

Chapter 28

Further Advancing Service Science with Service-Dominant Logic: Service Ecosystems, Institutions, and Their Implications for Innovation



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Abstract Service-dominant (S-D) logic has been recognized as a theoretical foundation for developing a science of service. As the field of service science advances the understanding of value cocreation in service systems, S-D logic continues to evolve as well. Recent updates and consolidation of the foundational premises establish five core axioms of S-D logic and outline a pathway for understanding the role of institutions in value cocreation in general, and innovation in particular. This chapter overviews the evolution of S-D logic and its service ecosystems view, which can contribute to the furthering the development of service science and advancing the study of innovation in service systems. Future research directions are proposed.

Keywords Service-dominant logic · Service ecosystems · Institutions · Innovation

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28.1 Introduction

Service science and service-dominant (S-D) logic share a common purpose: the study and understanding of value cocreation (Maglio et al. 2010; Vargo et al. 2010), though with somewhat nuanced approaches. S-D logic has been recognized as a conceptual foundation for the development of service science and the study of service systems (Maglio and Spohrer 2008). It posits that *service*, the application of resources for the benefit of another, is the basis of exchange and a central source of value cocreation (Vargo and Lusch 2004, 2008). This approach provides a framework for conceptualizing service and how value is cocreated in service systems, or dynamic and adaptive webs of interactions among people, organizations, and technology (Spohrer et al. 2007). More specifically, S-D logic establishes a theoretical foundation for the development of service science and the “systematic search for principles and approaches that can help understand and improve all kinds of value cocreation” (Maglio et al. 2010, p. 1).

S-D logic emerged in 2004 through the work of Vargo and Lusch (2004), which integrated a variety of research areas and highlighted the movement toward a service-centered view of exchange and value creation. Since then, S-D logic has evolved into a body of literature that connects traditional service research with a variety of related, emerging and growing research streams, including service science (Wilden et al. 2017). The contributions of numerous scholars have led to the identification of five overarching axioms. Furthermore, it has paved the way for Vargo and Lusch’s (2011, 2016) introduction of a service-ecosystems perspective, which is based on S-D logic. We argue that the evolution of S-D logic towards an “ecosystems” view can advance the development of a systematic approach to studying value cocreation and innovation within and among multiple service systems.

Service ecosystems are defined as “relatively self-contained self-adjusting systems of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (Vargo and Lusch 2016, p. 11). This emphasis on service as the basis of exchange and value creation draws attention to the complex and dynamic nature of the social systems through which service is provided, resources are integrated, and value is cocreated. Furthermore, an ecosystems view emphasizes the importance of *institutions*—social norms or “rules of the game” (North 1990, p. 4–5)—in value cocreation, especially as it relates to innovation. The consideration of institutions as central to value cocreation provides insight into the core resources of service science—technology, people, organizations and shared information (Maglio and Spohrer 2013)—and how and why they may be integrated in certain ways. In this way, a service ecosystems perspective extends the foci of service systems to include the social structures within which the core resources of service science are embedded. The aim of this chapter is to explore how advancements in S-D logic, especially its institutional, ecosystems view, can contribute to further development of service science and the study of service systems, particularly as they apply to innovation.

To this end, we present a service ecosystems approach to further advancing the study of service systems. We elaborate on how a service ecosystem perspective provides a lens for considering embedded levels of interaction and understanding the role of institutions in value cocreation in general, and innovation in particular. This view centers on resource integration as the central means for connecting people and technology within and among service systems. It also emphasizes the social factors that influence, and are influenced by, service-for-service exchange. In particular, the emphasis on the role of institutions in value cocreation requires the reconsideration of the scope of value cocreation and how it influences the actions and interactions of individual actors. As we will discuss in more detail, by considering the importance of institutions in service ecosystems, we can take a more systemic approach to studying how value is cocreated and innovation occurs.

This paper begins with a brief history of the role of S-D logic and its contribution to the development of service science. We highlight the importance of service science and its study of service systems in establishing a systemic perspective of service and value cocreation. We argue that a S-D logic, service ecosystems approach can help to further this initiative. We then outline the core axioms of S-D logic and discuss the importance of institutions and institutional arrangements in value cocreation and innovation. Finally, we discuss why and how service ecosystems view can be used as a transcending framework for thinking about different “types” of innovation, and offer suggestions for future research.

28.2 Service Systems and Service Ecosystems

The study of service systems is the heart of service science (Spohrer and Maglio 2010). A service system is “a configuration of people, technologies and other resources that interact with other service systems to create mutual value” (Maglio et al. 2009). Spohrer and Maglio (2010, p. 159) emphasize the importance of socially constructed meaning in service systems and highlight the way in which “symbols guide both internal behavior and mediate interactions with other entities.” In particular, the authors suggest that symbols are a central component of service systems, and that “symbol manipulation is increasingly important as a mechanism for value cocreation” (p. 159). In other words, processes of value cocreation draw on the abilities of individual actors in the “manipulation” or reinterpretation of various symbols and development new meanings, and thereby new ways of creating value.

S-D logic is considered as a foundational theoretical framework for service science and the study of service systems (Maglio and Spohrer 2008; Vargo et al. 2010). It has been suggested that a science of service grounded in S-D logic can potentially provide a more comprehensive and inclusive approach than traditional theories related to service and exchange (Vargo et al. 2010). Unlike traditional views of services as intangible units of output, S-D logic conceptualizes service as the application of competences for the benefit of another, which is central to value creation and exchange. Thus, an S-D logic foundation for service science, and its

study of service systems, encompasses the exchange of both tangible and intangible resources, and it emphasizes the processes, rather than the output, of value creation.

The study of service systems has been influenced by prior work connecting S-D logic and with systems thinking (Vargo and Akaka 2009). This research aligns with various theories on systems (e.g., see Barile and Polese 2010; Ng et al. 2011) and provides a conceptual foundation for the consideration of a service system as a “network of agents and interactions that integrate resources for value co-creation” (Ng et al. 2012, p. 1). In general, a systems approach to understanding service-for-service exchange draws attention toward multiple stakeholders (Ostrom 2010) and the importance of systems viability (Barile and Polese 2010) in value cocreation, as well as the emergent nature of service systems themselves (Ng et al. 2011).

S-D logic provides a lens for studying service systems because it centers on dynamic interactions among multiple actors. However, S-D logic also suggests that the reason various actors interact is to exchange resources with the goal of creating value for themselves and for others (i.e., through service provision). The connection between systems theories, S-D logic and service systems has been further extended by a service ecosystems view (Vargo and Lusch 2011). S-D logic advances the understanding of how socially constructed norms and meanings and other institutions mediate value cocreation, by highlighting the way in which all social and economic actors are resource integrators and active participants of value cocreation. A service ecosystems view further emphasizes institutions as a central driver of the actions and interactions that enable innovation (Vargo and Lusch 2011; Vargo et al. 2015). This approach advances the understanding of service science and service systems by drawing attention toward the underlying forces (i.e., institutions) driving interaction and exchange.

According to Vargo and Lusch (2016, p. 11), a service ecosystems view is similar to the concept of a service system within service science. They argue, however, “the ‘service ecosystem’ definition in S-D logic emphasizes the more general role of institutions, rather than technology,” with technology being seen as a specific institutional phenomenon: socially constructed, useful knowledge (Mokyr 2002). What further distinguishes an ecosystem view of service systems is that S-D logic also emphasizes how embedded levels (micro, meso and macro) of social contexts (i.e., institutional structures) (Chandler and Vargo 2011; Edvardsson et al. 2011) influence, and are influenced by, value cocreation processes within and among systems of service exchange.

It is noteworthy that the ecosystems view also explicates the idea that the creation of value is dependent on social contexts—interconnected relationships (Chandler and Vargo 2011) as well as social structures—rules, and resources (Edvardsson et al. 2011; Giddens 1984). However, the relationship between value cocreation and social contexts is recursive, because, as actors engage in exchange, they draw on and contribute to the formation of relationships (Akaka and Chandler 2011) as well as social norms guiding those exchanges (Edvardsson et al. 2011). Vargo and Lusch (2011) have suggested that value cocreation within service ecosystems is driven by the integration of resources, particularly shared institutions—common rules or norms for the governance of interaction. Importantly, S-D logic’s emphasis on the

integration of operant resources—those that act upon other resources—points toward institutions (and their social influence) as a primary resource in value cocreation. Because institutions are capable of influencing and guiding action, they can be considered as operant resources. Institutions and institutional arrangements—or assemblages of institutions (Vargo and Lusch 2016)—are an essential element of service ecosystems. Also, because they guide social interactions, institutions can be considered as a necessary resource for value cocreation to occur. The evolution of this research stream has resulted in the development of five core axioms and draws attention to the importance of institutions and institutional arrangements in service ecosystems. This is elaborated in the sections below.

28.3 Core Axioms of S-D logic

The essence of the meta-theoretical framework of S-D logic comprises 11 foundational premises (FPs) of which five are identified as axiomatic (Vargo and Lusch 2016). These five axioms, briefly introduced here, represent the core premises from which the other FPs can be derived from (Lusch and Vargo 2014).

28.3.1 *Axiom 1: Service Is the Fundamental Basis of Exchange*

To understand the meaning of Axiom 1, “Service is the fundamental basis of exchange”, it is important to recognize that S-D logic represents a *shift in the underlying logic of understanding exchange*, rather than a shift in the emphasis of type of output that is under investigation. This shift of logic is achieved by introducing a processual conceptualization of *service* (singular)—the application of resources for the benefit of another—as the basis of exchange (Vargo and Lusch 2004, 2008). In other words, the concept of service focuses on the process of serving rather than on a type of output such as services (plural). Consequently, S-D logic is not about making services more important than goods, but about transcending both types of outputs with a common denominator—service.

With the help of this processual conceptualization of the basis of exchange, exchange can be understood as actors applying their competences to provide service for others and reciprocally receiving similar kind of service (others’ applied competences or money as ‘rights’ for future competences) in return. However, (direct) service exchange is often masked, as in our efforts to improve our wellbeing, human kind has come up with several ways to cocreate value more effectively by exchanging service indirectly. Therefore, the concept of service exchange in S-D logic is not tied to the distinct moments of direct physical interaction among people (Vargo 2008) as is the case in the conventional literature on services (Lovelock 1983;

Zeithaml et al. 1985). Instead, a crucial feature of S-D logic is that service is also provided indirectly, for example, in a form of a product (i.e., vehicle for service provision) or monetary currency (i.e., rights for future service).

28.3.2 Axiom 2: Value Is Cocreated by Multiple Actors, Always Including the Beneficiary

S-D logic's conceptualization on value creation significantly differs from the linear and sequential creation and destruction of value emphasized in G-D logic (Wieland et al. 2016). Rather than placing the firm as the primary value creator and focusing on the value contributing activities among two actors (usually a firm and a customer), S-D logic argues for the existence of more complex and dynamic exchange systems within which value cocreation occurs at the intersections of activities of providers, beneficiaries, and other actors (Vargo and Lusch 2011; Wieland et al. 2012). Alternatively stated, S-D logic posits that value is *cocreated by multiple actors* through integration of resources in a specific context, rather than manufactured and then delivered (Vargo et al. 2008).

This implies that for value cocreation to occur there must be integration of the beneficiary actor's resources with those applied by the service provider. All of this, in turn, implies that the beneficiary is always an active participant of the value cocreation process, that is, every time value emerges as a result of resource integration, it is always cocreated by multiple actors. Furthermore, according to the S-D logic view on value cocreation, value unfolds over time and all the resource integrating actors and their activities preceding a specific instance of value determination by an actor, are seen as cocreators of value (both for that actor and to themselves). In other words, value creation does not just take place through the activities of a single actor (e.g. customer) or between a firm and its customers but among a whole host of actors. That is, "at least in specialized, human systems (and arguably in all species), value is not completely individually, or even dyadically, created but, rather it is created through the integration of resources, provided by many sources, including a full range of market-facing, private and public actors" (Vargo and Lusch 2016, p. 9).

28.3.3 Axiom 3: All Social and Economic Actors Are Resource Integrators

As explained, S-D logic argues that all actors provide service (apply resources for other's benefit) to receive similar service from others (other actors applying their resources) in the effort of cocreating value (Vargo and Lusch 2011). This means that all actors are both providers and beneficiaries of service and the activities and

characteristics of actors are not fundamentally so dichotomous as implied by the conceptual division of the ‘economic’ actors into producers and consumers. Hence, the axiom 3 “All social and economic actors are resource integrators”, implies an *actor-to-actor* (A2A) orientation that urges to move away from such restricted, pre-designated roles (e.g. “producers” vs. “consumers”, “firms” vs. customers”) to a more generic understanding of actors (Vargo and Lusch 2011). This suggestion has wide-ranging implications because it signals that all actors fundamentally do the same things: integrate resources and engage in service exchange, all in the process of cocreating value (Vargo and Lusch 2016). Vargo and Lusch (2011) argued that the discussion in business-to-business (B2B) marketing, rather than the traditional business-to-consumer (B2C) orientation, offers a better exemplar of the A2A orientation. This is because, B2B does not view actors as strictly producers or customers that are fundamentally different from one another but, rather, all actors in this discussion are considered as enterprises (of varying sizes, from individuals to large firms), engaged in the process of benefiting their own existence through benefiting the existence of other enterprises, either directly or indirectly. This is well-aligned with the idea of actors as active integrators of resources.

Resources in S-D logic are viewed “*as anything, tangible or intangible, internal or external, operand or operant, an actor can draw on for increased viability*” (Lusch and Vargo 2014, p. 121, emphasis in original). The literature regarding resources in S-D logic recognizes two broad types of resources that are being integrated (Lusch and Vargo 2014; Vargo and Lusch 2004). First type is operand resources which refers to those resources that require action taken upon them to be valuable. Second type is operant resources which refers to the resources that are capable of acting on other resources to contribute to value creation. Aligned with many of the resource-based views (Barney 1991; Penrose 1959/2011), S-D logic emphasizes the primacy of operant resources over operand resources in value co-creation. In other words, although operand resources often contribute to the cocreation of value, without the application of operant resources, such as knowledge, skills and competences, value co-creation does not occur (Vargo and Lusch 2004).

An important part of the S-D logic view on resources is to understand the nature of resources as processual and contextual. In other words, *resources are not, they become* (De Gregori 1987; Vargo and Lusch 2004). This means that actors’ knowledge and skills, that is, other resources, determine the *resourceness* of resources (Koskela-Huotari and Vargo 2016; Lusch and Vargo 2014). Consider for example fire, the resourceness of fire only became available for humans once the knowledge and skills to control and apply fire for specific purposes were developed. Hence, potential resources become resources, when appraised and acted on through integration with other potential resources.

28.3.4 *Axiom 4: Value Is Always Uniquely and Phenomenologically Determined by the Beneficiary*

In S-D logic, the purpose of human action is conceptualized as the cocreation of value. However, in this view, value is derived and determined in a particular context (Chandler and Vargo 2011; Vargo et al. 2008). More specifically, value is considered to be an emergent outcome of the resource integration and service provision practices that can be described as “an increase in the well-being of a particular actor” (Lusch and Vargo 2014, p. 57, italics in original). The perception of this value is phenomenologically determined by each actor in their respective (social) context (Chandler and Vargo 2011; Edvardsson et al. 2011; Vargo and Lusch 2008). This means that value is perceived experientially and differently by varying actors in varying contexts and each instance of value co-creation can have multiple possible assessments, including negatively valenced ones (Vargo et al. 2017).

The contextual and phenomenological nature of value determination should not, however, be confused with randomness or naive subjectivism. Instead, S-D logic argues that value determination, like value cocreation, is guided by social structure and the complex constellations of institutional arrangements it comprises (Sitaloppi et al. 2016; Vargo and Lusch 2016). In other words, “value-in-context suggests that value is not only always cocreated; it is contingent on the integration of other resources and actors” (Lusch and Vargo 2014, p. 23). The systemic and institutional conceptualization of value enables reconciling the separation of value-in-use and value-in-exchange because it provides the means for considering various aspects of value—how and through which institutional arrangements it is determined through use, as well as how and through which institutional arrangements it is captured in exchange (cf., Vargo et al. 2017).

28.3.5 *Axiom 5: Value Cocreation Is Coordinated Through Actor-Generated Institutions and Institutional Arrangements*

Recently, the need to articulate more clearly the mechanisms that enable and constrain the often massive-scale cooperation involved in value cocreation, was made apparent by S-D logic’s movement toward a systems orientation and more specifically the introduction of the service ecosystems perspective discussed earlier in this chapter (Vargo and Lusch 2011, 2016). Hence, axiom 5, “Value cocreation is coordinated through actor-generated institutions and institutional arrangements,” was added to emphasize the importance of *institutions*. The concept of an institution and, more specifically, *institutional arrangements*—sets of interrelated institutions—as used in S-D logic, should not be confused with the more everyday use

of the word ‘institutions’ referring to firms, governmental agencies or any such organizations. Instead, institutions in a sociological sense, refer to humanly devised rules, norms, and beliefs that enable and constrain action and make social life predictable and meaningful (Vargo and Lusch 2016).

Hence, institutions as coordination mechanisms of value cocreation consist of formalized rules and less formalized norms defining appropriate behavior, as well as cultural beliefs and cognitive models, frames and schemas encapsulating the often taken-for-granted assumptions and beliefs fundamental to guiding social action in different situations (cf. Scott 2014). Following Giddens’ (1984), S-D logic views institutional arrangement as the social structure that is both the medium and outcome of human action. In other words, institutional arrangements are not exogenous to service ecosystems and the actors they comprise, but socially constructed and internalized by them (cf. Berger and Luckmann 1967). In other words, institutions and institutional arrangements represent the structure of social systems that lend them their systemic form (Giddens 1984) and in a slightly more narrow sense can be thought as the actor-generated “rules of the game” in a society (North 1990) that enable and constrain the way resources are integrated, and value is both cocreated and determined (Vargo and Akaka 2012; Vargo and Lusch 2016; Wieland et al. 2016).

28.4 The Importance of Institutional Arrangements in Service Ecosystems

As explained, in S-D logic, institutions and institutional arrangements are viewed as the actor-generated coordination mechanism of service ecosystems and, therefore, the keys to understanding their functioning (Vargo and Lusch 2016). This emphasis on collective values and meanings aligns with prior discussions of symbols in service systems (Spohrer and Maglio 2010). However, the discussion of institutions and institutional arrangements in service ecosystems sheds light on how and why symbols gain their meaning and offers additional insights into how people act and interact in their efforts to create value. The role of institutions in shaping meaning (symbols) and interaction stems at least in part from the fact that, contrary to the assumptions of neoclassical economics, human beings have limited cognitive abilities (Simon 1996). Institutions represent the socially constructed aides that provide shortcuts to cognition, communication, and judgment. In fact, if actors appear to be rational in a given situation, it means they are guided by an institutional arrangement that is shared and generally acknowledged as the appropriate and logical in that situation. Hence, actors do not appear rational despite of institutions, but because of them (cf. Friedland and Alford 1991).

As described, institutions come in many forms including formal laws, informal social norms, beliefs and meanings (cf. Scott 2014). Institutions also do not usually exist independently of other institutions, but as part of more comprehensive,

interrelated institutional arrangements (Vargo and Lusch 2016). A conceptual distinction between an institution and institutional arrangement can be, however, useful as individual institutions can work as the building blocks for the ongoing formation and reformation of multiple, increasingly complex assemblages. Thus, in S-D logic the word “institution” is used to refer to a relatively isolatable, individual “rule” (e.g., norm, meaning, symbol, law) and “institutional arrangements” to refer to a relatively coherent assemblage of institutions that facilitates coordination of activity within service ecosystems.

When more actors share an institutional arrangement the greater the potential coordination benefit is to all of these actors, due to the network effects with increasing returns. Vargo and Lusch (2016) argue that institutions enable actors to accomplish an ever-increasing level of service exchange and value cocreation under time and cognitive constraints and, therefore, the formation of ever-more complex service ecosystems. However, while the guidance of institutional arrangement enables value cocreation in the first hand, it also comes at a potential expense. That is, the ability of “performing without thinking” (Whitehead 1911) is inherently susceptible to acting without reevaluating the appropriateness of the institutions for the context at hand (Vargo and Lusch 2016). Thus, institutions can lead to the development of the “iron cage” (DiMaggio and Powell 1983), that is, ineffective dogmas, ideologies, and dominant logics within a field that hinder innovation and change. Because of this, it is important to investigate how institutions can foster innovation in some cases and restrain it in others. In other words, an exploration of how a service ecosystems perspective can provide a dynamic approach to studying innovation is needed in order to advance the development of novel and compelling, potentially disruptive solutions.

28.5 Service Ecosystems Perspective as a Unifying View of Innovation

Innovation is central to the continuation of value cocreation and the enhancement of wellbeing. However, the fragmented nature of the innovation literature suggests that there are multiple processes of innovation depending on the “type” of innovation involved. This makes it difficult to assess the underlying driver of innovation and how institutions can be leveraged to help foster the cocreation of new solutions. Recognition of different types of innovation originated with Schumpeter’s (1934) identification of five areas of innovation—product innovation, process innovation, market innovation, input innovation and organizational innovation (see Abernathy and Clark 1985). Although most of these types of innovation referred to products or processes, Schumpeter (1934) recognized market innovation as a distinct type of innovation as well.

More recently, Abernathy and Clark (1985) separated innovation into two domains of innovative activities: technology/production and market/customer. In

their view, the “technology” side of innovation focuses on the production and operation processes involved with the design and development of new products. Alternatively, the “market” side of innovation focuses on the distribution of products and the development of relationships with customers. Along these lines, Hauser et al. (2006) identified five fields of research on innovation that center on the development of new technologies (i.e., organizations and innovation, and prescriptions for product development) and understanding the markets within which technologies are adopted or diffused (i.e., consumer response to innovation, strategic market entry, and outcomes for innovation).

A service ecosystem perspective denotes both an institutional and systemic orientation on innovation (Vargo et al. 2015). Understanding how innovation emerges is increasingly vital for the continuation of value creation in dynamic and interconnected service systems. In order to maintain viability of service systems, it is necessary to continually identify new solutions to increasingly complex problems. In the following, we highlight some of the most important areas for further research implied by these two, intertwined orientations and how they can further develop service science and the study of innovation within service (eco)systems.

28.5.1 Innovation as an Emergent Property of Service Ecosystems

So far, previous work using a service ecosystems perspective to study innovation has mainly focused on detailing the institutional rather than the systemic aspects of innovations (see e.g., Koskela-Huotari et al. 2016; Vargo et al. 2015). However, there is recent work that argues that one of the basic concepts from systems thinking—*emergent property* (Georgiou 2003)—could be used to extend the service ecosystems perspective’s conceptualization of innovation (Koskela-Huotari 2018). According to systems thinking (see e.g., De Haan 2006; Harper and Lewis 2012), emergence occurs when a whole system (e.g., an organization) produces outcomes that differ qualitatively from those produced individually by the parts of the system (e.g., individual members of the organization). Thus, an emergent property is “a property of a system that is dependent upon the connective structure of the system’s elements” (Harper and Lewis 2012, p. 329). Hence, emergence is not only about the emergent outcomes, but also the interactions between the elements that cause the coming into being of those properties, that is, the activities and mechanisms producing novelty. In other words, the understanding of innovation as an emergent property of service ecosystems requires the understanding of both the outcome and the process that brings it into being. This points to several avenues for future research to better understand the role of institutions and the systemic processes and outcomes that enable innovation.

Previous research has argued that institutional work, that is, the actions of individual and collective actors aimed at creating, maintaining, and disrupting

institutions (Lawrence and Suddaby 2006), provides a fruitful way to understand the process aspects of innovation as an emergent property (Vargo et al. 2015; Wieland et al. 2016). In other words, innovation can be seen as a process of changing value cocreation practices in service ecosystems that entails reconfiguring the institutional arrangements the actors are enacting. Furthermore, the service ecosystems perspective's "oscillating foci" (Chandler and Vargo 2011), that is, the ability to zoom in and out on phenomena, can be used to examine institutional work at different levels of aggregation as done by Koskela-Huotari et al. (2016). This means that the service ecosystems perspective enables the analysis of value cocreation and innovation on a broader level of aggregation (e.g., institutional work and its outcomes in an industry) to grasp the multitude of actors engaging in it, as well as attending to the micro-processes of a chosen focal actor (e.g., institutional work done by a specific organization or individual and its outcomes).

One way to attend to the static aspects innovation as an emergent phenomenon is to view it as a proto-institutional outcome (Koskela-Huotari 2018). In institutional theory, novel social elements (e.g., new practices, technologies, and rules) that are narrowly diffused and only weakly entrenched, but have the potential to become widely institutionalized, are referred to as *proto-institutions* (Lawrence et al. 2002; Zietsma and McKnight 2009). Stated differently, proto-institutions are institutions-in-the-making: They have the potential to become full-fledged institutions if social processes develop that entrench them and they are diffused throughout an institutional field.

Lawrence et al. (2002) proposed a theoretical framework in which novelty arises in collaborations. This fits well with the earlier argument of viewing innovation as an emergent property that depends on the connective structure of the system's elements. At this point, however, a specific collaboration has not produced any institutional effects on a meso- or macro-level of aggregation. Instead, a change has occurred, but only within the boundaries of the initial collaboration. In some cases, these novel elements (e.g., novel resourceness of resources or value cocreation practices) diffuse beyond the boundaries of the specific group of actors among which they were developed, and they are internalized by other actors in the field. In such cases, they become proto-institutions. In other words, proto-institutions represent the important first steps in the processes of creating institutions, thereby potentially forming the basis for broader, field-level change, such as market evolution.

It is clear that future research is needed to better understand how institutions in general, and proto-institutions in particular, emerge and evolve. Furthermore, how institutions relate to each other in institutional within institutional arrangements is still unclear. Some research questions that could help move this exploration forward include:

1. What is the role of dominant institutions in the emergence of proto-institutions?
2. How do proto-institutions emerge?
3. What is the relationship among institutions within an institutional arrangement?
4. How do people draw on different institutions in their efforts for value creation?
5. How do the relationships among institutions influence innovation?

28.5.2 *Prerequisites for Innovation in Service Ecosystems*

Along the lines of institutional change, understanding the antecedents of innovation is important for understanding how new forms of value are cocreated. As discussed, institutions both enable and constrain value cocreation within service ecosystems and, therefore, are instrumental for these activities by providing the building blocks for increasingly complex ecosystems. However, all actors with a service ecosystem do not necessarily share the same institutions, hence situations within which actors operate in the guidance of misaligned institutional arrangements can occur. Furthermore, actors in nested and overlapping service ecosystems can be guided by multiple institutional arrangements simultaneously (cf. Thornton et al. 2012). According to Sitaloppi et al. (2016) it is when this institutional pluralism—the co-existence of multiple inhabited institutional arrangements—turns into institutional complexity—incompatible prescriptions given by multiple institutional arrangements in a single situation than changes can occur within service ecosystems. In other words, institutional complexity can be seen as a prerequisite of innovation in service ecosystems.

Sitaloppi et al. (2016) argue that this is because, on the one hand, the coexistence of incompatible institutional arrangements elevates actors' conscious and reflective problem solving by reducing the taken-for-grantedness of institutional arrangements. On the other hand, institutional complexity makes available multiple institutional "toolkits," consisting of the cultural norms, meanings, and material practices comprising different institutional arrangements. The availability of multiple institutional toolkits enables the creative reconstruction of value cocreation practices in service ecosystems as actors can reconcile, transform, and integrate elements within them. It is, however, important to note that institutional complexity does not necessarily lead to the emergence of novelty; rather, it can also result in behavior in which countering alternatives leads to action aimed at maintaining the status quo (Sitaloppi et al. 2016). The emerging discussion of reflexivity in institutional analysis in organization studies (Suddaby et al. 2016) can be a productive area of further investigation. Hence potential further research questions, include for example:

1. Under which conditions does institutional pluralism turn into institutional complexity?
2. What factors determine whether institutional complexity results in divergent or convergent change?
3. What happens to value cocreation when institutions are misaligned?
4. Are there optimal situations of institutional complexity that can lead to innovation?
5. Do different types of networks or relationships lead to different value outcomes?
6. What are the main elements of a service ecosystem that lead to institutional change?

28.5.3 *Technology as an Operant Resource in Innovation*

Understanding the role of resources in innovation is important for further development of service science. In line with S-D logic's distinction between operant and operand resources, Maglio and Spohrer (2008) recognize four categories of resources in service systems: (1) resources with rights, (2) resources as property, (3) physical entities, and (4) socially constructed resources. Just as S-D logic focuses on the primacy of operant resources in value co-creation and the influence of institutions in service ecosystems, Spohrer and Maglio (2010, p. 159) also suggest that socially constructed resources are "increasingly important as a mechanism for value co-creation." In particular, the authors argue that symbols are a central feature of service systems, and processes of value co-creation often require the abilities of individual actors to "manipulate" or re-interpret symbols in service systems to develop new meanings, and ultimately new ways of creating value. This suggests that operant resources are not only important for cocreating value, but they are also the central resources in developing new ways for creating value (i.e., innovation).

S-D logic's emphasis on operant resources and systems of service exchange highlights the social processes that foster innovation, or institutional change (Vargo et al. 2015). The consideration of technology as an operant resource (Akaka and Vargo 2014) suggests that innovation is as a process for doing something, as well as an outcome of human action and interaction (Arthur 2009). In this view, innovation occurs, not only through the individual actions of humans (e.g., design), but also through the interaction among multiple actors and the recombination of practices and resources. This view of technological advancement falls in line with Arthur's (2009) notion of technology as an assemblage of practices and components as well as a means to fulfill a human purpose. It is important to note, however, that material artifacts remain an important component in many, if not all, technologies. When an artifact is institutionalized within a service system, it becomes a symbol (Spohrer and Maglio 2010), which represents particular practices and is associated with particular meanings.

Although S-D logic provides a framework for reconsidering value creation and service innovation, the nature and role of technology in service innovation has not been fully explored. Understanding the role of technology is important for understanding value co-creation and service innovation because it is one of the central components of service systems and a key driver of value co-creation and innovation. Thus, there is a need to further investigate the role of different types of resources in innovation in general and technology in particular. The following questions can help guide future research in investigating how particular resources and integration processes can influence innovation:

1. Does technology have agency within a service ecosystem?
2. How do resources "become" through innovation?
3. How are practices assembled to form new technologies?
4. Why does market innovation happen in some cases but not others?

28.6 Conclusion

The service ecosystems perspective presented highlights the importance of institutions in value cocreation and innovation. We argue that a service-ecosystems perspective helps to extend a service system view by emphasizing the role of institutions in shaping the integration of resources, such as people, organizations, technology and information and identifying institutionalization as a central process for the innovation. In this view, the underlying process by which different “types” of innovation occur is, ultimately, one and the same. More specifically, technological innovation can be conceptualized as the combinatorial evolution of useful knowledge, which is enabled and constrained by existing institutions and influenced by the ongoing negotiation and recombination of overlapping institutions (i.e., social technology). In other words, the development of a new technology includes a process of institutional maintenance, disruption and change (i.e., institutional work). This requires the integration of existing technologies with existing institutions and results in the development of new value propositions.

Along these lines, market innovation can be viewed as resulting in a broader institutionalization of new solutions. Both processes are driven by institutionalization but, whereas technological innovation results in the development of a new value proposition, market innovation results in the development of a new institutionalized solution. Furthermore, both processes are driven by the ongoing cocreation of value among multiple actors, within ecosystems of service exchange. Importantly, as new solutions become institutionalized they recursively contribute to the exchange of service and the cocreation of value. This emphasis on institutions in innovation contributes to the further advancement of service science and study of service systems by (1) broadening the overall innovation process to include the influence and change of institutions, and (2) extending the focus of innovation beyond technological advances to understanding social change. This broader perspective requires the consideration of institutional work and institutionalization, but also enables a deeper understanding of technological innovation, more specifically. Furthermore, this approach can inform business model innovation (Wieland et al. 2017), which is important for understanding how organizations can design compelling value propositions (Maglio and Spohrer 2013).

As institutions both enable and constrain the cooperation among resource-integrating actors in service ecosystems, they are critical to understanding and enabling economic growth. Through the inclusion of institutions and institutional arrangements in its narrative of value cocreation, S-D logic can provide managers and policy makers a practical perspective for viewing and understanding continuous and discontinuous innovation. A service ecosystem perspective sheds light on how discontinuous innovation, almost always leading to creative destruction, is heavily intertwined with de-institutionalization and reinstitutionalization (Vargo et al. 2015). It also shows that all types of actors are a part of the innovation process in a fundamentally similar way, but that different types of actors are often faced with at least somewhat different institutions and institutional arrangements (Wieland et al.

2016). Innovation is, therefore, not only the result of “producers” and “inventors,” but includes a much wider range of actors. This suggests that an institutionally informed service ecosystem perspective on innovation and other forms of the growth of human wellbeing needs more exploration and attention.

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