Consumer perceptions of service constellations:

Implications for service innovation

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Abstract

Purpose – Consumers increasingly experience and value services as elements of a larger constellation of mutually facilitating, complementary, and supporting services. A service constellation is a combination of multiple interdependent services – often produced by multiple specialized service providers – that offer consumers complementary value and synergetic benefits. The service innovation literature and service managers have been slow to acknowledge that the value created by a service should be viewed as being interdependent on other services. In this work, we investigate how the service constellation perspective affects innovation strategies and potentially contributes to the innovation literature, proposing a research agenda.

Design/methodology – By analyzing the notion of a service constellation, we provide an overview of major implications for service innovation research and practice. Three illustrative examples serve as anecdotal evidence. By identifying institutional, epistemological, and managerial differences, we contrast the service constellation approach with a traditional approach and describe a paradigm shift in service management. We outline consequences for service innovation.

Findings – Firms and service innovation researchers need to focus on the perceived consumer value of the constellation rather than on individual services. We illustrate how service innovation from the constellation perspective requires coordination and synchronization between projects and different approaches to portfolio management and screening.

Research limitations/implications – Adoption of the service constellation perspective creates new opportunities. New ways of creating value are highlighted that would not surface when focusing on individual services in isolation: new value propositions may result not only from conceptualizing and developing individual new

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services, but also from developing a new service constellation without altering

individual services.

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Introduction

In the marketing literature, the creation of value is regarded as the core objective of economic exchange (Woodruff, 1997): firms offer value propositions in the form of services[7], and consumers experience value when they use these services (Vargo and Lusch, 2004). What is less explicitly established in the literature is that, in many cases, the value a consumer associates with using one service – the focal service – depends on the value that can be derived from using other services that somehow complement, facilitate, or support that focal service. Moreover, when seeking particular types of value, consumers are increasingly buying into constellations of services rather than considering isolated services (Jüttner and Wehrli, 1994). Even when consumers consider buying and using a single service, they (implicitly or explicitly) take into account the actual or future existence of other services that (positively or negatively) affect the value of what they, at that point in time, consider to be the focal service. For example, consumers value an Apple iPad or a Google Nexus partly for their hardware and operating systems, but also (if not mainly) for the thousands of other services that are offered by third party application providers that make the hardware and operating systems valuable. As another example, a tourist derives more value from a city trip when more effective transportation and ticketing services allow her to spend more time in museums, a review service facilitates the prioritization of the attractions in those museums, or a booking system supports her ability to find lodging. Thus, the value of an individual service or service offering in a service constellation is potentially larger than the value of that service in isolation, and the constellation adds value to the individual services just as the services add value to the constellation (Cf., Larivière *et al.*, 2013).

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[7] In line with the service-dominant logic (Vargo and Lusch 2004), we use the term 'service' to refer to both tangible and intangible products.

The insight that a product's value to a consumer may depend on the simultaneous purchase or use of other products is not completely new. For example, research on bundling (e.g., Stremersch and Tellis, 2002) suggests that the sale of two or more separate (though often related and complementary) products in one package can create added value; that is, the combination of products can make the bundle more attractive than the two products separately. This stream of literature has focused on determining when to bundle (and when not to) and how to price (un-) bundled products or services. However, this literature focuses mainly on monetary value. The notion that a constellation of interdependent services may call for specific consideration with respect to the value of the service in use has not been widely adopted in most business domains, including the domain of service innovation, and an exclusive focus on developing and evaluating individual services in isolation still dominates management and marketing journals as well as managerial practices.

In this article, we argue that taking a service constellation perspective has far-reaching consequences for the service innovation process, from the idea stage through the screening, new service development, and launch phases (Calantone and Di Benedetto, 1988; Cooper, 1992). Many of these consequences have not yet been investigated or discussed in detail in the service innovation literature. Although adopting the concept of service constellations makes service innovation decision-making more complex than focusing on the development of individual services in isolation, this approach also takes the consumer perspective more seriously and thus makes organizations more market-oriented (Cooper and Kleinschmidt, 1993; Langerak *et al.*, 2004; Narver *et al.*, 2004). From a service constellation perspective, optimal value propositions may require early and far-reaching cooperation with other stakeholders because few service providers have the capabilities to offer "one-stop-

shopping solutions" to consumers on their own (Pagani and Fine, 2008). Complexity

is also apparent when realizing that changes or improvements to an individual service

may have consequences for the value-creation potential of other services (cf., Cooper

et al., 1999; McNally *et al.*, 2009; Schilling and Hill, 1998). That is, adapting one

service may in fact require other services to be adapted as well, or may even make

other services redundant. The service constellation perspective may also create new

opportunities in the sense that it highlights new ways of creating value that would not

surface when focusing on individual services: new value propositions could be

generated not only by conceptualizing and developing individual new services, but

also by developing new service constellations without necessarily altering any

individual services. In other words, mastering the complexity of service constellations

creates the potential to generate additional value.

Although it seems clear that the service constellation perspective has far-

reaching consequences for service innovation research and practice and may even

lead to a paradigm shift, its precise effects are less clear. This article develops a

research agenda that proposes to investigate and clarify these consequences and

should be regarded as a first step in this direction. We aim to provide an analysis of

the concept of a service constellation as well as an overview of the most important

implications for service innovation research and practice.

The remainder of the article is structured as follows. First, we explain what we

mean by service constellations and how they relate to service systems or ecosystems.

This conceptualization is followed by three examples illustrating the importance of

focusing on service constellations rather than individual services. We then compare

the service constellation perspective with the traditional focus on individual services

in isolation. Next, we discuss service innovation from the service constellation

perspective. We conclude by providing initial ideas for a research agenda on service constellation research and indicating the major management implications of this new perspective.

Service constellations

We define and explain service constellations as the combination of multiple interdependent services that provide complementary value to consumers (Cf., Jüttner and Wehrli, 1994; Normann and Ramirez, 1993). We explicitly distinguish service constellations from service (eco) systems (e.g., Adner, 2006) or value nets (Brandenburger and Nalebuff, 1996). Service constellations focus on the objects (services) that consumers value, buy, and use, whereas ecosystems (e.g., Adner, 2006; Adner and Kapoor, 2010) refer to the system of actors involved in delivering these services and the relationships (norms, etc.) between them. Similarly, value nets refer to the set of players in a business that add or remove value from the services an organization offers to the customer (Brandenburger and Nalebuff, 1996). Well-known examples of ecosystems[8] include the communities of technology and service providers around Apple, Google, and Microsoft. The concept of an ecosystem is often used to demonstrate the interdependence of various actors in an industry (Adner, 2006; Hannan and Freeman, 1977) and to investigate how competition occurs between ecosystems rather than between individual actors (Iansiti and Levien, 2004). The concept of a value constellation has also been used to focus on a network of actors, although this concept takes the role of the customer into account more explicitly (Jüttner and Wehrli, 1994; Normann and Ramirez, 1993).

A major benefit of the service constellation approach to innovation is that it underlines the importance of focusing on the consumer perspective: consumers buy

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[8] We use the term system to denote all concepts (including value nets and value constellations) that refer to the actors rather than the service.

services because of their value-in-use (Sandström *et al.*, 2008). In other words, whereas the ecosystem approach takes a more economic and organizational perspective on service industries (how service creates value for organizations), the service constellation approach focuses more on the consumer perspective on service (how consumers experience and value service). We do not suggest that one approach is better than the other. Rather, we suggest that they complement each other. Ultimately, one or more actors playing one or more roles deliver every service within a service constellation. We thus suggest that service innovation management should incorporate two layers: (1) service constellations, as the carriers of systemic value to consumers, and (2) service (eco) systems, as the multi-actor arrangements that produce service constellations (see Figure 1).

Please Insert Figure 1 Here

Three illustrative examples

We intend to demonstrate why it is important for service developers to adopt the service constellation perspective rather than focusing on individual isolated services through three illustrative examples. More specifically, the examples show that the value the consumer derives from a service that is part of a service constellation is larger than it would have been without the existence of the constellation's other (facilitating, complementary, or supporting) services (Van Riel *et al.*, 2001). We present examples from three service sectors: tourism and travel, mobile telecommunications, and health care. From the consumer point of view, service constellations are likely to be important in other service sectors throughout the private and public domains, including professional sports (e.g., sports leagues), retailing (e.g., shopping malls), higher education (e.g., educational programs), housing (e.g., urban

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planning and housing projects), and financial services (e.g., financial planning services).

From the perspective of the service providers, the three examples are presented in ascending order of interdependence and need for coordination and/or synchronization.

Illustrative example A: Tourism and travel

Tourists and travelers have complex and often highly individualized needs and desires that can only be satisfied through a complex set of services that *together* produce their holiday or travel experience. Tourists and other travelers make use of a service constellation that consists of a broad range of services: e.g., public rail, road, and air transportation, lodging, booking and ticketing services, tour services, restaurants, museums, resorts, and travel review services. From the consumer perspective, these services play mutually supporting, facilitating, or complementary roles (Van Riel *et al.*, 2004). Due to the fragmented nature of the industry, many service providers are likely to be involved in the production of the mutually interdependent (at least from the constellation perspective) services that together comprise the trip (Zehrer, 2009). Consumers are likely to evaluate a trip holistically; that is, they evaluate a range of services as an integrated experience (Otto and Ritchie, 1996), such as the integrated combination of experiences offered by the hotel, various restaurants, tour operators, local transportation companies, street vendors, and the airline company. For travelers, the trip as a whole constitutes the perspective used to assess the value of the individual services.

This integral view has two implications for understanding how services generate value. First, from the consumer perspective, the perceived value generated by elements of the service constellation is potentially greater than, but certainly

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different from, a simple sum of its elements. Individual elements of a trip, such as air travel, may not provide high value when the consumer is asked to rate the isolated service experience. Air travel and public transportation services may be instrumental, however, in reaching the hotel that may either offer outstanding value by itself or also serve as a facilitator for a visit to a museum. The outstanding restaurants that surround it could leverage the value experience of the hotel. Thus, there are synergistic effects among the various services that comprise a travel experience.

Second, the evaluations of a service constellation's elements affect each other. Outstanding service offered by the hotel may influence the entire holiday experience, while service failures during the air trip (such as overbooking, lost luggage, or flight cancellations) may overshadow correctly performed services. Note that the individual service elements of a service constellation in this example may run into the tens or even hundreds because holidays lasting several weeks can represent a long sequence of service encounters.

Although we have presented the holiday service offering as a constellation, very little organized and explicit coordination exists or is even required among the involved service providers. From an organizational perspective, no clear ecosystem seems to have developed. Travel and tourism are examples of service constellations that do not have much coordinated governance, although certain companies offer 'package deals' that come closer to involving a form of coordination. In many ways, they are also open constellations because market mechanisms seem to regulate innovations in this sector. Only in rare cases do service providers consider co-developing their services or even a portfolio of complementary services with other providers. Furthermore, no single dominant facilitator of travel and tourism

constellations is currently present in the market, although configurations may vary depending on the region or city.

Illustrative example B: M-services

Users of mobile services have varied service needs and generally use their devices with the intention of obtaining a broad and diverse range of benefits. Constellations that appear to be more integrated, with a higher need for explicit coordination between service providers, are the mobile service constellations that can be discerned around mobile operating systems such as Android, Windows Mobile, or iOS. For example, from a consumer perspective, the combination of software distribution platforms (iTunes, Appstore), software applications and mobile services (apps), operating systems (OSX, iOS), and Internet-enabled portable devices (iPhone, iPod, iMac, iPad, MacBook) jointly form a service constellation. Although the manufacturer of the operating system and the devices, e.g., Apple, plays a relatively dominant role in many parts of this offering, music companies, movie companies, software developers, and many other consumer service providers jointly provide most of the core services. Apple, however, provides many of the indispensible facilitating and supporting services. Again, we can observe that consumers have a range of interrelated, highly individualized needs regarding mobile services that can only be satisfied by a complex system of specialized service providers. Here too, the added value of the various individual services (e.g., a movie locator service) increasingly depends on the quality and availability of other facilitating (operating system), complementary (GPS, maps), or supporting (app review) services. Which service acts as a supporting or supported service depends on the way the consumer uses the services. What one user views as complementary could be a core service for another.

Because of the complexity of the market, consumers do not process information about all aspects of the individual service offerings. Rather, they process market information much more holistically, reducing their options to choosing between service constellations (Kasper *et al.*, 2010). In the mobile services context (more so than in the tourism industry), the choice is mostly between service constellations (e.g., the service constellations surrounding iOS versus Android) instead of between individual services.

In M-services, ecosystems with a dominant actor (e.g., Apple or Google) that determines a large part of the rules underlie the service constellations. The dominant actor has the choice between explicit coordination, in which the dominant actor decides which service is to be developed by which actor, and implicit coordination, which relies on evolutionary principles. In the context of M-services, most ecosystems appear to be characterized by partially explicit, partially implicit coordination. Within such ecosystems, large numbers of small and highly specialized developers create services that are often provided through mobile apps. By allowing a great number of developers into the system, variety is achieved, thus creating additional value for consumers (Boudreau, 2012). For each system, evolutionary principles determine which applications and providers ultimately survive and which do not (Boudreau, 2012).

Illustrative example C: Health care services

Patients with neurodegenerative diseases, such as Parkinson's and Alzheimer's, require highly complex, dynamic, and individualized treatments that consist of a sequence of medical and paramedical services provided by multiple specialized health care professionals and institutions. Patients and their caretakers are looking for a complex combination of benefits, such as well-being, and a general stabilization or

even improvement of their condition. In the Netherlands, an organization called

ParkinsonNet (For a more detailed description, see for example: Munneke and Bloem,

2011; Van Riel *et al.*, 2013) serves as an organizer and coordinator in what could be

viewed as a health care service constellation. The organization partially coordinates a

complex set of complementary and interdependent services offered by a range of

providers: e.g., neurological services (provided by neurologists), rehabilitation

treatments (provided by physical therapists), food and nutrition counseling (provided

by dietitians), and support in everyday life (offered by social workers). Because

patients cannot usually determine their exact needs and because the effectiveness and

value of an individual service (for example, in terms of patient well-being) depend not

only on the way the individual service is delivered but also on how it is combined

with other services, the initiators of ParkinsonNet decided to explicitly organize the

coordination of various services within the ecosystem. Following Porter and Teisberg

(2006), the provision of health care in the ParkinsonNet example is thus organized

around the medical condition of the patient over the full cycle of care, albeit in this

case not by the consumer of the services. This example stresses that the service

constellation concept can be used to capture the complexity inherent to some service

settings such as health care.

Please Insert Table 1 Here

Paradigm shift

In the following paragraphs, we propose a 'constellation approach' to service

innovation and contrast it with previous traditional models of service innovation. We

now take the perspective of service firms, or service providers, rather than consumers

and analyze the consequences of the constellation concept from their point of view.

We discuss three key types of differences: institutional (legal, organizational, and

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social structure), epistemological (theoretical perspectives, creativity, and incentives to innovate), and managerial differences (power, locus of decision-making, managerial challenges, and success metrics), as presented in Table 1. Both the traditional service and service constellation approaches should be considered ideal types (Weber, 1957). Although no particular organization or combination of organizations may perfectly exemplify the service constellation approach to innovation, this logic helps orient and define a way of thinking and acting that contests traditional approaches to innovation. In general, the service constellation approach requires a different logic.

However, in the contemporary marketplace, the two models should be seen as overlapping rather than as mutually exclusive (See the logic offered, for example by Polanyi, 1944). Adaptations in legal, organizational, and social structures are pervasive and can enable the constellation approach to services. Although the ownership structure of traditional innovation tends to revolve around securing sole ownership of a single innovation, the service constellation approach more often revolves around the distributed or shared ownership of clusters of services. From the perspective of the service innovator, resources and attention go into conceptualizing and understanding a value *constellation* wherein ideas for value creation can emerge and evolve, rather than the focus being on producing *one* good idea for value creation.

Several epistemological differences prevail under service constellations as well. The most notable is that rather than operating using a "lightning bolt" model, in which ideas result from one inventor's inspiration, knowledge is developed by a group of people, originating from multiple organizations, who work collaboratively on a particular and complex problem (Chesbrough *et al.*, 2006). Because the group dynamics of innovators are important, the sociological perspectives of status,

influence, and resonance are more important than the traditionally psychological perspective of individual creativity. Because innovators are aware of the complexity of the environment, knowledge is considered to be probabilistic rather than deterministic.

Finally, the service constellation approach brings with it several shifts in managerial logic. As Weber (1922/1978) and others (e.g., Adler and Borys, 1996) have argued, bureaucracy, which is characterized by hierarchy, specialization, and formalization in the traditional model, has great efficiencies and advantages in terms of clear relationships of authority and technological capacities for producing work and assigning responsibility. The new model of service constellations, however, enjoys few of the benefits of bureaucracy. Power relationships are less hierarchical and decision-making is distributed. Whereas the traditional approach is rational and analytic, the new approach is complex acknowledges probabilistic calculation, and is more improvisational, reacting to emergent opportunities rather than single-mindedly executing a plan. The imperatives for managers, then, are to filter rather than produce ideas and to fairly distribute value to the producers rather than capturing value solely for themselves. The success metrics also differ. A successful service constellation survives over time by securing legitimacy for the constellation as a whole. Creating dependencies on other goods and services by connecting the benefits of the constellation to tasks of daily life may mean that the constellation survives and thrives through the mutual interests of its users and providers.

Service innovations

Innovation in such service constellations is therefore likely to differ from innovation in traditional settings, where individual services are created in relative isolation. Previous literature has shown that taking the interests of many actors into account in

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new product development changes the nature of innovative processes (Driessen and Hillebrand, 2013). In the case of service constellations, many actors are involved because the constellation consists of many services. Furthermore, because services are no longer considered to be independent according to the service constellation approach, neither are service innovations: innovation in one service may have consequences for other services within the constellation and, consequently, for the entire service constellation. Service innovation in the context of service constellations has two important characteristics that distinguish it from traditional innovation.

First, service innovation in the context of service constellations will often be *architectural* in nature. From a service constellation perspective, innovation may result from a different arrangement of individual service elements (e.g., combining them differently, aligning them better), i.e., from architectural innovation (Henderson and Clark, 1990), without necessarily introducing innovation into the individual service elements themselves. Although innovating in relation to individual services may involve new technologies or radically new customer experiences and is therefore characterized by high technological and market uncertainty, architectural innovation can build on already existing services. Thus, innovation within service constellations can involve less uncertainty, take less time, and ultimately be easier to pursue.

However, due to the architectural nature of many innovations, the issue of coherence – from the technological and customer journey perspectives – becomes prominent. Individual services within a constellation might incorporate unrelated technologies or manage the customer journey in different manners (e.g., number of touch points, use of self-service technologies). Thus, the processes of identifying technological interrelations, designing interfaces between different technologies, and mapping the customer journey deserve special attention. In other words, coherence in

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designing the underlying service systems (Spohrer *et al.*, 2007), in terms of introducing implicit or explicit coordination among interdependent activities, is a central condition for the successful achievement of architectural innovations within a service constellation.

Second, service innovation in the context of service constellations often occurs as *co-evolution.* An important insight is that innovation (from the service constellation perspective) does not only involve innovation in relation to the individual service, but may also simultaneously involve innovation pertaining to the architecture of services and their underlying service systems (Spohrer *et al.*, 2007). It is the co-evolution of these three domains of innovation – individual services, architecture, and underlying service systems – that makes service constellations competitive and ultimately successful.

Co-evolution is intrinsic to the nature of the complex systems in which service constellations come into existence. According to complexity theory (Anderson, 1999; Dougherty and Dunne, 2011), within any complex system, innovation is the result of many unpredictable and non-linear interactions among its components. Thus, when part of an ecosystem deliberately implements a change (even a small and incremental one), the frequent interaction and exchange of information among actors can trigger unplanned changes in other parts of the system. This unplanned transfer mechanism can amplify the impact of the initial change and may lead to the emergence of more radical innovations. Thus, in the context of service constellations, innovation is not necessarily a deliberate and explicitly coordinated process but also partly a self-emerging one.

Given the randomness of interactions, the emergence of innovation is difficult to predict, but coordinating actors in ecosystems can create optimal conditions for the

emergence of valuable service constellations. One fundamental condition – borrowed from thermodynamics – may be the creation and maintenance of a state of disequilibrium within the system, namely by constantly introducing events and activities that are 'outside the norm' and keeping the system in a dynamic and chaotic state (Dougherty and Dunne, 2011). Innovative service constellations may emerge from the ecosystem's attempt to creatively evolve and self-organize to maintain internal coherence and recover equilibrium (Sawhney and Prandelli, 2000). Long-term superior innovation performance may well be achieved by 'maintaining' continuous disequilibrium and letting the constellation evolve.

Implications

The notion of service constellations has major implications for the study of service innovation. Although we do not pretend to be exhaustive here, this section provides a research agenda with the hope that it will stimulate service innovation researchers (and managers) to adopt a service constellation perspective in their future work. This section is structured as follows. First, innovation in a service constellation requires managers to understand the constellation and its services. Hence, we start by delineating the implications of the service constellation approach for understanding a service constellation itself: i.e., what it takes to understand a service constellation and the research that is needed to help managers in that area. Second, we provide several suggestions for future research to further our understanding of innovation practices in service constellations.

Understanding service constellations

Research is needed on three levels: the constellation itself, its underlying service system, and individual actors. A first requirement would be to map value creation throughout the constellation in terms of the relationships among service elements and

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the complex benefits consumers wish to derive from them. This mapping of value requires extending the concept of service blueprinting, as originally detailed by Shostack (1987). Whereas service blueprinting originally focused on the design elements of services within the boundaries of a single organization and service, the service constellation approach suggests that the blueprinting logic should cross organizational borders to help design and redesign service constellations that provide optimal value for consumers. Although extensions to blueprinting have been suggested to include services that consist of multiple interfaces between a single service provider and its customers (Patrício *et al.*, 2008), adopting the service constellation perspective would imply that this notion be extended to include multiple service providers. In addition, more research is needed to understand how and why various services in the service constellation enhance one another's values (or, inversely, how and why they have detrimental effects on the value creation of others). Such research should preferably be conducted from the consumer perspective.

In the next stage, it would be required to map the underlying service system, i.e., the actors that may be involved and their roles and activities. Researchers studying the service system may want to use role theory. Role theory focuses on depicting and understanding behavior in social settings (Biddle, 1986), such as actors in an service system. In inter-organizational settings, role theory has been used to investigate which types of activities are undertaken by organizations in network-related situations (Katz and Kahn, 1966) and has resulted in several typologies of roles (e.g., Heikkinen *et al.*, 2007; Snow *et al.*, 1992). A role-theoretic framework may be greatly helpful in understanding (the functioning of) service systems. In addition, at the service system level, more attention is needed on ecosystem management. The examples provided earlier in this article demonstrate that systems might involve very complex

interrelationships between multiple actors. In such complex situations, it is difficult to predict how actors will react to specific changes in the system. Agent-based modeling could help to understand the interrelationships in such systems (Garcia, 2005). A closely related question pertains to the degree to which ecosystems can or ought to be controlled. Too much control may inhibit innovation, whereas too little control may result in chaos, too much fragmentation, and too little standardization, leading to suboptimal customer value (Yoo *et al.*, 2012). A balance between these two extremes is likely to be best, but more research is needed to understand the determinants of such a balance.

Another line of research that requires more academic attention is the manner in which consumers use and experience services and how they value a service within the context of a service constellation; for example, when and why customers perceive a service as being core, supporting, complementary, or facilitating. Such research may provide a better understanding of where the boundaries of service constellations should be drawn from a customer perspective.

In addition, research needs to focus on the employee- and firm-level capabilities required to address the complexity of service constellations and ecosystems. For example, network management capabilities (Provan and Kenis, 2008) and capabilities to manage the tensions (Hemetsberger and Reinhardt, 2009) that inherently emerge in ecosystems have received relatively little attention in the service literature and are likely to become more important.

Understanding innovation

The adoption of the service constellation concept has implications for the organization of the innovation process. Information currency and absorptive capacity appear to play an even more important role for a firm that contributes to a service constellation

than for one that develops an individual service. The information and knowledge-sharing infrastructure of such a firm may need to be adapted to include up-to-date information about future states of the service constellation. A potential avenue of future research is the study of structural characteristics of services or ecosystems that develop successful service constellations. Part of the ecosystem structure may be virtual in nature, e.g., virtual collaboration using web 2.0 tools (Driessen *et al.*, in press). Within the structure of an ecosystem, the behavior of actors requires further study. More specifically, there is a need to better understand the behavioral foundations of innovation ecosystems, e.g., by making an inventory of innovation roles in ecosystems and defining them.

Although service innovation has traditionally focused on improving individual services, we suggest that innovation may also come from maintaining the ecosystem in a state of disequilibrium. More knowledge is needed on the mechanisms that generate and maintain disequilibrium. Given the distinctiveness of service constellations, researchers need to verify the effectiveness of sources of disequilibrium for individual companies (e.g., the pursuit of a new opportunity, a threat/crisis from the environment, organizational change). Such sources of disequilibrium may be the inclusion or dismissal of a service element, for example, by updating an operating system or launching a new version of a device.

The adoption of the service constellation perspective also calls for new innovation performance metrics. Adopting a more network-based approach to evaluation (Kumar *et al.*, 2013) could for example, improve estimations of innovation success. Most research on service innovations currently tends to use the adoption or diffusion of individual services as a dependent variable. The service constellation perspective suggests that it may be more relevant to study the adoption or diffusion of

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service constellations or to introduce measures focusing on overall satisfaction with or loyalty to a constellation. This aim requires a different approach, especially because the boundaries of service constellations may be more difficult to determine than those of individual services (Yoo *et al.*, 2012). However, this type of measurement would much better approach the actual experience of the consumer and might explain consumer behavior better than measures that focus on satisfaction with individual services.

Conclusion

Although there may be a generation effect, affecting younger more tech savvy consumers more than the older generations (Bolton *et al.*, 2013), consumers generally perceive the value-offering potential of services less and less in isolation. Instead, they see services as part of constellations of interdependent services that mutually complement, support, and facilitate each other. In this article, we have introduced the service constellation concept with the purpose of developing a better understanding of how it affects approaches to service innovation. Although the article provides some examples of service constellations that vary in the extent to which they are organized, centralized, or distributed systems and in their use of more or less implicit forms of coordination, this enumeration is far from complete. It is clear that considering services as elements in a service constellation has far-reaching consequences for the organization of the service innovation process. However, it is less clear what these consequences are and how actors should adapt to the constellation perspective. Therefore, we have provided suggestions for future research, and indicated the main domains in which we expect to see major opportunities for improvement.

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	Individual service innovation approach	Service constellation approach
Legal structure	* Sole ownership	* Shared or distributed ownership
Organizational structure	* Hierarchical	* Decentralized, rhizomatic
Knowledge structure	* One good idea	* Network of ideas
	* Closed / patented	* Open source / shared
	* Local interest optimization	* Global optimization
Social structure	* Isolation	* Community
	* Competition	* Co-operation
	* Economic theories	* Complexity theory
Theoretical perspectives	* Transaction cost economics	* Organizational ecology
	* Psychological perspective	* Sociological perspective
	* Deterministic	* Probabilistic
Creativity	* Lightning bolt (Newton)	* Collaborative innovation
Models of science	* Mechanistic / deliberate	* Emergent
Power / decision-making	* Centralized	* Distributed / dispersed
	* Rational / analytic	* Complex / integrative
Challenges	* Finding a brilliant idea	* Selecting good ideas
	* Enclosing property	* Distributing value fairly
	* Market share	* Survival / sustainability
Success metrics	* Competitive advantage	* Status / reputation / credibility / trustworthiness
	* Profit	Centrality of the system, dependence on others

Table 1: Traditional vs. service constellation approach

Figure 1: Service constellation and ecosystem

Service constellation with individual service offerings

Ecosystem with individual service providers
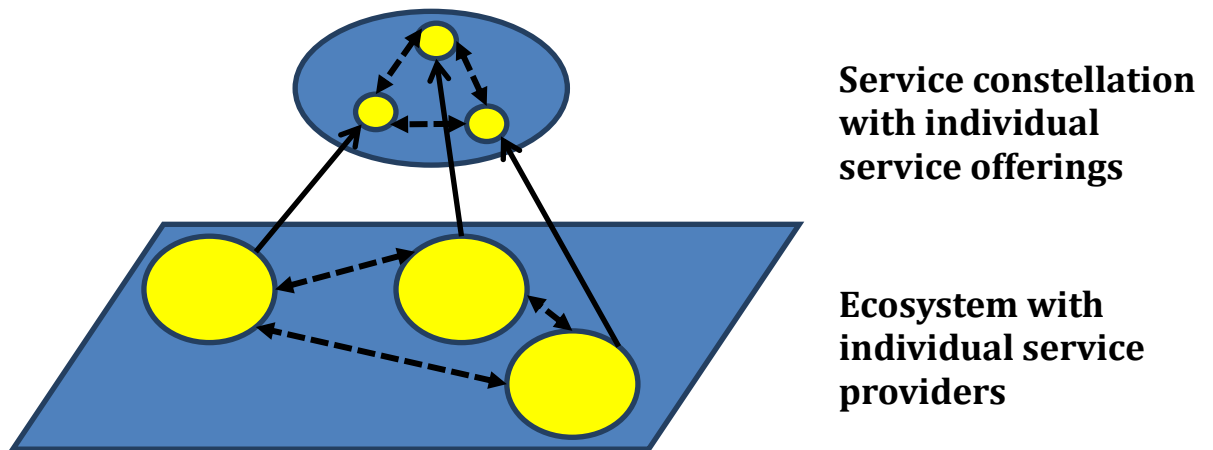
Note: solid arrows represent actors in the service system that offer a service in the service constellation. Dashed arrows represent interdependencies.