Service Ecosystem Boundary and Boundary Work

Abstract

We aim to explain service ecosystem change at the intersection of focal service ecosystems through the concepts of boundary and boundary work. We define a service ecosystem boundary as a set of symbolic or social boundaries that enable the functioning of an ecosystem by identifying and authorizing actors and recognizing, legitimizing, and protecting resources. We further introduce boundary work and conceptualize the three types through which it manifests in service ecosystems: competitive, collaborative, and configurational. We further illustrate this typology by applying these types of boundary work in an analysis of the evolution of the music service ecosystem. Our paper has implications for the definition of actors and resources in service ecosystems in addition to the processes that include or exclude these actors and resources. Furthermore, our conceptualization contributes to the literature by providing a lens for investigating boundary changes in service ecosystems and explaining their fluidity or stability.

Keywords

Service-dominant logic; Service ecosystem; Institutional work; Boundary work; Institutional boundary; Service ecosystem change

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1. Introduction

A service ecosystem is a "relatively self-contained self-adjusting system of resource-integrating actors connected by *shared institutional logics* and *mutual value creation*" (Vargo & Lusch, 2016, p. 10). As a system, a service ecosystem is separated from its environment (which consists of other service ecosystems) by a boundary, with identifiable inputs and outputs crossing the boundary (Barile et al., 2012; Ng et al., 2010). However, service ecosystems are nested and overlapping, which makes their boundaries fuzzy (Lusch & Vargo, 2018). Indeed, a service ecosystem boundary is impacted by the self-containment of interacting and overlapping service ecosystems, which is driven by their institutional arrangements. Hence, any attempt to understand a service ecosystem requires a clear definition of the boundary that identifies actors and resources that belong to a service ecosystem, to other service ecosystems, or to multiple overlapping service ecosystems.

First, the extant literature has predominantly assumed a free membership of actors and resources in a service ecosystem (e.g., Brodie et al., 2019; Wieland et al., 2016). This logic can be attributed to the Axiom 3 of Service-Dominant Logic (S-D logic), which states that "all social and economic actors are resource integrators" (Vargo & Lusch, 2016, p. 18). Although this is theoretically true and advances the service ecosystem perspective, further conceptualization is still required to analytically investigate service ecosystems. For instance, in practice, there may be actors and resources which are not legitimate to be included in a focal service ecosystem (e.g., actors with limited capabilities, Danatzis et al., 2022). Indeed, in their operationalization of service ecosystems, most extant studies have largely focused on actors, resources, and roles that are established in a service ecosystem and driven by shared institutions (e.g., patient and physician in the healthcare ecosystem, Akaka & Chandler, 2011; McColl-Kennedy et al., 2020), often overlooking actors which reside on the boundary or in

other service ecosystems and have the potential or desire to be included in the focal service ecosystem (e.g., quack physicians, robots, and uninsured or poor patients). However, those actors, resources, and roles—although excluded—are often key to the understanding of value cocreation and the analysis of service ecosystems. Therefore, to accommodate actors residing on the boundary of overlapping ecosystems or in other service ecosystems in the analysis of service ecosystems, it is necessary to fully understand service ecosystem boundaries.

Second, in explaining the changes of service ecosystem as a system of service ecosystems, the S-D logic literature has investigated the inter-relationships among focal service ecosystems. For instance, Mele et al. (2018) showed how the conflict, ambiguity, and opportunistic behavior that result from resources belonging to multiple service ecosystems play a role in shaping a focal service ecosystem. Similarly, studies which have adopted an institutional lens (i.e., investigating institutions as "rules, norms, meanings, symbols, practices, and similar aides to collaboration," Vargo & Lusch, 2016, p. 6) have examined service ecosystem destabilization mechanisms (e.g., institutional complexity and boundary objects, Koskela-Huotari et al., 2020). These studies have investigated forces on the boundary of a focal service ecosystem or at other service ecosystems that define its stability (i.e., the ability to retain an existing form) or fluidity (i.e., the ability to take new forms) as a whole (Chandler et al., 2019; Nenonen et al., 2014). Nonetheless, when changes occur at the intersection of service ecosystems, their boundaries are also subject to change. Therefore, understanding service ecosystem boundaries and their dynamics further extends this line of research by capturing the nuances of service ecosystem change at the intersection of focal service ecosystems.

Third, service ecosystem boundaries are important to study as actors and resources frequently belong to multiple service ecosystems simultaneously. This creates empirical challenges when attempting to clarify the relationships between service ecosystems as well as

the temporality of actors' engagement with multiple ecosystems. Recent S-D logic studies have attempted to address these complexities by investigating conflicting institutions and instances of negative value cocreation (e.g., Frow et al., 2020; Keeling et al., 2021; Mele & Spena, 2021; Verleye et al., 2017). However, these conflicting institutions may belong to multiple ecosystems. Similarly, compromises to value cocreation may be the result of an actor's concurrent positive value cocreation in another service ecosystem. Clarifying service ecosystems boundaries allows the relationships between service ecosystems to be studied and sheds light on the nuances of complex actor engagements.

S-D logic scholars have recently investigated the notion of boundary by introducing concepts such as service ecotone (Simmonds & Gazley, 2018) and boundary objects (Mele, Sebastiani, & Corsaro, 2019; Sajtos et al., 2018). These studies have sought to explain how actors collaborate across service ecosystem boundaries through objects (Mele et al., 2019; Sajtos et al., 2018) or actors (Simmonds & Gazley, 2018) residing in multiple ecosystems. However, a systematic, theoretical articulation of service ecosystem boundaries and their dynamics has yet to be attempted. Thus, in this paper, we aim to provide conceptual clarity on service ecosystem boundaries. Drawing on the notion of boundary work (Zietsma & Lawrence, 2010), we further seek to explain how and why service ecosystem boundaries might change or be changed (i.e., how they are defended, maintained, broken, or transformed).

Our study contributes to the S-D Logic literature in three main ways. First, we contribute to the extant literature that investigates service ecosystem boundaries (e.g., Mele et al., 2019; Sajtos et al., 2018; Simmonds & Gazley, 2018) by providing a conceptual clarification and investigating boundary dynamics. Second, we complement existing institutional studies on service ecosystem change (see Koskela-Huotari et al., 2020 for a review of the literature) by providing a framework that explains the change at the intersection

of service ecosystems. Finally, we contribute to the negative value cocreation literature (e.g., Frow et al., 2020; Keeling et al., 2021) by explaining their occurrence due to the inter-relationships among focal service ecosystems.

2. Research design

To define the research design for our conceptual paper, we draw on MacInnis (2011), Jaakkola (2020), and Hulland (2020) in our theory adaptation. Conceptual papers enhance "the value of extant, domain-specific research not simply by cataloguing existing findings, but also . . . by refining, reconceptualizing, or replacing existing frameworks" (Hulland, 2020, p. 34). We begin from a focal conceptualization (i.e., that of a service ecosystem), arguing that it is incomplete in some respects, then introduce additional concepts (i.e., boundary work) to bridge the shortcomings (Jaakkola, 2020). Thus, we offer an enhanced view by revising previous knowledge (MacInnis 2011). In addition to theory adaptation, we aim to develop "a typology paper that provides a more precise and nuanced understanding of a phenomenon or concept, pinpointing and justifying key dimensions that distinguish the variants" (Jaakkola, 2020, p. 23). We seek to differentiate the phenomenon, capturing the varying dimensions (Jaakkola, 2020; MacInnis, 2011). The initial dimensions are adopted from Langley et al.'s (2019) typology of boundary work in organizational settings and adjusted to the context of service ecosystem change.

To further test the logic and validity of our reasoning and structure, we illustrate the conceptual framework through the specific case of the music industry. This industry has changed dramatically in recent years, shaped by disruptive revenue models that leverage digital technologies such as the Swedish digital platform Spotify. Crowdfunding platforms such as Kickstarter, and micro-licensing, in addition to open audio platforms such as SoundCloud, have democratized music production, promotion, and consumption. However, some initially successful disruptive business models, such as the first peer-to-peer music-

sharing website, Napster, were subsequently deemed illegal. The music service ecosystem has seen the emergence and exclusion of numerous actors and resources, providing a rich set of examples of challenging, defending, crossing, or creating service ecosystem boundaries.

The role of illustrations is to assist readers in understanding "how the conceptual argument might actually be applied to one or more empirical settings" (Siggelkow, 2007, p. 22). We selected the case of the music industry for its ability to make the conceptual framework "visible and easy to grasp" (Jaakkola, 2020, p. 20) and because it allows us to illustrate the logical development of the core concepts we present through extensive examples. We develop the illustrative case through a selection of sources (i.e., scholarly journals, practitioner magazines, and websites).

3. Service ecosystem boundary

Although we can easily identify boundaries in physical systems (e.g., ecologies and mechanical or electrical systems), they are blurry and difficult to set in a social system, such as a service ecosystem (Chimenti, 2020). In social systems, two forms of boundaries exist, namely symbolic and social. A symbolic boundary comprises "conceptual distinctions made by social actors to categorize objects, people, practices, and even time and space" (Lamont & Molnar, 2002, p. 168) and is a tool through which social actors individually and collectively agree to define a reality (Lamont & Molnar, 2002). Symbolic boundaries exist in service ecosystems and enable their functioning by defining resources, actors, and their roles. For instance, actors agree to define certain roles and categories of resources such as employee, customer, organization, industry, and government, which can be investigated at micro-, meso, and macro-levels (Akaka et al., 2013). When social actors share and agree upon the symbolic boundary, it becomes an objectified form of social differences (e.g., class, race, and gender) that creates unequal access to resources and social opportunities (i.e., social boundary, Lamont & Molnar, 2002). Social boundaries are revealed in stable patterns of social behavior

such as rituals and cultural associations (Lamont & Molnar, 2002). For instance, in food-supply ecosystems, Fairtrade emerged as a tool to distinguish actors who adopted fair trade practices (i.e., symbolic boundary). Over time, it became a powerful identifier of responsible suppliers with fair trade practices and gained regulatory and normative support among industry actors (i.e., social boundary) (Kleinaltenkamp et al., 2018). Both symbolic and social boundaries exist in service ecosystems, enabling their functioning and defining the rules for membership and access to resources. Service ecosystem actors negotiate, define, and communicate boundaries through mutually accepted rules, norms (or stigmas), and agreements (e.g., trade-off practices, McColl-Kennedy et al., 2020).

We tie the definition of service ecosystem boundary to the distinctions ecosystem actors make to categorize resources. These resources can be separated from actors and integrated into value cocreation processes (e.g., heteropathic and homeopathic resources, Peters, 2016), or attached to actors who represent them within an ecosystem (e.g., cognitive, emotional, and interactional readiness, Danatzis et al., 2022). Actors make conceptual distinctions (i.e., boundaries) between what is in and what is outside a focal service ecosystem. Our conceptualization is consistent with the idea of resources as "becoming", as boundaries regulate and restrict actors' resource evaluation and use (Edvardsson et al., 2014). In fact, these boundaries predominantly aim to protect service ecosystem resources by excluding contaminating resources (e.g., excluding patients' emotional preferences, which is an example of contaminating resources from medical treatments, Keeling et al., 2021). The resource-protective nature of the boundary was addressed in the initial conceptualization of the boundary by Durkheim (1965 [1911]), who introduced symbolic boundaries that separate religious experiences from other experiences through the symbolic distinction between the sacred and the profane. Similar distinctions were shown to be made by consumers separating valuable resources from contaminating ones (Belk et al., 1989). These symbolic distinctions

are further extended to actors associated with sacred or profane resources and become a basis for socially agreed categories (i.e., social boundaries) (Durkheim, 1965 [1911]). One example is the social boundary around physicians who can only practice medicine if they are certified (i.e., a symbolic boundary representing their knowledge as a sacred resource as opposed to knowledge gained from illegitimate sources considered to be a profane resource). Furthermore, boundaries tend to create higher-level value cocreation potential by maintaining resource exclusivity (e.g., unique brand rituals, Caridà et al., 2019). The value-enhancing nature of boundaries has been acknowledged by sociologists who associate superiority and inferiority to groups and resources separated by boundaries (e.g., conspicuous consumption, Veblen, 1899). The academic debate has concentrated on the issue of inequality caused by such boundaries generating unequal access to resources in societies (e.g., Bourdieu, 1984 [1979], Weber, 1978 [1922]). The unequal access to resources in service ecosystems is one of the sources of conflict which triggers actors' effort to change, cross, or defend the boundaries (we discuss the dynamics of service ecosystem boundaries under the concept of boundary work below). Therefore, we suggest that value cocreation occurs not only through the integration of resources but also indirectly by building boundaries that protect and enhance service ecosystem resources. Consistently, we define a service ecosystem boundary as a set of symbolic or social boundaries that enable a service ecosystem to function by identifying and authorizing actors and recognizing, legitimizing, and protecting resources.

Service ecosystem boundaries closely relate to institutional arrangements as "interrelated sets of institutions that together constitute a relatively coherent assemblage that facilitates coordination of activity in value-cocreating service ecosystems" (Vargo & Lusch, 2016, p. 18). In organization studies, the relationship between boundary and institution is explained through the concept of organization fields as "organizations that, in the aggregate, constitute a recognized area of institutional life" (DiMaggio & Powell, 1983, p. 148).

Boundaries of an organization field, as an open social system, are fuzzy and set empirically by the heuristic processes of investigators (i.e., it is an analytical social phenomenon) (Scott, 2014). Berthod et al. (2018) suggest that service ecosystems could also be conceived as fields to bring in neo-institutional theory and enable further analytical investigations of service ecosystem dynamics. From an analytical perspective, we can conclude that the institutional arrangements shared among service ecosystem actors define service ecosystem boundaries. However, actors have different interpretations of rules and norms, which may also lead to conflicting views of institutions (Kleinaltenkamp, 2018). Therefore, the sharedness of institutions varies across a service ecosystem with a stronger consensus on institutions and institutional arrangements at the core. A service ecosystem boundary is where there are multiple, frequently conflicting, interpretations of institutions influenced by overlapping service ecosystems and actors who challenge or defend the existing interpretation of boundaries. Although these conflicts have been investigated at an aggregate level of service ecosystem (e.g., Chandler et al., 2019; Verleye et al., 2017), the boundary provides a key analytical tool for investigating conflicts regarding the role they play in service ecosystem change. Indeed, a recursive relationship exists between institutional arrangements and service ecosystem boundaries. Koskela-Huotari and Vargo (2016) demonstrated the role of institutional arrangements in "resource becoming" through their sense-making mechanisms. On the one hand, arrangements contextualize resources and their process of "resourceness shaping" (Koskela-Huotari & Vargo, 2016), leading to boundary creation. On the other hand, established boundaries protect those resources, leading to the enhancement of dominant institutional arrangements (as discussed above).

S-D logic scholars have examined institutions, institutional complexity, and institutional work to explain service ecosystems and their dynamics. They have shown that service ecosystems continuously transform as a result of mechanisms that catalyze change,

such as institutional complexity (Siltaloppi et al., 2016), service network imbalance (Verleye et al., 2017), ambiguity, and conflict (Mele et al., 2018). Previous studies have further introduced the notions of institutional reconciliation (Chandler et al., 2019), social emergence and shared intention (Taillard et al., 2016), proto-institutions (Kleinaltenkamp et al., 2018), institutionalization (Vargo et al., 2015), routine dynamics (Tuominen et al., 2020) and institutional work (Baker & Nenonen, 2020; Sajtos et al., 2018; Vink et al., 2019), to explain service ecosystem changes and the role that institutions may play in catalyzing them. These studies have predominately investigated service ecosystems either at an aggregate-level of analysis or at the focal service ecosystem level. For instance, proto-institutions as "practices, technologies and rules that are narrowly diffused and only weakly entrenched, but that have the potential to become institutionalized" (Lawrence et al., 2002, p. 283) have been examined at an aggregate-level of service ecosystem. Alternatively, Vink et al. (2019) identified service design practices that reshaped mental models as a form of institutional work (i.e., the actors' purposive and collective efforts to create, maintain, and break institutions; see Koskela-Huotari et al., 2016) in a focal service ecosystem. However, these studies have overlooked the relationship between multiple interacting service ecosystems and the role of the actors and resources who belong to these multiple service ecosystems. The notion of service ecosystem boundary complements extant institutional studies by providing an analytical lens that explains service ecosystem changes in relation to service ecosystem boundaries and other overlapping ecosystems. Indeed, service ecosystem boundaries are repeatedly and overtly challenged, defended, crossed, or changed by actors residing within a focal service ecosystem, on its boundary or in other service ecosystems (Chimenti, 2020). In other words, as service ecosystem boundaries create unequal access to resources and therefore service exchange opportunities, actors (usually those residing outside a focal service ecosystem) aim to challenge or cross the boundaries to benefit from such opportunities. For instance, social

class excludes actors who lack legitimate resources despite their legitimate resource-integrating roles (Bourdieu, 1984 [1979], Weber, 1978 [1922]). In the case of such class boundaries, actors within the boundary accumulate further resources to broaden the resource gap with those outside, thereby reinforcing their membership (Lamont & Molnar, 2002). On the other hand, resources emerge, and actors innovate (e.g., through social movements and technological innovation, Lamont & Molnar, 2002) to change such strong boundaries. We explain these dynamics through the notion of service ecosystem boundary work as "actors' efforts to establish, expand, reinforce, or undermine boundaries" (Zietsma & Lawrence, 2010, p. 194).

4. Service ecosystem boundary work

The establishment of service ecosystem boundaries as a form of boundary work plays an essential role in shaping service ecosystems. Boundaries are challenged, crossed, and changed, where conflicts between institutional arrangements appear in service ecosystems. Actors exposed to the conflicting institutional arrangements take sides and either defend, attack, or reconfigure existing boundaries. For instance, actors outside a focal service ecosystem may develop new resources and thus claim new roles within a service ecosystem, challenging existing boundaries. Alternatively, new resources may emerge within a service ecosystem and challenge the existence or legitimacy of existing resources, leading to the redefinition of service ecosystem boundaries.

The boundary dynamics prompt three situations in service ecosystems, leading to three different types of boundary work. First, service ecosystem actors may hold opposing views on boundary changes and engage in *competitive* types of boundary work. Second, service ecosystem actors may agree on the way to cross, change, or remove boundaries and engage in *collaborative* types of boundary work. Finally, actors outside a service ecosystem boundary may seek to influence and change the boundaries, engaging in *configurational* types of

boundary work (boundary work by internal actors is explained by competitive and collaborative types). These types are consistent with the typology of boundary work that Langley and colleagues (2019) developed on the basis of their review of boundary work studies in the organization and management literature. Whereas the competitive types of boundary work represent a service ecosystem's capacity to retain its form (i.e., the stability of a service ecosystem, Chandler et al., 2019), the collaborative and configurational types of boundary work explain how service ecosystems take new forms (i.e., the fluidity of service ecosystems, Chandler et al., 2019).

4.1. Competitive boundary work

Competitive boundary work in service ecosystems involves *creating*, *defending,* and *contesting* boundaries to protect resources (e.g., cultural meanings, reputation) that may lose their properties to exposure (see Figure 1).

INSERT FIGURE 1 ABOUT HERE

First, explicit boundaries are *created* to identify, legitimize, and authorize service ecosystem actors and resources. Although initially these boundaries are loosely defined as a result of ambiguity (Mele et al., 2018), they become established and shared among service ecosystem actors through iterations and repetition of resource-integrating practices (Tuominen et al., 2020; Vink et al., 2019). Communities of practice (i.e., groups of interacting people who share a passion or concern for an activity) are one example of such boundary creation; actors are expected to have certain resources to belong to these communities and they are guided on how to integrate legitimized resources and collaborate to enhance resource integration (Fox, 2000; Wenger, 2000). In service ecosystems, these

boundaries are expressed through identity representations (Lam, 2020), e.g., consumer, personal, or employer brands.

Furthermore, actors *defend* the created boundaries to exclude undesirable actors and resources by applying hard, physical barriers (e.g., exclusive spaces); legitimization processes (e.g., certification, intellectual property protection, or formal exclusion); or soft behavioral barriers (e.g., intimidation). When applied fairly across a service ecosystem, defensive boundary work is accepted and played out by most actors. Otherwise, actors facing discrimination constantly and overtly challenge this boundary work. The definition of fairness rests on higher-level institutional arrangements determining how service ecosystem resources should be distributed. In the service ecosystem literature, instances of defensive boundary work are predominantly referred to as "value co-destruction" as they involve separation, ignorance or resistance (Frow et al., 2020; Keeling et al., 2021). The literature frequently frames this type of boundary work negatively—e.g., as Mele et al. (2018) suggest, opposing multiple forms of innovation or institutional change. However, from the perspective of the actor defending the boundary to protect resources, this is a positive process.

Finally, when it is difficult to achieve the full exclusion of undesirable actors and resources, service ecosystem actors create a multi-layered hierarchical boundary, each layer of which requires actors to have certain resources to become a member. Members outside a service ecosystem are not excluded; they can begin at the basic level of an ecosystem and join higher levels by contesting and competing against other actors. The levels may be associated with either boundaries around resources associated with actors (e.g., actor rankings and tiers) or boundaries around resources (e.g., quality levels).

4.2. Collaborative boundary work

Collaborative boundary work in a service ecosystem is the result of *crossing*, *negotiating,* or *undermining* existing boundaries (see Figure 2). This type of boundary work is crucial in enabling new ways of resource integration by bringing new actors and resources into a service ecosystem. For instance, innovation diffusion as an "emergent, cocreative process that involves multiple actors integrating new resources and altering their institutional arrangements" (Vargo et al., 2020, p. 529) is one of the key service ecosystem changing processes that relies on collaborative boundary work.

INSERT FIGURE 2 ABOUT HERE

Extant literature which examines boundary work in service ecosystems has predominantly explained how actors *cross* a service ecosystem boundary to collaborate with actors residing outside of an ecosystem (Sajtos et al., 2018). Actors crossing service ecosystem boundaries acknowledge and respect those boundaries, yet they adopt various strategies to collaborate with those on the other side. First, actors use boundary objects, consisting of "devices, artifacts, and images that support the construction of meaning by different actors" to cross service boundaries (Mele et al., 2019, p. 263). Boundary objects are "[…] plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star & Griesemer, 1989, p. 393). These boundary objects (e.g., physical material such as identity-identifying clothes, Vink et al., 2019) enable actors to work with other actors from completely different service ecosystems by translating meanings across service ecosystems (Sajtos et al., 2018). Second, actors use boundary spanners to cross service ecosystem boundaries. For instance, Simmonds and Gazley's (2018) notion of ecotones conceptualizes a

temporally and spatially dynamic boundary zone between ecosystems, in which boundary spanners with unique characteristics exchange services in both service ecosystems. Boundary spanners are actors who integrate resources across a service ecosystem boundary, thus enabling those on different sides to collaborate.

Furthermore, collaborating actors from both sides *negotiate* service ecosystem boundaries. Actors negotiating a service ecosystem boundary seek to form a shared view on how to move the boundary. This type of collaborative boundary work occurs mainly when the emergence of resources (or lack thereof) triggers actors to redefine their roles and negotiate a boundary in a service ecosystem (e.g., the role expansion of patients, Go Jefferies, Bishop, & Hibbert, 2019). For instance, boundary negotiation can appear when actors outside of a boundary repurpose their resources and step in to perform the work of existing actors struggling with resource deficiencies. These negotiated boundaries may be temporary. Once actors have resolved the resource deficiencies, they may push the negotiated boundaries back to their original position, which was set to protect resources and ensure effective resource integration. However, when resource deficiencies cannot be overcome, a negotiated boundary may be accepted permanently as the new service ecosystem boundary. Self-service is an example of boundary negotiation in which consumers develop resources (self-reliance, competence, self-confidence) and expand their resource-integrating role in the service exchange (van Tonder et al., 2020).

Finally, collaborating actors seeking to integrate resources in novel ways or to bring in new resources can *undermine* ecosystem boundaries. This type of boundary work resembles the practice-based change of routines that "begins from performance when individual actors introduce new resources and perform routines differently" (Tuominen et al., 2020, p. 577). Boundary work of this kind occurs when there is no strong defense of current boundaries or the undermined boundaries do not harm resource-integration processes. In many cases (e.g.,

co-production, co-consumption, and craft consumption), undermining (or removal) of a service ecosystem boundary is welcomed as an innovative approach that enhances resource integration. However, some actors heavily challenge the undermining of boundaries when it damages their resources (e.g., product counterfeiting, software piracy, and smuggling).

4.3. Configurational boundary work

Configurational boundary work involves the *creation of temporary* or *new forms* of boundaries that enable external actors to influence a service ecosystem (see Figure 3). Consistent with the notion of externally planned changes in service ecosystem routines (Tuominen et al., 2020), this type of boundary work occurs by creating temporary boundary spaces on the boundary of a service ecosystem or by generating new boundaries outside a service ecosystem to potentially merge with an existing service ecosystem boundary.

First, temporary spaces, such as exhibitions or knowledge transfer partnerships, enable external actors to bring in their resources and, together with the existing members, experiment with the potential redefinition of service ecosystem boundaries. If existing actors in a service ecosystem accept them, these efforts may lead to further collaborative engagements (i.e., through collaborative boundary work) and eventually a redefinition of service ecosystem resources and roles.

INSERT FIGURE 3 ABOUT HERE

Furthermore, new boundaries formed outside a service ecosystem can heavily influence ecosystem boundaries. The creation of these boundaries predominantly occurs where two or more conflicting institutions merge. The emergence of resources outside a service ecosystem enables the coalescing of opposing institutions, leading to the creation of these new boundaries. For instance, social movements resulting from the convergence of traditionally

conflicting institutions can lead to the creation of new roles and thus new forms of boundaries. The emergence of these new, external boundary forms challenges the existing roles and resources within a service ecosystem, redefining its boundaries.

5. Illustrative case study

The music industry has evolved dramatically over time, witnessing numerous and diverse cases of boundary work by actors within and outside the music service ecosystem. In particular, emerging and external actors such as Apple, Napster, and Spotify, have always challenged the boundary around the medium of music exchange (e.g., CD vs. Internet), and major record labels such as Sony, Universal, and Warner Music, have defended it. Furthermore, a strong boundary exists around mainstream artists (due to their associated resources, such as popularity and style), limiting the access of emerging and alternative artists to the music service ecosystem. Activists, independent artists, and emerging businesses, such as SoundCloud, also challenge the boundary, whereas major record labels and key players in a service ecosystem defend it. In the following sections, we illustrate various types of service ecosystem boundary work, drawing on examples from the music service ecosystem.

5.1. Competitive boundary work

5.1.1. Creating boundaries

One of the key challenges in the music industry is keeping music in the hands of those who pay for it. As digital technology has advanced, music modification and distribution have become effortless, making music piracy a concern for major record labels. These major record labels have made several efforts to *create* boundaries to exclude non-paying users from the music service ecosystem. An example of limiting the free copying and distribution of music is the creation of digital rights management (DRM) tools, “a system wherein a set of values, understandings, technologies and objects are interconnected around a central artefact to frame practices in an industry” (Blanc & Huault, 2014, p. 21). DRMs frequently include a

license agreement restricting the copying and viewing of the music content. Thus, they act as a service ecosystem boundary, separating the legal and illegal use of music.

5.1.2. Defending boundaries

To exclude non-paying actors, major record labels also engage in defending the music service ecosystem boundary. A case in point is the use of CDs instead of MP3 files, to limit the widespread diffusion of digital files online. Major record labels defended the adoption of the CD as a medium for the exchange of music files, against pressure to use the internet instead. Such defending efforts appeared in parliamentary debates regarding the advantages and dangers of the internet for the music industry (Blanc & Huault, 2014). In the United States, the Recording Industries Association of America took legal action against Dimond Multimedia, Napster, and other MP3 sharing platforms (Jain, 2020). Even when these record labels were forced to use the internet as the medium for music exchange, they chose to create music files with elements inherited from physical CDs, such as visual artwork, titles, and artist names.

5.1.3. Contesting boundaries

Some of the strongest boundaries in the music industry have been the multi-layered boundaries that form around the mainstream artists who work with major record labels. These boundaries take the form of tiers of artists, ranked by their popularity and style of music. Actors contest such multi-layered boundaries by engaging in auditions and competitions and seeking awards. Most key players in the music service ecosystem traditionally accept these boundaries, which exclude emerging artists and alternative works (particularly those challenging mainstream styles). There have always been attempts to break such boundaries by independent artists and activists looking for a more inclusive and fair industry. In the following sections, we further discuss such efforts to break these multi-layered boundaries

from the other side of the music service ecosystem boundary (i.e., configurational boundary work).

5.2. Collaborative boundary work

5.2.1. Crossing boundaries

Open audio platforms, generated by a connected community of artists, listeners, and curators, are examples of boundary objects that enable emerging artists to cross the music service ecosystem boundary created by the major record labels. For example, as one of the largest open audio platforms, SoundCloud has empowered artists with resources to build their careers without accessing major record labels' resources. This platform makes it easy for artists to record and upload sounds and share them privately or publicly (e.g., via blogs, websites, or social networks). Furthermore, it allows them to engage directly with fans, promoting their music and receiving feedback. SoundCloud has a social-network function that enables registered users to follow the profiles of other users and to like and share music tracks. For example, its web service depicts the time bar of each piece in the form of a sound wave and provides an option for users to add comments to songs at certain points along the track. The SoundCloud community tends to have relatively more interest in what the artists propose, enabling SoundCloud users to listen to specific musical tracks of their own volition, without advice and recommendations from the streaming platform (as is typical of such platforms as Spotify). Lesser-known artists can thus take advantage of the opportunity to have SoundCloud offer their work to listeners, as alternatives to more popular artists within the same genre, among the "Suggested Tracks." There are more than 170 million active users, most of whom are music lovers interested in new and emerging artists.

5.2.2. Negotiating boundaries

One of the key boundaries created by major record labels in the music industry has been around listeners who legally own music products. This boundary has been negotiated by

music-streaming platforms, such as Spotify, to shift the ownership of music from listeners to the streaming platforms. Spotify, one of the world's largest music streaming service providers, offers subscription-based streaming services and music-listening experiences without the exchange of physical or digital music. The negotiated boundary around the ownership of digital files restricts the copying and distribution of music, which has persuaded major record labels, such as Sony, Universal, and Warner Music, to sign deals with Spotify and populate two-thirds of their catalog. The business model also allows users to experience ad-based streaming if they are unwilling to pay the subscription fee, amounting currently to approximately half of the users (Simon, 2019).

5.2.3. Undermining boundaries

One of the key roles of record labels is the financial sponsorship of music production. For many years, any artist aiming to produce music of reasonable quality was expected to sign a deal with a record label. Marillion (a UK band) and their fans undermined this strong boundary when they raised $60,000 to fund the band's U.S. tour and subsequently to produce their 2001 album (Gamble et al., 2017). Crowdfunding platforms, such as Kickstarter and Indiegogo have further empowered fans and music lovers to undermine the conventional boundary around the financial sponsorship of music production. In addition, the development of digital technologies has enabled independent artists to produce and distribute work of reasonable quality at a much lower cost, thereby undermining the record labels' role.

5.3. Configurational boundary work

5.3.1. Creating temporary boundaries

Numerous examples exist of temporary and experimental spaces in the music industry for promoting and testing alternative and emerging artists and genres. One of the most popular events among these temporary spaces is the Independent Music Awards, which unites a global community of indie artists, industry influencers, and engaged fans. It

celebrates independent musicians, producers, labels, videographers, and visual artists who follow their muse rather than metrics, and it connects them to a world of new audiences and opportunities. Iconic artists, past honorees, programmers, press, talent buyers, and other influencers throughout the Americas, Europe, and the Pacific Rim review submissions solely for artistry, daring, and authenticity—not streams, likes, or marketing success. The winning songs are promoted globally on branded streaming playlists through targeted 12-week campaigns to over 650 terrestrial and internet radio stations and through ongoing performances and distribution opportunities.

5.3.2. Creating new boundaries

For many years, numerous attempts to weaken the major record labels' defense of the boundaries around physical music distribution had failed. For instance, such start-ups as eMusic and Riffage failed to obtain licenses from established artists to sell their music in MP3 formats. However, such opposition was broken when Apple entered the music service ecosystem in 2003, launching a legal music download platform called iTunes. Apple created a new boundary outside the music service ecosystem by connecting users through a set of hardware and software resources to a user interface that simplified the user experience with digital content. These users were happy to pay to download music content in exchange for a convenient, reliable experience. Hence, major record labels began working with Apple, licensing their productions through the iTunes platform. By contrast, actors within the music service ecosystem could not offer a sufficiently strong value proposition to break the existing boundary, even though their technological development may have been equally advanced. However, an external actor such as Apple could breach the record labels' defenses by creating a strong boundary around its attractive user base, which could then create a new boundary within the music service ecosystem (Jain, 2020).

6. Discussion

In this paper we introduce three types of boundary work which explains changes at a focal firm service ecosystem boundary. These three types are developed based on Langley et al.'s (2019) typology of boundary work in organizational settings, including competitive, collaborative and configurational boundary work. We extend this typology to the multi-actor and multi-level context of the service ecosystem. Whereas competitive boundary work depicts the efforts of actors within and outside a focal service ecosystem respectively defending or attacking its boundary, collaborative and configurational boundary work illustrate changes in a service ecosystem boundary that allows collaboration with other service ecosystems. Collaborative boundary work explains collaborations that occur between overlapping service ecosystems, with actors and resources belonging to those service ecosystems. However, configurational boundary work happens where actors external to a focal service ecosystem aim to influence its boundary.

This paper contributes to the S-D logic and service ecosystem literature in several ways. First, we complement and further develop recent attempts to understand service ecosystem boundary and boundary work. Previous studies (e.g., Mele et al., 2019; Sajtos et al., 2018; Simmonds & Gazley, 2018) have predominantly focused on collaborative boundary work by investigating concepts such as the *boundary object* and *service ecotones*. These studies consider a service ecosystem boundary as a static phenomenon investigated through existing mechanisms, enabling collaboration across the boundary. We further complement this line of research by characterizing a service ecosystem boundary as dynamic and ever-changing (i.e., through boundary work). For instance, Simmonds and Gazley (2018) introduced the concept of service ecotones as temporally and spatially dynamic zones where two or more service ecosystems interact. They specifically highlighted the role of actors in such spaces in creating novel resources and enabling collaboration between neighboring

ecosystems. Our framework further extends the understanding of these spaces by distinguishing between temporary spaces—created to challenge and change existing boundaries (i.e., conducting configurational boundary work)—and permanent spaces, in which actors belong to multiple service ecosystems across existing boundaries.

Second, we contribute to the service ecosystem change literature and S-D logic Axiom 5, by clarifying the institutional changes that occur between service ecosystems through the concept of service ecosystem boundary work. The majority of studies on service ecosystem change have investigated institutions that guide and limit resource integration and actor engagement at an aggregate-level of service ecosystem or within a focal service ecosystem (e.g., see Koskela-Huotari et al., 2020 for a review of the literature). In this article, we introduce the concept of service ecosystem boundary work to explain the nuances of service ecosystem change on its boundary and in relation to the actors and resources that may reside in other service ecosystems.

Third, extant S-D logic studies have investigated resource integrations at multiple levels (e.g., macro, meso, micro) to contextualize service ecosystems (Akaka et al., 2013). The notion of service ecosystem boundary complements this analytical framework by providing an overarching perspective to investigate systems of service ecosystems and their inter-relationships through any pre-defined analytical logic. In fact, each level of analysis can be defined by its boundary, where actors and resources belong to multiple focal service ecosystems at different levels, which impacts their interactions with each other.

Finally, service ecosystem boundary work sheds further light on "value co-destruction" or "negative value cocreation" (e.g., Frow et al., 2020; Keeling et al., 2021). Actors belong to multiple service ecosystems, and as they cocreate value they also tend to defend service ecosystem boundaries that other actors may perceive as destructive. Indeed, actors always cocreate positive value that may conflict with others' value cocreation. This may occur when

an actor defends or pushes an ecosystem boundary, or in situations where cocreating actors disagree on the definitions of service ecosystem boundaries.

7. Future research

This conceptual paper opens several lines of research that can further advance our understanding of service ecosystems and their stability or fluidity. First, room exists for the further investigation of the newly identified types of competitive, collaborative, and configurational boundary work. Although our paper provides an overall framework, including possible ways of defending, crossing, or changing a service ecosystem boundary, multiple strategies and mechanisms may exist under these overarching categories that reveal new opportunities for boundary work. These opportunities can be discovered through empirical exploratory investigations of unique types of boundary work. Extant literature has identified popular strategies predominantly in the domain of collaborative boundary work, such as boundary objects (Mele et al., 2019) and boundary spanning (Simmonds & Gazley, 2018). Specifically, further studies are required to investigate the competitive and configurational boundary work previously overlooked by scholars.

Second, further research must conceptualize and empirically investigate the boundaries within service ecosystems. Specifically, understanding internal boundaries can help advance our knowledge of actors, resources, actor engagement, and value cocreation. Although our conceptualization can extend to the internal service ecosystem boundaries, further granularity is necessary to address more complex actor interactions in the form of service exchange and resource integration. Indeed, service exchange itself is a unique form of boundary work (in which resources cross an actor's boundary) that requires further clarification. Furthermore, given the existence of multiple loose or established boundaries within a service ecosystem, the definition of an actor and the actor's relationship with resources within a service ecosystem should be reviewed. Although resources help to identify actors (e.g., an actor's

body, buildings, territories), actors define boundaries according to the resources they accumulate and curate over time (e.g., color boundaries, shape boundaries, conceptual boundaries). Hence, what we consider actors and resources is not static and constantly changes over time. For example, a boundary that defines an individual actor might be built on resources naturally associated with the actor (e.g., the actor's body), resources acquired or developed through service exchanges (e.g., an extended self), or information representing the idea of an actor (e.g., a virtual self).

Third, future research should investigate the establishment and demise of the service ecosystem boundary. A service ecosystem boundary could be relatively loose when an ecosystem first emerges as actors explore their roles, negotiate memberships, and evaluate resources. Over time, service ecosystem boundaries may develop through actors' engagement in multi-level institutional work, such as negotiation, role definitions, and the creation of shared intention (Taillard et al., 2016), leading to a strong set of boundaries around resources and actors within an ecosystem. Further research could shed light on the journey from a loose boundary to an established one, and vice versa. Several key questions that enhance our understanding of service ecosystem change may arise here. For instance, at what point is a boundary collectively shared, and how? How are boundaries institutionalized? When is an established boundary ready to collapse? How can we recognize the tipping point? Finally, how are these journeys facilitated or inhibited?

Last, we propose a reconsideration of actor engagement definition (i.e., "both the disposition of actors to engage, and the activity of engaging in an interactive process of resource integration within the institutional context provided by a service ecosystem", Storbacka et al., 2016, p. 3009) to potentially include the legitimization (or delegitimization) of actors who intend to integrate resources within a focal service ecosystem. Specifically, when actors challenge, change, or cross a service ecosystem boundary to engage in service

exchanges, they engage in service ecosystem boundary work. This critical boundary work contributes to the lifeline of a service ecosystem by bringing new ideas, processes, values, or objects into service ecosystems. Conversely, actors may create and defend a service ecosystem boundary to protect their resources. Such behaviors may influence the stability or fluidity of a service ecosystem. These types of behavior are pivotal to better understanding of the evolution of service ecosystems and industries. Furthermore, service ecosystem boundary work can fully explain how actors emerge, adopt new roles, or leave a service ecosystem (i.e., actor engagement dynamics; see Brodie et al., 2019).

8. Managerial implications

Adopting the concepts of service ecosystem boundary and boundary work can help managers expand their view of a business from one that includes only the issues associated with service ecosystems they manage to one that includes issues signaling matters across the boundary of and outside an ecosystem (e.g., to move beyond a patient-centric approach and address the needs of the well-being community, Gallan et al., 2019). Without these new concepts, managers may limit their perspectives to changes within service ecosystems and the institutions guiding resource integration within service ecosystems, despite the radical changes are being introduced that go unnoticed by actors outside of those service ecosystems. A good example of such changes in the music service ecosystem is Apple's introduction of iTunes into the music ecosystem. Practitioners should be aware of the higher-level changes in service ecosystems and attempt to detect forces on boundaries or outside of a service ecosystem to maintain its stability or foster its fluidity.

Ignoring collaborative and competitive boundary work allows managers to focus on creating a strong boundary and defending it. We believe that this strategy may work only in the short term; in the long term, there is a strong probability that new forms of resources and actors may emerge outside an ecosystem, with the ability to break through even the strongest

boundaries. We illustrate this in the music service ecosystem through the examples of crowdfunding platforms and the SoundCloud community. We suggest that managers invest more in collaborative boundary work and engage in new efforts to define novel roles and resources within service ecosystems.

Finally, numerous attempts have been made to break down service ecosystem boundaries or challenge them to become more inclusive. Although boundaries have valuable function in protecting service ecosystem actors and resources, they may become sources of discrimination against one or more groups of social or economic actors. We recommend that managers review service ecosystem boundaries and propose strategies to include actors in the relevant ecosystem who are subject to discrimination before these boundaries collapse completely and lose their function in an ecosystem.

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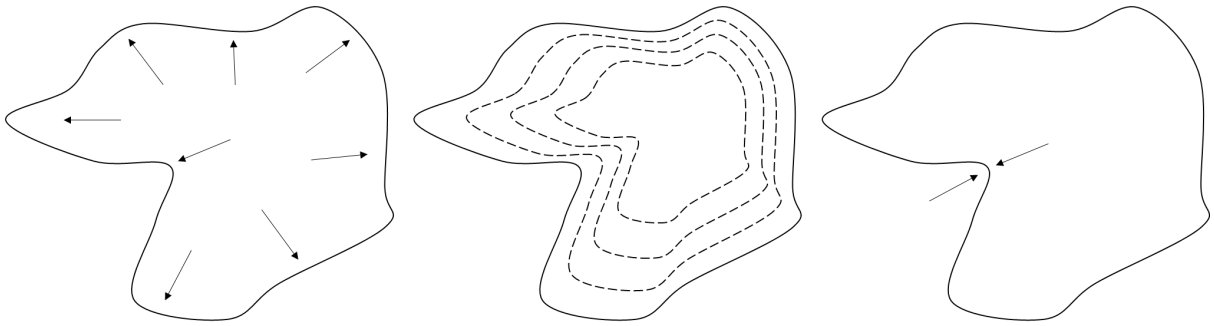

Figure 1, Competitive Boundary Work

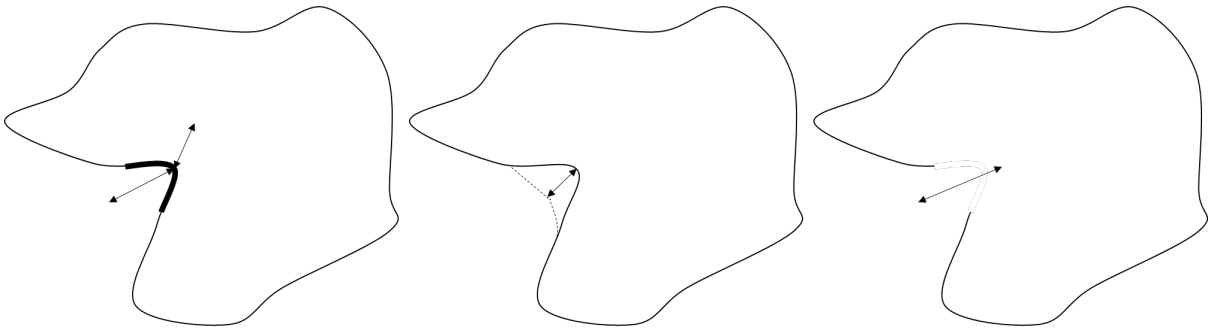

Figure 2, Collaborative Boundary Work

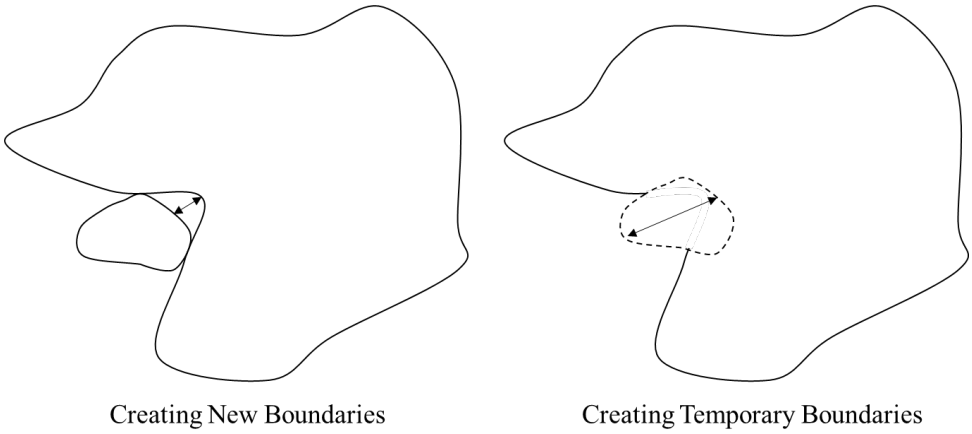

Figure 3, Configurational Boundary Work