new worldview grounded on sustainability (Sebhatu *et al.*, 2021), which implies that service ecosystems need to go through a disrupting, shifting behavior. Future research is needed to understand and develop strategies for changing intervention points, specifically those with the deepest leverage in service ecosystems (purposes and worldviews), for tackling systemic service problems and designing sustainable service ecosystems, such as climate change, inequality and poverty. More specifically, our typology may inform studies on the transition toward circular service ecosystems (De Bruyne and Verleye, 2023; Fehrer *et al.*, 2023).

Furthermore, maintaining the service ecosystem's viability also requires the efforts of actors across all aggregation levels within the service ecosystem (Mele *et al.*, 2023; Razmdoost *et al.*, 2023). Our delineation of the two self-adjustment mechanisms shows that researchers and practitioners aiming to transform service ecosystems need to consider the adequate blend of coordination and adaptation, as well as their alternating dominance (Mingers, 2000), over time. Future research should therefore explore the interplay and alternating dominance of these two mechanisms in service ecosystem dynamics. If adaptation efforts do not consider this interplay, such as in the tourism example, coordination may bounce the service ecosystem back to its previous reproduction dynamics. On the other hand, even in worldwide transition efforts toward a sustainable energy ecosystem, where adaptation-dominated self-adjustment disrupts the prevailing purpose of the wider service ecosystem, coordination-dominated self-adjustment within some of its nested systems is still needed so the wider service ecosystem does not collapse in this process. Therefore, future research can explore how to balance coordination and adaptation over time in different service ecosystems (e.g. healthcare, transportation, energy and hospitality), so they can transform into desired trajectories without collapsing or bouncing back to reproduction dynamics (Sigala, 2020).

While there are many service ecosystems in need of significant transformation to become more sustainable, other unstable behavioral patterns may be undesirable, such as the case of the disruption of health care systems during the pandemic. Therefore, future research should also study the means for stabilizing service ecosystems exhibiting unstable or disruptive behavioral patterns. In empirical studies, a focus could be on how different, stabilizing practices emerge and unfold over time in different ecosystems.

As the leverage of the intervention points and the alternating dominance of coordination and adaptation within self-adjustment may vary over time, the dynamics of a focal service ecosystem may evolve from reproduction to reconfiguration to transition and vice versa. To that end, service scholars can develop a theoretical grounding in socio-technical systems literature that has been advancing its conceptual development on transition pathways (Geels and Schot, 2007). Empirical studies may focus on identifying and comparing different service ecosystem pathways towards sustainability. We also call for research that tests various methods for performing longitudinal analyses to examine service ecosystem dynamics, in line with existing recommendations for longitudinal studies (e.g. Frow *et al.*, 2016). In parallel, a more fine-grained approach informed by causal-loop modeling (Sterman, 2001) can offer a better understanding of the longer-term, varied, emerging dynamics that might result from actors' own and the ecosystems' actions and reactions.

Managerial and policy implications

The accelerating pace of social and economic shifts, including digital transformation and climate change, require new lenses to make sense of highly uncertain environments (Ostrom *et al.*, 2021). The typology of service ecosystem dynamics allows us to reframe the seemingly random turmoil of the service environment, as the instability in the behavioral patterns of service ecosystems of which service organizations are part. The typology of service ecosystem dynamics offers managers and policymakers an analytical lens for devising different behavioral patterns of service ecosystems co-existing and evolving over time, enriching their understanding and helping them to make sense of, regulate and manage turbulent service environment that may emerge—from socio-environmental upheavals to pandemics.

Yet, viewed through the lens of service ecosystem dynamics, this instability may not be necessarily negative and stability always positive or vice versa. In fact, innovation and other forms of adaptation always imply at least some degree of reconfiguration within service ecosystems and, thus, instability in their behavior. Such adaptation may need support from proper policies. Furthermore, most service ecosystems (e.g. energy, food, transportation) will need to go through a profound transformation to adapt to climate change and other manifestations of the instability within Earth's bio-physical ecosystems. Such transformation will imply shifting behavioral patterns within service ecosystems and, thus, disruptions for service firms and other ecosystem actors. Service managers can make use of this understanding of the varying behaviors of service ecosystems to manage desired levels of customer experience. For instance, in reproduction dynamics, customers may go through a consistent experience over time; while in transition dynamics, customer experience may be shaped by conflicting worldviews and adaptation stretch, going through pervasive transformation processes.

Through the lens of service ecosystem dynamics, service managers and policymakers can make sense of the mechanisms at play within their efforts in the focal service ecosystem. For example, technological advancements, such as Artificial Intelligence (AI), have profoundly reshaped the context in which customers experience services and the ways services are delivered (Huang and Rust, 2018). The typology of service ecosystem dynamics offers a new lens for practitioners to understand this technology-enabled transformation, namely, how new technologies like robots and AI affect self-adjustment (e.g. service ecosystems adapting to health care robots; Lanne *et al.*, 2020, or smart sensing technology in elderly care; Mele *et al.*, 2023) and which intervention points are affected (e.g. new practices and norms of care).

Overall, the proposed typology anchors the views to make sense of the interplay between change and stability in the service environment through three analytical lenses—reproduction, reconfiguration and transition—suggesting actionable guidelines through which service ecosystems can be intentionally shaped (see, e.g. Koskela-Huotari *et al.*, 2021). We hope that the typology, its managerial and policy implications and the proposed research directions help establish a foundation to strengthen a systemic and dynamic outlook for service research to navigate the service environment and foster desired trajectories of service ecosystem transformation.

References

Abson, D.J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., von Wehrden, H., Abernethy, P., Ives, C.D., Jager, N.W. and Lang, D.J. (2017), "Leverage points for sustainability transformation", *Ambio*, Vol. 46 No. 1, pp. 30-39, doi: 10.1007/s13280-016-0800-y.

Akaka, M.A., Vargo, S.L. and Lusch, R.F. (2012), "An exploration of networks in value cocreation: a service-ecosystems view", *Review of Marketing Research*, Vol. 9, pp. 13-50, doi: 10.1108/S1548-6435(2012)0000009006.

Akaka, M.A., Vargo, S.L. and Schau, H.J. (2015), "The context of experience", *Journal of Service Management*, Vol. 26 No. 2, pp. 206-223, doi: 10.1108/josm-10-2014-0270.

Banoun, A., Dufour, L. and Andiappan, M. (2016), "Evolution of a service ecosystem: longitudinal evidence from multiple shared services centers based on the economies of worth framework", *Journal of Business Research*, Vol. 69 No. 8, pp. 2990-2998, doi: 10.1016/j.jbusres.2016.02.032.

Barile, S., Lusch, R., Reynoso, J., Saviano, M. and Spohrer, J. (2016), "Systems, networks, and ecosystems in service research", *Journal of Service Management*, Vol. 27 No. 4, pp. 652-674, doi: 10.1108/josm-09-2015-0268.

Baron, S., Patterson, A., Maull, R. and Warnaby, G. (2018), "Feed people first: a service ecosystem perspective on innovative food waste reduction", *Journal of Service Research*, Vol. 21 No. 1, pp. 135-150, doi: 10.1177/1094670517738372.

Beirão, G., Patrício, L. and Fisk, R.P. (2017), "Value cocreation in service ecosystems: investigating health care at the micro, meso, and macro levels", *Journal of Service Management*, Vol. 28 No. 2, pp. 227-249, doi: 10.1108/josm-11-2015-0357.

Boenigk, S., Kreimer, A.A., Becker, A., Alkire, L., Fisk, R.P. and Kabadayi, S. (2021), "Transformative service initiatives: enabling access and overcoming barriers for people experiencing vulnerability", *Journal of Service Research*, Vol. 24 No. 4, pp. 542-562, doi: 10.1177/10946705211013386.

Booth, A., Sutton, A. and Papaioannou, D. (2016), *Systematic Approaches to a Successful Literature Review*, edited by Steele, M., 2nd ed., SAGE, London.

Botti, A. and Monda, A. (2020), "Sustainable value co-creation and digital health: the case of trentino eHealth ecosystem", *Sustainability (Switzerland)*, Vol. 12 No. 13, p. 5263, doi: 10.3390/su12135263.

BP (2022), "Energy outlook: 2022 edition", available at: https://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html (accessed 15 March 2022).

Breidbach, C.F. and Brodie, R.J. (2017), "Engagement platforms in the sharing economy", *Journal of Service Theory and Practice*, Vol. 27 No. 4, pp. 761-777, doi: 10.1108/jstp-04-2016-0071.

Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S. and Hofacker, C. (2019), "Technological disruptions in services: lessons from tourism and hospitality", *Journal of Service Management*, Vol. 30 No. 4, pp. 484-506.

Carida', A., Colurcio, M., Edvardsson, B. and Pastore, A. (2022), "Creating harmony through a plethora of interests, resources and actors: the challenging task of orchestrating the service ecosystem", *Journal of Service Theory and Practice*, Vol. 32 No. 4, pp. 477-504, doi: 10.1108/jstp-06-2021-0110.

Chandler, J.D., Danatzis, I., Wernicke, C., Akaka, M.A. and Reynolds, D. (2019), "How does innovation emerge in a service ecosystem?", *Journal of Service Research*, Vol. 22 No. 1, pp. 75-89.

Charmaz, K. (2006), *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*, SAGE, London.

Cornelissen, J. (2017), "Editor's comments: developing propositions , a process model, or a typology? Addressing the challenges of writing theory without boilerplate", *Academy of Management Review*, Vol. 42 No. 1, pp. 1-9, doi: 10.5465/amr.2016.0196.

Damacena, C., Schmidt, S. and Gauze, I.P.B. (2018), "Service ecosystems: insights from a wedding", *Management Research Review*, Vol. 41 No. 12, pp. 1395-1410, doi: 10.1108/mrr-05-2017-0141.

De Bruyne, M.-J. and Verleye, K. (2023), "Realizing the economic and circular potential of sharing business models by engaging consumers", *Journal of Service Management*, Vol. 34 No. 3, pp. 493-519, doi: 10.1108/josm-08-2021-0318.

Doty, D.H. and Glick, W.H. (1994), "Typologies as a unique form of theory building: toward improved understanding and modeling", *Academy of Management Review*, Vol. 19 No. 2, pp. 230-251, doi: 10.5465/amr.1994.9410210748.

Dubois, A. and Gadde, L.E. (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55 No. 7, pp. 553-560, doi: 10.1016/s0148-2963(00)00195-8.

Edvardsson, B., Kleinaltenkamp, M., Mchugh, P. and Windahl, C. (2014), "Institutional logics matter when coordinating resource integration", *Marketing Theory*, Vol. 14 No. 3, pp. 291-309, doi: 10.1177/1470593114534343.

Edvardsson, B., Frow, P., Jaakkola, E., Keiningham, T.L., Koskela-Huotari, K., Mele, C. and Tombs, A. (2018), "Examining how context change foster service innovation", *Journal of Service Management*, Vol. 29 No. 5, pp. 932-955, doi: 10.1108/josm-04-2018-0112.

Fehrer, J.A., Kemper, J.A. and Baker, J.J. (2023), "Shaping circular service ecosystems", *Journal of Service Research*. 10946705231188670.

Field, J.M., Fotheringham, D., Subramony, M., Gustafsson, A., Ostrom, A.L., Lemon, K.N., Huang, M.H. and McColl-Kennedy, J.R. (2021), "Service research priorities: designing sustainable service ecosystems", *Journal of Service Research*, Vol. 24 No. 4, pp. 462-479, doi: 10.1177/10946705211031302.

Finsterwalder, J. and Kuppelwieser, V.G. (2020), "Equilibrating resources and challenges during crises: a framework for service ecosystem well-being", *Journal of Service Management*, Vol. 31 No. 6, pp. 1107-1129, doi: 10.1108/josm-06-2020-0201.

Forrester, J.W. (1961), *Industrial Dynamics*, Pegasus Communications, Waltham, MA.

Forrester, J.W. (1969), *Urban Dynamics*, Pegasus Communication, Waltham, MA.

Frow, P., McColl-Kennedy, J.R. and Payne, A. (2016), "Co-creation practices: their role in shaping a health care ecosystem", *Industrial Marketing Management*, Vol. 56, pp. 24-39, doi: 10.1016/j.indmarman.2016.03.007.

Frow, P., McColl-Kennedy, J.R., Payne, A. and Govind, R. (2019), "Service ecosystem well-being: conceptualization and implications for theory and practice", *European Journal of Marketing*, Vol. 53 No. 12, pp. 2657-2691, doi: 10.1108/ejm-07-2018-0465.

Gambarov, V., Sarno, D., Hysa, X., Calabrese, M. and Bilotta, A. (2017), "The role of loyalty programs in healthcare service ecosystems", *The TQM Journal*, Vol. 29 No. 6, pp. 899-919, doi: 10.1108/tqm-02-2017-0019.

Gaur, A. and Kumar, M. (2018), "A systematic approach to conducting review studies: an assessment of content analysis in 25 years of IB research", *Journal of World Business*, Vol. 53 No. 2, pp. 280-289, doi: 10.1016/j.jwb.2017.11.003.

Geels, F.W. and Schot, J. (2007), "Typology of sociotechnical transition pathways", *Research Policy*, Vol. 36 No. 3, pp. 399-417, doi: 10.1016/j.respol.2007.01.003.

Gioia, D.A., Corley, K.G. and Hamilton, A.L. (2013), "Seeking qualitative rigor in inductive research: notes on the Gioia methodology", *Organizational Research Methods*, Vol. 16 No. 1, pp. 15-31, doi: 10.1177/1094428112452151.

Gonçalves, L. and Patrício, L. (2022), "From smart technologies to value cocreation and customer engagement with energy services", *Energy Policy*, Vol. 170, 113249, doi: 10.1016/0160-791X(79)90024-1.

Huang, M.H. and Rust, R.T. (2018), "Artificial intelligence in service", *Journal of Service Research*, Vol. 21 No. 2, pp. 155-172, doi: 10.1177/1094670517752459.

Jaakkola, E. (2020), "Designing conceptual articles: four approaches", *AMS Review*, Vol. 10 Nos 1-2, pp. 18-26, doi: 10.1007/s13162-020-00161-0.

Kieft, A., Harmsen, R. and Hekkert, M.P. (2020), "Toward ranking interventions for technological innovation systems via the concept of leverage points", *Technological Forecasting and Social Change*, Vol. 153 No. August 2018, 119466, doi: 10.1016/j.techfore.2018.09.021.

Kleinaltenkamp, M., Corsaro, D. and Sebastiani, R. (2018), "The role of proto-institutions within the change of service ecosystems", *Journal of Service Theory and Practice*, Vol. 28 No. 5, pp. 609-635, doi: 10.1108/jstp-12-2017-0241.

Koskela-Huotari, K. and Vargo, S.L. (2016), "Institutions as resource context", *Journal of Service Theory and Practice*, Vol. 26 No. 2, pp. 163-178.

Koskela-Huotari, K., Patrício, L., Zhang, J., Karpen, I.O., Sangiorgi, D., Anderson, L. and Bogicevic, V. (2021), "Service system transformation through service design: linking analytical dimensions and service design approaches", *Journal of Business Research*, Vol. 136 No. December 2020, pp. 343-355, doi: 10.1016/j.jbusres.2021.07.034.

Lanne, M., Tuisku, O., Melkas, H. and Niemelä, M. (2020), "My business or not? The perspective of technology companies on shifting towards care robotics", *European Planning Studies*, Vol. 28 No. 2, pp. 296-318, doi: 10.1080/09654313.2019.1652249.

Lusch, R.F. and Nambisan, S. (2015), "Service innovation: a service-dominant logic perspective", *MIS Quarterly*, Vol. 39 No. 1, pp. 155-175.

Lusch, R.F. and Vargo, S.L. (2014), *Service-Dominant Logic: Premises, Perspectives, Possibilities*, Cambridge University Press, Cambridge. doi: 10.1017/CBO9781139043120.

MacInnis, D.J. (2011), "A framework for conceptual contributions in marketing", *Journal of Marketing*, Vol. 75 No. 4, pp. 136-154, doi: 10.1509/jmkg.75.4.136.

Markard, J., Geels, F.W. and Raven, R. (2020), "Challenges in the acceleration of sustainability transitions", *Environmental Research Letters*, Vol. 15 No. 8, 081001, doi: 10.1088/1748-9326/ab9468.

Matalucci, S. (2021), "Energy crisis: harsh winter would add fuel to climate change fire", DW, available at: https://www.dw.com/en/energy-crisis-harsh-winter-would-add-fuel-to-climate-change-fire/a-59335095 (accessed 5 April 2022).

McKinsey (2020), "The future of business: reimagining 2020 and beyond", No. July.

Meadows, D.H. (1997), "Places to intervene in a system (in increasing order of effectiveness)", *Whole Earth*, Vol. 91, pp. 78-84.

Meadows, D.H. (2008), *Thinking in Systems*, Chelse Green Publishing, White River Junction.

Mele, C., Nenonen, S., Pels, J., Storbacka, K., Nariswari, A. and Kaartemo, V. (2018), "Shaping service ecosystems: exploring the dark side of agency", *Journal of Service Management*, Vol. 29 No. 4, pp. 521-545, doi: 10.1108/josm-02-2017-0026.

Mele, C., Tuominen, T., Edvardsson, B. and Reynoso, J. (2023), "Smart sensing technology and self-adjustment in service systems through value co-creation routine dynamics", *Journal of Business Research*, Vol. 159 January, 113737, doi: 10.1016/j.jbusres.2023.113737.

Meynhardt, T., Chandler, J.D. and Strathoff, P. (2016), "Systemic principles of value co-creation: synergetics of value and service ecosystems", *Journal of Business Research*, Vol. 69 No. 8, pp. 2981-2989, doi: 10.1016/j.jbusres.2016.02.031.

Mingers, J. (2000), "The contribution of critical realism as an underpinning philosophy for OR/MS and systems", *Journal of the Operational Research Society*, Vol. 51 No. 11, pp. 1256-1270, doi: 10.1057/palgrave.jors.2601033.

Mingers, J. and White, L. (2010), "A review of the recent contribution of systems thinking to operational research and management science", *European Journal of Operational Research*, Vol. 207 No. 3, pp. 1147-1161, doi: 10.1016/j.ejor.2009.12.019.

Nenonen, S., Gummerus, J. and Sklyar, A. (2018), "Game-changers: dynamic capabilities' influence on service ecosystems", *Journal of Service Management*, Vol. 29 No. 4, pp. 569-592, doi: 10.1108/josm-02-2017-0025.

Ordanini, A. and Parasuraman, A. (2012), "A conceptual framework for analyzing value-creating service ecosystems: an application to the recorded-music market", *Review of Marketing Research*, Vol. 9, pp. 171-205, doi: 10.1108/s1548-6435(2012)0000009010.

Ostrom, E. (2015), *Governing the Commons: the Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge. doi: 10.1017/CBO9781316423936.

Ostrom, A.L., Field, J.M., Fotheringham, D., Subramony, M., Gustafsson, A., Lemon, K.N., Huang, M. and McColl-Kennedy, J.R. (2021), "Service research priorities: managing and delivering service in turbulent times", *Journal of Service Research*, Vol. 24 No. 3, pp. 329-353, doi: 10.1177/10946705211021915.

Patrício, L., Sangiorgi, D., Mahr, D., Čaić, M., Kalantari, S. and Sundar, S. (2020), "Leveraging service design for healthcare transformation: toward people-centered, integrated, and technology-enabled healthcare systems", *Journal of Service Management*, Vol. 31 No. 5, pp. 889-909, doi: 10.1108/josm-11-2019-0332.

Polese, F., Payne, A., Frow, P., Sarno, D. and Nenonen, S. (2021), "Emergence and phase transitions in service ecosystems", *Journal of Business Research*, Vol. 127, pp. 25-34, November 2020, doi: 10.1016/j.jbusres.2020.11.067.

Prior, D.D. (2016), "Incorporating exchange governance in service-dominant logic: lessons from transaction cost economics", *Marketing Theory*, Vol. 16 No. 4, pp. 553-560, doi: 10.1177/1470593116635879.

Razmdoost, K., Alinaghian, L. and Smyth, H.J. (2019), "Multiplex value cocreation in unique service exchanges", *Journal of Business Research*, Vol. 96, pp. 277-286, doi: 10.1016/j.jbusres.2018.11.046.

Razmdoost, K., Alinaghian, L., Chandler, J.D. and Mele, C. (2023), "Service ecosystem boundary and boundary work", *Journal of Business Research*, Vol. 156, 113489, November 2022, doi: 10.1016/j.jbusres.2022.113489.

Scott, W.R. (2014), *Institutions and Organizations: Ideas, Interests, and Identities*, 4th ed., SAGE Publications, London.

Sebhatu, S.P., Enquist, B. and Edvardsson, B. (2021), *Business Transformation for a Sustainable Future*, Routledge, London.

Sigala, M. (2020), "Tourism and COVID-19: impacts and implications for advancing and resetting industry and research", *Journal of Business Research*, Vol. 117 June, pp. 312-321, doi: 10.1016/j.jbusres.2020.06.015.

Siltaloppi, J., Koskela-Huotari, K. and Vargo, S.L. (2016), "Institutional complexity as a driver for innovation in service ecosystems", *Service Science*, Vol. 8 No. 3, pp. 333-343.

Simmonds, H. and Gazley, A. (2018), "Service ecotones: the complex boundary zones of service (eco) systems", *Journal of Service Theory and Practice*, Vol. 28 No. 3, pp. 384-404, doi: 10.1108/jstp-08-2017-0136.

Sterman, J.D. (2000), *Business Dynamics: Systems Thinking and Modeling for a Complex World*, McGraw-Hill, Boston.

Sterman, J.D. (2001), "System dynamics modeling: tools for learning in a complex world", *California Management Review*, Vol. 43 No. 4, pp. 8-25, doi: 10.2307/41166098.

Storbacka, K., Brodie, R.J., Böhmann, T., Maglio, P.P. and Nenonen, S. (2016), "Actor engagement as a microfoundation for value co-creation", *Journal of Business Research*, Vol. 69 No. 8, pp. 3008-3017.

Taillard, M., Peters, L.D., Pels, J. and Mele, C. (2016), "The role of shared intentions in the emergence of service ecosystems", *Journal of Business Research*, Vol. 69 No. 8, pp. 2972-2980, doi: 10.1016/j.jbusres.2016.02.030.

Tronvoll, B. (2017), "The actor: the key determinator in service ecosystems", *Systems*, Vol. 5 No. 2, doi: 10.3390/systems5020038.

van Tonder, E., Saunders, S.G. and Farquhar, J.D. (2020), "Explicating the resource integration process during self-service socialisation: conceptual framework and research propositions", *Journal of Business Research*, Vol. 121 No. April 2019, pp. 516-523, doi: 10.1016/j.jbusres.2020.02.037.

Vargo, S.L. and Akaka, M.A. (2012), "Value cocreation and service systems (re)formation: a service ecosystems view", *Service Science*, Vol. 4 No. 3, pp. 207-217.

Vargo, S.L. and Lusch, R.F. (2004), "Evolving to a new dominant logic for marketing", *Journal of Marketing*, Vol. 68 No. 1, pp. 1-17.

Vargo, S.L. and Lusch, R.F. (2016), "Institutions and axioms: an extension and update of servicedominant logic", *Journal of the Academy of Marketing Science*, Vol. 44 No. 1, pp. 5-23, doi: 10.1007/s11747-015-0456-3.

Vargo, S.L. and Lusch, R.F. (2018), *The SAGE Handbook of Service-Dominant Logic*, edited by Vargo, S.L. and Lusch, R.F., SAGE Publications, London.

Vargo, S.L., Peters, L., Kjellberg, H., Koskela-Huotari, K., Nenonen, S., Polese, F., Sarno, D. and Vaughan, C. (2023), "Emergence in marketing: an institutional and ecosystem framework", *Journal of the Academy of Marketing Science*, Vol. 51 No. 1, pp. 2-22, doi: 10.1007/s11747-022-00849-8.

Vargo, S.L., Wieland, H. and Akaka, M.A. (2015), "Innovation through institutionalization: a service ecosystems perspective", *Industrial Marketing Management*, Vol. 44, pp. 63-72.

Vink, J., Koskela-Huotari, K., Tronvoll, B., Edvardsson, B. and Wetter-Edman, K. (2021), "Service ecosystem design: propositions, process Model, and future research agenda", *Journal of Service Research*, Vol. 24 No. 2, pp. 168-186, doi: 10.1177/1094670520952537.

WHO EURO (2022), "Health systems", available at: https://www.euro.who.int/en/health-topics/Health-systems (accessed 15 March 2022).

Wieland, H., Polese, F., Vargo, S.L. and Lusch, R.F. (2012), "Toward a service (eco)systems perspective on value creation", *International Journal of Service Science, Management, Engineering, and Technology*, Vol. 3 No. 3, pp. 12-25.

WTTC (2020), "'Safe travels': global protocols & stamp for the new normal", available at: https://wttc.org/initiatives/crisis-preparedness-management-recovery/safetravels-global-protocols-stamp (accessed 25 October 2023).

Appendix

The supplementary material for this article can be found online.

About the authors

Nabila As'ad is a PhD Candidate at the Faculty of Engineering, University of Porto, Portugal and a Research Assistant at the Center for Industrial Engineering and Management, INESC TEC. She's an Informatics graduate with years of experience as a systems analyst and a profound interest in service design and systems thinking. Her PhD research focuses on the understanding of the increasingly complex and dynamic service ecosystems and how actors designing services within such ecosystems, mainly within the empirical context of the energy sector. Her works have been published in the *Journal of Service Management*, *Journal of Islamic Marketing*, among others. Nabila As'ad is the corresponding author and can be contacted at: asad.nabila89@gmail.com

Lia Patrício is Associate Professor at the Faculty of Engineering of the University of Porto and coordinator of the Center for Industrial Engineering and Management at INESC TEC. Her research has focused on customer experience and design for innovation and more recently on citizen engagement and service design for service system transformation. She was PI of the project for the design of the Portuguese Electronic Health Record and of the Service Design for Innovation Marie Curie – Innovative Training Network. Lia Patrício is associate editor of the Journal of Service Research and Journal of Services Marketing. Her research has been published in the *Journal of Service Research*, *Journal of Service Management*, *Journal of Business Research*, among others.

Kaisa Koskela-Huotari is an Associate Professor at the Department of Marketing and Strategy of Stockholm School of Economics, Sweden. Kaisa's research interests lie at the intersection of service-dominant logic, institutional theory and systems thinking. She utilizes these perspectives in her predominantly conceptual work to understand change in social systems and inform the understanding of innovation, service design and market evolution. Her articles have been published in esteemed journals such as the *Journal of the Academy of Marketing Science, Journal of Service Research, Journal of Business Research* and *Journal of Service Management* among others. Kaisa's co-authored paper was honored with the 2022 *Journal of Service Research* Best Article Award and in 2023, she received the Mary Jo Bitner "Rising Star in Services" Award.

Bo Edvardsson is a Professor and Founder of CTF-Service Research Centre, Karlstad University Sweden. He is the former editor of the *Journal of Service Management*. His research includes the logic of service, new service development and innovation, customer experience, complaint management, service ecosystems and the transition from product to service in manufacturing. He is on the review board for several scholarly journals including the *Journal of Service Research, Journal of Service Management* and *International Journal of Research in Marketing*. He is often invited to give keynote presentations at research conferences and participate in leadership development programs. His research impact in March 2024 shows 28.024 Google Scholar citations.