

Designing Institutional Complexity to Enable Innovation in Service Ecosystems

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Abstract

In this paper we build on a view of change and innovation stemming from institutional complexity in service ecosystems, that is, institutionally enabled and constrained systems of service systems, and give suggestions on how such conditions can be designed to facilitate innovation. We conceptualize service ecosystems as near-decomposable complex systems in which change is enabled through the co-existence of alternative, overlapping and conflicting institutionalized views on problems and solutions, and draw from social network theory to understand how such institutional complexity emerges both between and within actors in service systems. We then connect these theoretical insights with practice and give guidance on how institutional complexity can be created and how opportunities for interaction and collaboration between diverse and conflicting views on problems and solutions can be fostered.

1. Introduction

Large paradigmatic change – that of moving away from a mechanistic worldview towards a systemic worldview – currently characterizes sciences and society [1]. This ‘systems thinking’ entails thinking in terms of relationships, patterns and context, and fully embracing the interconnected and interdependent nature of the studied phenomena. This paradigm change, therefore, also suggests that the notion of innovation must be reconceptualized beyond the traditional research and development settings. Hence, understanding how innovation takes place in complex service systems and networks is a central research priority [2, 3]. Service science aims at the creation of such innovations, based on comprehensive scientific understanding of *service systems* that cuts across multiple academic disciplines [2, 4, 5]. The notion of service system – configuration of people, technologies, and other resources that interact with other service systems to create mutual value – builds on the service-dominant (S-D) logic worldview [6]. In addition to studying

innovation in service systems, S-D logic provides a framework for studying innovation in complex *service ecosystems*, that is, interrelated systems of service systems [7-9].

The service ecosystems view extends the notion of service systems by highlighting the role of *institutions* as the coordination mechanism in value cocreation [8, 10]. It is important to stress that institutions as understood in sociology, do not refer to firms, governmental agencies or any such organizations. Instead, institutions consist of formalized rules such as laws, less formalized norms including social expectations, values and moral codes that define appropriate behavior, as well as cultural beliefs and cognitive models, frames and schemas that encapsulate the taken-for-granted assumptions and beliefs fundamental to guiding social action in different situations [11]. Hence, institutions and institutional arrangements – sets of interrelated institutions – are the constitutive elements of service ecosystems that enable and constrain the way resources are integrated and value is cocreated and evaluated [7, 10]. As a result, the service ecosystems perspective portrays innovation not as a value proposition offered by one of the actors (e.g. a firm produced product), but as a broader institutional change in how value is cocreated among multiple actors [12, 13]. In other words, innovation is the change in the institutionalized and interrelated rules, norms, meanings and practices guiding value cocreation in service ecosystems. As an example, consider what Airbnb and Uber have recently done to reconfigure the lodging and transportation industries. They have not just introduced a new value proposition to an existing market, but radically changed the rules guiding value cocreation practices and enabled the introduction of new actors (private home/car owners) and resources (unused living space/motor vehicles) to solve the problems of finding temporal accommodation and transportation.

Theoretically, the challenge of explaining such a radical change in the way value is cocreated, is that on the one hand, actors in service ecosystems are

bound and constrained by shared institutions, but at the same time, are somehow able to change and re-construct the institutionally governed systems and ecosystems in which they (inter-) act. Giddens [14] suggests that actors produce and reproduce the institutionalized solutions in their situated practice. Hence, institutions can be perceived as having no existence outside human cognition and action, giving actors the possibility of changing the very ‘structures’ that govern them in mutual interaction. However, this relatively general formulation does not explain how actors construct service systems, and how specific actors gain the opportunity to ‘act otherwise’.

To this end, we seek to elaborate the theoretical basis of innovation as perceived through the lens of S-D logic and its service ecosystems perspective. We do so particularly by developing a view of innovation rooted in institutional complexity [15], to which social network theory, particularly Granovetter’s [16] and Burt’s [17] conceptualization of the dynamics of social ties, provide additional insights. By describing how actors tend to endogenously construct service ecosystems with near-decomposable structure [18] marked by the formation of areas or sub-systems characterized by dense interconnections (strong ties), which are separated by structural holes and then again linked with weak ties, and by exploring the opportunities that weak ties provide to actors spanning otherwise disconnected networks, the current paper explains how actors self-organize into systems characterized by institutional pluralism and complexity. This complexity is the source of potential tensions as different views of value and value creation contradict and call for reconciliation [19]. These complexities, emerging in the nexus of multiple denser system areas linked by weak ties, elevate actors’ conscious reflection [20], which, coupled with opportunities for agency warranted by actors’ structural position, provide opportunities for institutional change [15]. At the end of this paper, we connect this theoretical basis to practice in order to provide insights on how to design of institutional complexity in service systems to facilitate innovation.

2. Theoretical foundations: Service ecosystems perspective on innovation

Service-dominant (S-D) logic [7, 21-23] is best characterized as a transcending worldview originally aimed at overcoming the products versus services (or tangible versus intangible output) divide characterizing much of the current research. This was done by introducing the transcending notion of *service* that focuses on the process of serving rather than on a form of output [21, 22]. In S-D logic,

service is defined as the application of resources (such as knowledge and skills) for the benefit of another [21]. Furthermore, it is argued that service is always exchanged for service, either directly or indirectly. This means that actors apply their competences to provide service for others and reciprocally receive similar kind of service (others’ applied competences or ‘rights’ for future competences) in return. Conceptualized this way, service becomes the fundamental basis of all exchange, providing a common framework for understanding exchange and human interaction both in the ‘economic’ and ‘social’ spheres of life.

In addition, S-D logic is based on an understanding of the interwoven fabric of individuals and organizations, brought together into networks and societies, specializing in and exchanging service to create value at the context of their everyday lives [24, 25]. Hence, S-D logic views value as contextual and cocreated through service-for-service exchanges among multiple actors [7]. S-D logic can be seen as a part of the more general move away from a mechanistic to a systemic worldview [1] as it highlights the dynamic and complex nature of value cocreation by arguing that actors constantly apply and exchange their competences and integrate available resources from multiple sources for value cocreation [23]. This systemic view is encapsulated in the concept of *service ecosystems*, defined [7] as “relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange” (p. 161).

2.1. Service ecosystems as complex systems

Essentially, service ecosystems are complex systems. As one of the pioneer of systems thinking and complex systems, Simon [18] argues that in systems “the more complex arise out of combinatory play upon the simpler” (p. 165). The larger and richer the collection of building blocks that is available for construction of a system, the more elaborate are the structures that can be generated. A complex system is one made up of a large number of parts that interact in a non-simple way. In such systems, the whole is more than the sum of the parts, at least in the important pragmatic sense that, given the properties of the parts and the laws of their interaction, it is not a trivial matter to infer the properties of the whole [26]. In their dynamics, complex systems have the property of near-decomposability that greatly simplifies their behavior. According to Simon [26] near-decomposability implies that a complex system

comprises of a number of interconnected subsystems in such a way that elements within any particular subsystem interact much more vigorously and rapidly with each other than do elements belonging to different sub-system. In near-decomposable systems failures may be contained as local events, without disastrous system-wide consequences [18]. Yet, the system as a whole can cumulate the benefits of 'learning' over time, as the sub-systems are not completely decomposable.

The notion of near-decomposability simplifies the description of complex systems, such as service ecosystems, and makes it easier to understand how the information needed for the development or reproduction of such systems can be stored in reasonable compass. Simon [26] argues that near-decomposability is a pervasive feature of the architecture of the complex systems that we find in the world, both inorganic and organic, ranging from elementary particles to social systems. Hence, service ecosystems, resulting from reciprocal service exchanges between numerous actors, can also be seen as near-decomposable complex systems made up by numerous nested subsystems or service systems. This means that building on top of an individual resource-integrating actor are systems composed of interrelated actors, such as families, firms, industries and nations, themselves composed of many parts and, in turn, parts of still larger systems [27]. What is a whole system at one level is a part of a system at another level.

The service ecosystems perspective emphasizes the importance of institutions – shared rules, norms, values and beliefs, as well as shared language and technologies – and institutional arrangements – sets of interrelated institutions – as constitutive elements of service ecosystems [7, 8, 28]. Furthermore, the notion of institutions and institutional arrangements as the 'glue' and coordination elements in service ecosystems [7, 10] enable to 'decompose' service ecosystems from merely looking at them as actors and linkages between the actors, but to understanding ecosystems as complex collections of interrelated institutions, that is, institutional arrangements, that both provide the context for value cocreation as well as continually get reproduced as actors interact with each others through service-for-service exchanges.

2.2. Innovation as institutional change in service ecosystems

The transcending notion of service, combined with the institutional and systemic view embedded in the service ecosystems perspective, points toward a broader conceptualization of (service) innovation, not

as new products or services, but as change in how value is cocreate in service ecosystems through resource integration. Ultimately, this view suggests that innovation is driven by the collaborative efforts of various actors to find or develop new ways to cocreate value within service ecosystems by changing the institutional structure that enable and constrain their actions [13]. Hence the nature of innovation changes drastically from novel outputs to the process of de- and re-institutionalizing (new) value cocreation practices in a service ecosystem. Compared to the traditional views on innovation, the service ecosystems perspective not only removes the distinction between "producers" and "consumers" in value cocreation [23] and blurs the line between 'economic' and 'social' innovation [12], but also eradicates the distinction between "innovators" and "adopters" and argues that all actors participate in innovation with a fundamentally similar way by creating, maintaining and disrupting institutions [13].

The basic premise of institutional literature is that in social conduct, actors tend to institutionalize certain practices for solving problems, which together with the associated rules, values and meanings provide stability and meaning to social life [11]. With origins in understanding the formation and persistence of institutions, more recent research on institutions has sought to understand institutional change. Dacin and colleagues [29], for example, suggest that institutional change can proceed from the most micro interpersonal and sub-organizational levels to the macro-level of societies. It can take place in relatively brief and concentrated periods, or over time measured in decades or centuries. In other words, institutional change can take place incrementally, so that observers and participants are hardly aware of any change, or abruptly, in dramatic episodes that present large discontinuities with former patterns.

Actors who give meaning and life to institutions derive this diversity from exogenous sources and endogenous perceptions, interpretations, and enactments of institutional logics [29]. The observation that multiple institutional logics exist and compete for attention points to the importance of examining the institutional arenas or relational contexts wherein such contents get played out [30]. In these institutional arenas, such as organizational fields or industries, institutional change is traditionally portrayed as processes by which fields move from one "dominant" logic to another [19]. In other words, these 'field-level' studies display a periodic form of change, whereby a "jolt" [31] ushers in a new dominant logic, such disruptions effectively separating one relatively stable period of beliefs and

practices from another. Hence, for the most part, the assumption has been that any contradiction between logics is transitional with little suggestion of the possibility of ongoing complexity [19]. Recently, however, a number of scholars have begun to highlight the coexistence of multiple logics over extended periods of time [32-34], marking an increasing acknowledgement of the ongoing struggles to reconcile different institutions into arrangements conducive to improved forms of value creation. Even so, these recent treatments and discussions of the coexistence of logics have tended to be framed as competition between two logics, rather than inconsistencies between “constellations” or “arrangements”¹ of logics [35].

The S-D logic views institutions and institutional arrangements – sets of interrelated institutions – as constitutive elements of service ecosystems that enable and constrain resource integrating actors in the effort of cocreating value [7]. Drawing from institutional theory, the previous arguments point to the importance of institutional pluralism and complexity in explaining change and innovation in service ecosystems. Service ecosystems as complex and near-decomposable systems can be conceptualized as having multiple nested ‘levels’ or subsystems of context(s) composing from institutional arrangements that frame and guide actors in resource integration, service exchange and value cocreation [18, 24, 27, 28]. In other words, the service ecosystems perspective emphasizes the multidimensionality of institutional arrangements and illustrates the embeddedness of simple micro-level actions and interactions within more complex meso- and macro-level systems and structures [36]. Value co-creation in service ecosystems is, therefore, framed by multidimensional institutional context(s) that bring forth institutional complexity [24, 28].

Institutional complexity in service ecosystems is in continual flux, meaning that over time it unfolds, unravels and re-forms, creating different circumstances to which resource-integrating actors must respond [19]. Hence, the consequence of institutional complexity is that actors often encounter situations in which many institutions and institutional arrangements offer contradicting and conflicting interpretations and prescriptions for action [15, 20]. The intersecting and overlapping institutions can, for example, create conflicting views on what value is, and how the ‘resourceness’ of resources is perceived [13, 28]. These conflicts and contradictions in

institutional arrangements are the sources of choice, synthesis and change [20, 37] and can be seen as prerequisites of innovation [15].

While extant research has highlighted the presence of multiple institutions and institutional arrangements, it suggests that future research should delve deeper into the dynamic patterns of complexity that confront actors, arising from the multiplicity of institutional arrangements to which actors must respond, and the degree of incompatibility between them. Hence, current research lacks insight into the formation of opportunity and actors’ resourcefulness in initiating and promoting change as a result of institutional complexity and how such institutional complexity can be designed in service ecosystems. Specifically, this literature inadequately considers the basis of opportunity and agency for actors in the nexus of multi-layered institutional context that both pre-exists and emerges through the relational ties between actors and systems of actors. We argue that these questions are essential for clarifying the relationship between ecosystems, institutional arrangements and actors, and the dynamics of value co-creation within service ecosystems characterized by institutional complexity. In effort to extend the service ecosystems perspective on innovation, we draw from social network theory. In the following, we synthesize insights from the notions of strong and weak ties and structural wholes, to better understand how institutional complexity exists and emerges in service ecosystems as the resource-integrating actors interact with each other through service exchanges and simultaneously connect multiple institutions and institutional arrangements enabling and constraining value cocreation.

3. The emergence of institutional complexity in service ecosystems – Insights from social network theory

Drawing on social network theory, we argue that the emergence of institutional complexity in service ecosystems can be viewed from two intertwined perspectives. On the one hand institutional complexity emerges between actors and different social groups and can be explored by studying how actors are connected with each other with varying levels of interaction. On the other hand, due to the multiplexity of social connections and roles a single individual actor has, institutional complexity emerges also within an individual actor as he/she has the access to multiple institutional arrangements and the roles and scripts embedded in them that give

¹ We prefer to use the term institutional arrangement referring to sets or assemblages of interrelated institutions, that is, institutionalized practices, norms, rules, meanings etc.

potentially contradicting prescriptions for action and sense making in specific situations.

3.1. Complexity of connections between actors

A stream of research that strongly correlates with institutionalization and the dynamic nature of institutional complexity in service ecosystems is Granovetter's [16, 38, 39] work on social 'ties' and their varying strengths in social networks. To bridge micro-level interactions with macro-level patterns, Granovetter [16] focused on interpersonal social network as "it is through these networks that small-scale interaction becomes translated into large-scale patterns, and that these, in turn, feedback into small groups" (p. 1360). In his analysis Granovetter especially focuses on the "strength" of an interpersonal tie that he defines as "a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (ibid., p. 1361). Hence, the stronger the tie connecting two individuals, the more similar they are. In other words, if strong ties connect A to B and A to C, both C and B, being similar to A, are probably similar to one another, increasing the likelihood of a friendship once they have met [16, 38]. Applied in reverse, these two factors – time and similarity – indicate why weaker A-B and A-C ties make a C-B tie less likely than strong ones as C and B are less likely to interact with each other and less likely to be compatible, if they do interact with one another. In his work, Granovetter also distinguished between weak ties that might exist within a social group and bridging weak ties that connect otherwise separate social groups together – arguing for the importance of the latter in connecting actors even more significantly different from one another.

This suggests that indirect and therefore, dissimilar contacts are thus typically reached through ties in the 'weak sector', making weak ties the channels through which ideas, influences, or information socially distant from an actor may reach him/her. Hence, the fewer weak ties and indirect contacts an actor has, the more encapsulated he will be in knowledge of his own 'friendship' circle. Equally, information can reach a larger number of people, and traverse greater social distance when passed through weak rather than strong ties [16, 40]. Hence, though making individuals similar within a group, the absence of weak ties creates fragmentariness between groups of actors and makes the diffusion of new knowledge and ideas difficult, as opportunities for such diffusion are non-existing.

Through Granovetter's work it is possible to see how the "strength" of ties between resource integrating actors is essential in explaining institutional complexity that exists in service ecosystems, as well as the incompatibility between institutional arrangements of actors lacking bridging weak ties between them. Actors that interact frequently with each other in service ecosystems build stronger ties and are/become similar also in terms of the institutions and institutional arrangements they share. At the same time, weak ties in service ecosystems result in connections between different kinds of institutional arrangements, as the actors connected with each other through weak ties are more likely members of different social groups and have dissimilarity in their respective institutional arrangements. Contrary to communities tied together by strong ties, such as families or tight organizations, examples of actors connected through weak ties include people working together over national, cultural, and corporate boundaries. In addition, bridging weak ties are more likely to connect individuals who are significantly different from another and for this reason lead to complex role sets and the need for cognitive flexibility [38], that is, the capability to reconcile between conflicting institutions and institutional arrangements and bringing forth opportunities for broader institutional changes and innovation.

Whereas Granovetter [16, 40] focuses on how actors belonging in separate networks/social groups are connected via bridging weak ties, Burt [17] examines how they are disconnected and how actors can strategically use such disconnects for their advantage through the mechanism of 'brokerage'. According to Burt, contacts are redundant to the extent that they lead to the same people. In Granovetter's terms, strong ties make contacts more likely redundant. Non-redundant contacts, on the other hand, signify 'structural holes', or the absence of ties between actors. In other words, non-redundant contacts are disconnected in some way. Hence, weak ties are essential to the flow of information that integrates otherwise disconnected social structures into a broader society [17].

Essential to the notion of structural holes is the mechanism of brokerage, which concerns the position of an actor across a structural hole, that is, between two otherwise disconnected groups of actors. Because of this disconnect, the broker gains information from one party or side of the network before the actors on the other side, and is able to leverage this information asymmetry for controlling the other party in a manner beneficial to the broker. Hence, the notion of structural holes signifies the

structure-deriving opportunities for individual actors to benefit from the disconnection between actors and tighter networks.

Besides Burt's view of brokerage as 'the third who enjoys' (*tertius gauden*), research has identified the non-interfering conduit and 'the third who connects' (*tertius iungen*) as alternative orientations to brokerage [41]. Combined, these three orientations resonate well with S-D logic perspective as they enable a view of actors having the opportunity to influence change in service ecosystems by 'brokering' between other actors and the disconnected parts of the service ecosystems. Resting on institutional literature, the broker has several alternative institutional arrangements available to him/her and is therefore less affected by the constraining pressures of only one social group and the related institutional arrangement.

Combining these insights with the notion of 'near-decomposability' of service ecosystems implies that subsystems within service ecosystems are simultaneously both partially independent and interdependent due to the difference in ties strengths and the existence of structural holes. The partial independency of subsystems, collections of actors and institutional arrangements, within service ecosystems can help to explain institutional complexity – the coexistence of multiple institutional arrangements – as the elements within any particular subsystem interact much more vigorously and rapidly with each other than do elements belonging to different subsystem. Hence, subsystems are characterized by 'strong ties', which makes actors and their institutional arrangements belonging to a same subsystem to be more similar than actors and their institutional arrangements belonging to a different subsystem. The partial interdependency of subsystems, that is, the existence of weak ties or 'brokers' of structural holes between subsystems, on the other hand, explain how different and possible incompatible institutional arrangements can interact/conflict with one another and how institutional complexity, enabling change and innovation, emerges in service ecosystems. In other words, institutional transformations occur in service ecosystems due to institutional complexity that emerges as a consequence of near-decomposability of service ecosystems, that is, varying density of interaction and 'strength' of ties between the parts or subsystems of the service ecosystem(s).

3.2. Multiplexity of roles

While insightful, both Granovetter and Burt have assumed as the basis of their models the assumption

that actors at a single point of time have only one network position or role, and one type of tie connecting them to other actors. This is often the case in service system research as well – actors are perceived to perform one function within the system of interrelated and dynamically interacting resources aimed at the achievement of a particular task or solution. The service ecosystems perspective, on the other hand, builds on the generic actor-to-actor (A2A) conceptualization of S-D logic and implies a more complex view on actors, roles sets and linkages between the actors [23]. The basic notion of the A2A conceptualization is that actors, that are involved in a dynamic, reciprocal market activity, do not fit neatly into categorical roles (such as consumers and producers) with the clearly separated motives, needs, and desires, usually assigned to them [23]. Instead, resource-integrating actors enact multiple roles simultaneously. Similarly, Padgett and Powell [42] argue that individuals are complicated role ensembles such as "businessman-farther-politician", having goals that are influenced by all the different roles. Hence, to further understand institutional complexity in service ecosystems, it is important to highlight that actors are simultaneously members of multiple social groups or subsystems in which they enact different roles guided by different institutional arrangements.

Hence, actors, the connections among the actors, and their respective institutional arrangements must be considered with an eye on multiplexity, that is, the multi-level view of ties of varying strength and 'content'. In other words, actors may be acquaintances in one context but lack a 'tie' in another, depending on the 'selective blindness of the researcher' [41]. For example, it is possible that in some dimension a structural hole exists between actors who know each other in a specific context but not in other contexts (e.g. work colleagues that do not socialize outside the work setting). Hence, the dynamic evolution of networks rests on actors' complex roles sets, multiplex relationships and the 'net sum' of these determining the ability of actors to engage in innovation, for example [43].

From an institutional perspective, multiplexity appears as actors' capability to operate within and possess intricate knowledge of multiple institutional arrangements at the same time. Resting on Granovetter's insights [16, 40] as well as recent theorizing on institutions [37], this happens as actors identify with the collective identity of a social group resting on a particular set of institutionalized assumptions, values and beliefs. As implied in the previous, actors are not only bound to one group but develop their own identity with respect to multiple groups as they interact in them [44] – as stated by

Granovetter, the more frequently actors interact, the more they become alike [16]. As a result of this process, service ecosystems are constituted into a multi-level sub-system structure characterized by near-decomposability and varying strength of ties.

Thus, to expand the view of weak ties and brokerage, we need to embrace the fact that actors simultaneously belong to multiple social groups, and continually enact various roles. As a result, the ties between actors exist on multiple layers depending on the ‘content’ and context of the relationship (i.e., tie multiplexity), with the possibility of two actors being connected by strong ties in one context, and a structural hole in another [43]. This multi-layered view also points toward the plentiful opportunities for brokerage.

4. Enabling innovation by designing institutional complexity in service systems

Combining these theoretical insights into practice, our paper enables the formulation of a two preliminary ‘principles’ for designing service systems conducive to innovation. By combining the multi-actor, dynamic, and institutionally embedded view of S-D logic with the insights from social network literature and the complexity-based view of innovation, it appears that fostering institutional complexity is a crucial design parameter in the (re-) construction of service systems. To this end, the following provides an outline for ‘designing for complexity’.

4.1. Foster opportunities for institutional complexity to emerge and prosper in service systems

Service systems arguably benefit from clearly specified relations among actors, technology and other resources. However, the extent to which all actions and actors’ roles are formally specified involves a consideration of not only the efficiency and effectiveness of the service system, but also its ability to renew and innovate. Hence, in addition to alignment, standardization and regularity, a service system aiming at innovating solutions for value coreation must, by nature, contain ambiguity, diversity and overlap in institutional arrangements guiding actors’ thinking and acting. This institutional complexity introduces multiple perspectives to be considered and provides actors with latitude for seeking new solutions. In a similar vein, Ashby [45], with his concept of requisite variety argues that the

system must be designed to include as much complexity as exists in its environment.

In more concrete terms, the diversity or complexity inside an organization or a broader service system depends on the availability and interaction of actors with diverse backgrounds and multiple worldviews. By hiring or otherwise engaging people with different educational backgrounds, roles, expertise, job histories, ethnicity and nationality, service systems are able to build the potential complexity within them to allow new conceptualizations of both problems and solutions to emerge.

This complexity can, however, be dampened by forcing actors into too narrow roles with strict predefined scripts for action, as innovation depends on actors’ ability to change the existing roles sets and prescriptions for action as they identify and seize opportunities of reconciling and synthesizing between alternative and potentially contradicting institutions as conflicts between them arise. Moreover, as Granovetter suggests, actors interacting more frequently tend to become alike. Hence, the preservation of complexity requires changing roles among actors, reorganization as well as employee turnover, which ensures the availability of fresh ideas.

Inside the service system, the notion of near-decomposability suggests that by ‘breaking’ actors into smaller groups that work intensively together within the groups, while simultaneously allowing chances for occasional interaction between the groups, the service system structures provide opportunity for both exploiting current knowledge and exploring new solutions [46]. Rather than the size of these sub-groups, an important factor for innovation may be the extent to which actors within different sub-systems are encouraged and enabled to simultaneously both perform their roles and develop the solutions they work with [47]. In other words, near-decomposability may be leveraged best when sub-units vigorously both ‘produce’ and innovate, each sub-units constantly building off of each others’ contributions but also seeking internally for better ways of solving problems.

4.2. Enable interaction and collaboration between diverse and conflicting views on problems and solutions

At the sub-unit level, this ambidextrous orientation likely requires cross-functional teams often perceived in the innovation literature as a prerequisite for innovation. While their benefits are clear, it is also necessary for the system to provide a

common framework within which the diverse individuals act. As Farjoun [48] suggests, innovation depends both on stability and variance as certain enabling and shared structures are necessary as platforms for experimenting with new solutions. Hence, it is vital for any service system to support collaboration among diverse actors so as to enable them to arrive at useful outcomes. Literature suggests common goals are powerful means for aligning interests [49], which enable the members to transcend their differences in search for a solution to the common problem.

However, the common basis extends beyond common goals to the domain of institutions described in more detail throughout this paper. Firstly, this involves the existence of common language, which embodies a shared practical understanding without which the integration of knowledge into new solutions is difficult [50, 51]. While its formation takes time and interaction between actors [16], it may also be facilitated by ‘boundary actors’ or brokers who possess intricate knowledge and master the language of multiple communities, and can thus facilitate between different sub-groups [52]. Literature also reports organizations that have developed ‘trading zones’ in which actors, possessing shared language and knowledge to an adequate degree, are able to interact and formulate new solutions collaboratively [53]. These insights point to the importance of designing efficient boundary spaces and broker roles in the service system so as to facilitate knowledge transfer and innovation.

In practice, the formation of shared knowledge and language may require for example job rotation in which actors are moved regularly from one sub-unit to another in order to learn new practices and knowledge embedded in the routines and institutions of different groups. As a result, these actors also form social ties to members of multiple sub-groups, becoming brokers between multiple actors and thus particularly important for innovation [54].

Hence, while the service system may benefit from the sub-unit structure, it also needs brokers or boundary spanners to be able to leverage insights from different parts of the system for innovation. Obstfeld [54] shows that such boundary spanners are more likely those socially rather than technologically competent, underscoring the need in service system design for individuals with good social skills able to bring previously disconnected actors together to innovate on a particular problem. Besides the socially skilled people, increasingly complex service systems also require in increasing numbers the so-called T-shaped people, who possess adequate technological knowledge spanning multiple areas, with one very

deep area of specialization in the context of which (s)he is able to integrate available knowledge into new (very specific) solutions [55].

5. Conclusion

Previous research in the service ecosystems perspective to innovation emphasizes that the maintenance, disruption, and change of institutions (i.e., institutionalization) is always a cocreational process in which actors try to resolve the nested contradictions and inconsistencies that are foundational to institutional arrangements [13, 15]. In this paper, we have explored this view further based on social network literature and systems theory, which align with the existing view as well as offer new insights to the emergence and dynamics of institutional complexity inherent to service ecosystems.

More specifically, we argue for a pluralistic, multi-level view of service ecosystems in which actors are simultaneously embedded in multiple contexts and group of actors. As they interact more frequently with specific groups, they come to share the norms, values and beliefs – that is, institutions – with these actors, hence becoming more alike. Fewer ties between different groups or sub-systems mark the existence of weak ties, which give boundary-spanning actors opportunity to integrate information from disconnected groups, creating opportunities for innovation. As a result, innovation more likely emerges at the boundaries of service systems, as the boundary-spanning actors must reconcile multiple incompatible institutions so as to provide new solutions.

This theoretical view provides understanding of how the macro-level of service ecosystems, with its near-decomposable structure, emerges from the micro-level interactions and exchanges among actors, also providing the context(s) within which the micro-level interaction is framed [7, 24]. While multiple levels and layers of institutional arrangements potentially influence value cocreation, actors – by connecting with each other in particular contexts – take on specific roles, norms and scripts associated with that context. In the presence of contradictory prescriptions for action, they collaboratively formulate situated solutions – innovate – which carries the potential for system-level change in the value cocreation practices.

This theoretical model rooted in the service ecosystems view of S-D logic provide the basis for proposing preliminary design ‘principles’ for service systems, particularly considering the innovativeness

of service systems. To our view, service system design should seek to create and foster opportunities for institutional complexity to emerge and prosper in the service system, involving a consideration of the delicate balance between providing common guiding structure and enabling different kinds of actors to envision and implement situated solutions seeding innovation. In addition, we consider important that service system design enables collaboration among diverse and conflicting views at the micro level, taking into consideration the situated and enacted character of knowledge requiring boundary actors to facilitate interaction and exchange between specialized sub-units.

References

- [1] Capra, F. and P.L. Luisi, *The Systems View of Life: A Unifying Vision*. Cambridge University Press, New York, NY, 2014
- [2] Maglio, P.P. and J. Spohrer, "Fundamentals of service science", *Journal of the Academy of Marketing Science*, 2008, 36(1), pp. 18-20.
- [3] Ostrom, A.L., A. Parasuraman, D.E. Bowen, L. Patricio, C.A. Voss, and K. Lemon, "Service Research Priorities in a Rapidly Changing Context", *Journal of Service Research*, 2015, 18(2), pp. 127-159.
- [4] Spohrer, J. and P.P. Maglio, "The Emergence of Service Science: Toward Systematic Service Innovations to Accelerate Co-Creation of Value", *Production and Operations Management*, 2008, 17(3), pp. 238-246.
- [5] Chesbrough, H., "Toward a science of services", *Harvard Business Review*, 2005, 83(2), pp. 16-17.
- [6] Maglio, P.P., S.L. Vargo, N. Caswell, and J. Spohrer, "The service system is the basic abstraction of service science", *Information Systems and e-Business Management*, 2009, 7(4), pp. 395-406.
- [7] Lusch, R.F. and S.L. Vargo, *Service-Dominant Logic: Premises, Perspectives and Possibilities*. Cambridge University Press, Cambridge, MA, 2014
- [8] Vargo, S.L. and M.A. Akaka, "Value Cocreation and Service Systems (Re)Formation: A Service Ecosystems View", *Service Science*, 2012, 4(3), pp. 207-217.
- [9] Vargo, S.L., R.F. Lusch, and M.A. Akaka, "Advancing service science with service-dominant logic", in *Handbook of Service Science*, P.P. Maglio, J.A. Kieliszewski, and J.C. Spohrer, Editors, Springer, New York, NY, 2010, pp. 133-156.
- [10] Edvardsson, B., M. Kleinaltenkamp, B. Tronvoll, P. McHugh, and C. Windahl, "Institutional logics matter when coordinating resource integration", *Marketing Theory*, 2014, 14(3), pp. 291-309.
- [11] Scott, W.R., "Institutions and Organizations: Ideas, Interests and Identities". 4 ed., Sage, Thousand Oaks, CA, 2014
- [12] Koskela-Huotari, K., J. Siltalo, and S.L. Vargo, "Transcending the division of 'economic' and 'social' innovation", *Proceedings of the 24th International RESER Conference*, 2014, pp. 761-768.
- [13] Vargo, S.L., H. Wieland, and M.A. Akaka, "Innovation through institutionalization: A service ecosystems perspective", *Industrial Marketing Management*, 2015, 44(1), pp. 63-72.
- [14] Giddens, A., *The Constitution of Society*. Polity Press, Cambridge, 1984
- [15] Siltalo, J., K. Koskela-Huotari, and S.L. Vargo, "Institutional pluralism as a driver for innovation", *Proceedings of the 24th International RESER Conference*, 2014, pp. 1265-1274.
- [16] Granovetter, M.S., "The strength of weak ties", *American Journal of Sociology*, 1973, 78(6), pp. 1360-1380.
- [17] Burt, R.S., *Structural Holes: The Social Structure of Competition*. Harvard University Press, Cambridge, MA, 1992
- [18] Simon, H.A., *The Sciences of the Artificial*. Third ed., MIT Press, Cambridge, 1996
- [19] Greenwood, R., M. Raynard, F. Kodeih, E.R. Micelotta, and M. Lounsbury, "Institutional Complexity and Organizational Responses", *The Academy of Management Annals*, 2011, 5(1), pp. 317-371.
- [20] Seo, M.-G. and W.E.D. Creed, "Institutional contradictions, praxis, and institutional change: A dialectical perspective", *Academy of Management Review*, 2002, 27(2), pp. 222-247.
- [21] Vargo, S.L. and R.F. Lusch, "Evolving to a new dominant logic for marketing", *Journal of Marketing*, 2004, 69(January), pp. 1-17.
- [22] Vargo, S.L. and R.F. Lusch, "Service-dominant logic: continuing the evolution", *Journal of the Academy of Marketing Science*, 2008, 36(1), pp. 1-10.
- [23] Vargo, S.L. and R.F. Lusch, "It's all B2B...and beyond: Toward a systems perspective of the market", *Industrial Marketing Management*, 2011, 40(2), pp. 181-187.
- [24] Chandler, J.D. and S.L. Vargo, "Contextualization and value-in-context: How context frames exchange", *Marketing Theory*, 2011, 11(1), pp. 35-49.
- [25] Lusch, R.F., S.L. Vargo, and M. O'Brien, "Competing through service: Insights from service-dominant logic", *Journal of Retailing*, 2007, 83(1), pp. 5-18.
- [26] Simon, H.A., "The architecture of complexity", *Proceedings of the American Philosophical Society*, 1962, 106, pp. 467-482.
- [27] Ostrom, E., *Understanding Institutional Diversity*. Princeton University Press, Princeton, NJ, 2005
- [28] Koskela-Huotari, K. and S.L. Vargo, "Institutions as the resource context", *Journal of Service Theory and Practice*, *forthcoming*.
- [29] Dacin, M.T., J. Goodstein, and W.R. Scott, "Institutional theory and institutional change: Introduction to the special research forum", *Academy of Management Journal*, 2002, 45(1), pp. 43-56.
- [30] Friedland, R. and R.R. Alford, "Bringing society back in: Symbols, practices, and institutional contradictions", in *The New Institutionalism in Organizational Analysis*, W.W. Powell and P.J. DiMaggio, Editors, The University of Chicago Press, Chicago, 1991, pp. 232-263.

- [31] Meyer, A.D., "Adapting to environmental jolts", *Administrative Science Quarterly*, 1982, 27(4), pp. 515-537.
- [32] Dunn, M.B. and C. Jones, "Institutional logics and institutional pluralism: The contestation of care and science logics in medical education", 1957-2005, *Administrative Science Quarterly*, 2010, 55(1), pp. 114-149.
- [33] Jarzabkowski, P., J. Matthiesen, and A.H. van de Ven, "Doing which work? A practice approach to institutional pluralism", in *Institutional Work: Actors and Agency in Institutional Studies of Organizations*, T.B. Lawrence, R. Suddaby, and B. Leca, Editors, Cambridge University Press, Cambridge, UK, 2009, pp. 284-316.
- [34] Reay, T. and C.R. Hinings, "Managing the Rivalry of Competing Institutional Logics", *Organization Studies*, 2009, 30(6), pp. 629-652.
- [35] Goodrick, E. and T. Reay, "Constellations of Institutional Logics: Changes in the Professional Work of Pharmacists", *Work and Occupations*, 2011, 38(3), pp. 372-416.
- [36] Akaka, M.A., S.L. Vargo, and R.F. Lusch, "The complexity of context: A service ecosystems approach for international marketing", *Journal of Marketing Research*, 2013, 21(4), pp. 1-20.
- [37] Thornton, P.H., W. Ocasio, and M. Lounsbury, *The Institutional Logics Perspective: A New Approach to Culture, Structure, and Process*. Oxford University Press, New York, MA, 2012.
- [38] Granovetter, M., "The strength of weak ties: A network theory revisited", *Sociological Theory*, 1983, 1(1), pp. 201-233.
- [39] Granovetter, M., "The impact of social structure on economic outcomes", *Journal of Economic Perspectives*, 2005, 19(1), pp. 33-50.
- [40] Granovetter, M.S., "Economic action and social structure: The problem of embeddedness", *American Journal of Sociology*, 1985, 91(3), pp. 481-510.
- [41] Obstfeld, D., S.P. Borgatti, and J.P. Davis, "Brokerage as a process: Decoupling third party action from social network structure", in *Contemporary Perspectives on Organizational Social Networks*, S.P. Borgatti, et al., Editors, Emerald Group Publishing, Cambridge, MA, 2014, pp. 135-159.
- [42] Padgett, J.F. and W.W. Powell, *The Emergence of Organizations and Markets*. Princeton University Press, Princeton, NJ, 2012.
- [43] Shipilov, A.V. and S.X. Li, "The Missing Link: The Effect of Customers on the Formation of Relationships Among Producers in the Multiplex Triads", *Organization Science*, 2012, 23(2), pp. 472-491.
- [44] Holland, D., W. Lachiotte, D. Skinner, and C. Cain, *Identity and Agency in Cultural Worlds*. Harvard University Press, Cambridge, MA, 1998.
- [45] Ashby, W.R., *An introduction to cybernetics*. Chapman & Hall, London, 1956.
- [46] March, J.G., "Exploration and exploitation in organizational learning", *Organization Science*, 1991, 2(1), pp. 71-87.
- [47] Simsek, Z., "Organizational Ambidexterity: Towards a Multilevel Understanding", *Journal of Management Studies*, 2009, 46(4), pp. 597-624.
- [48] Farjoun, M., "Beyond dualism: Stability and change as a duality", *Academy of Management Review*, 2010, 25(2), pp. 202-225.
- [49] Vican, S. and K. Pernell-Gallagher, "Instantiation of institutional logics: The "business case" for diversity and the prevalence of diversity mentoring practices", in *Institutional Logics in Action, Part B*, M. Lounsbury and E. Boxenbaum, Editors, Emerald, 2013, pp. 233-273.
- [50] Carlile, P.R., "A pragmatic view of knowledge and boundaries: Boundary objects in new product development", *Organization Science*, 2002, 13(4), pp. 442-455.
- [51] Brown, J.S. and P. Duguid, "Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovation", *Organization Science*, 1991, 2(1), pp. 40-57.
- [52] O'Mahony, S. and B.A. Bechky, "Boundary organizations: Enabling collaboration among unexpected allies", *Administrative Science Quarterly*, 2008, 53(3), pp. 422-459.
- [53] Kellogg, K.C., W.J. Orlikowski, and J. Yates, "Life in the Trading Zone: Structuring Coordination Across Boundaries in Postbureaucratic Organizations", *Organization Science*, 2006, 17(1), pp. 22-44.
- [54] Obstfeld, D., "Social networks, the tertius iungens orientation, and involvement in innovation", *Administrative Science Quarterly*, 2005, 50(1), pp. 100-130.
- [55] Barile, S., G. Franco, G. Nota, and M. Saviano, "Structure and Dynamics of a "T-Shaped" Knowledge: From Individuals to Cooperating Communities of Practice", *Service Science*, 2012, 4(2), pp. 161-180.