

# Chapter 11

## The Future of Service Systems: From Synergetics to Multi-Sided Platforms



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**Abstract** The purpose of this chapter is to frame the future of service systems at the theoretical intersection of synergetics and multi-sided platforms. The future, or propagation and evolution, of service systems requires an understanding of the pivots and modes by which the people, technology, and value propositions in a service system jointly evolve. A better understanding of this can emerge from applying the approaches of synergetics, or the enslaving and consensualization of service systems through order parameters (Meynhardt et al., *J Bus Res* 69:2981–2989, 2016), and multi-sided platforms, or the technologies that enable direct interactions among two or more groups (Hagiu, *MIT Sloan Manage Rev* 55:71, 2014; Hagiu and Wright, *Int J Ind Organ* 43:162–174, 2015). Together these two approaches enrich the study of the future of service systems.

**Keywords** Service systems · Synergetics · Multi-sided platforms · Temporality · Service

### 11.1 Introduction

The purpose of this chapter is to frame the future of service systems from the theoretical approaches of synergetics and multi-sided platforms. Synergetics refers to the influence of order parameters, and their enslaving or consensualization of people, objects and technology (Meynhardt et al. 2016). Multisided platforms refer to technologies that enable direct interactions among multiple otherwise disconnected groups (Hagiu 2014; Hagiu and Wright 2015). These approaches can inform the traditional study of service systems as “value-co-creation configurations of people, technology, value propositions” (Maglio and Spohrer 2008, p. 18). Together, they shed a different light on extant

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interdisciplinary research from the service, information systems, computer science, and marketing disciplines that have typically focused on glimpses of systems as frozen in singular moments; these traditional approaches have tended to emphasize interconnectedness over time (Chandler and Vargo 2011).

However, to further develop service system research, it is necessary to focus on the future, or propagation and evolution, of service systems. Reducing the study of service systems to change or temporality among actors incompletely articulates how service systems move into the future. Instead, it is important to broaden our thinking about service systems in order to consider the complexity that arises when the pivots and modes of people, technology, and value propositions jointly evolve over time. They do not progress in a strict linear fashion; rather, there are feedback loops, multiplier effects, and emergent parameters to consider. There is not yet a comprehensive framework that advances service science in a way that accommodates these issues. The purpose of this chapter is to draw on concepts from synergetics and multi-sided platforms to explore the pivots and modes of service systems.

## 11.2 Synergetics

Inherently, the study of service systems is the study of value. Service systems are viewed, generally, as value-co-creation configurations connected by value propositions (Maglio and Spohrer 2008). A value proposition connects service systems together by inviting an actor to engage with another actor (Chandler and Lusch 2015). When offered a value proposition, an actor can choose to resist, reject, or accept the value proposition. By accepting the value proposition, an actor can become engaged with a service system. Value propositions in this way are the glue that holds a service system together. Value propositions invite engagement. Thus, without value propositions, service systems would not exist.

Based on this, when the value associated with a particular value proposition changes, it goes without saying that the system also changes because the nature of engagement in the service system has changed. However, it is difficult to fully understand the nature of this change because of its highly complex nature. It is complex because of the variety of ways that value propositions can be offered. Conversely, there are also many diverse responses that value propositions can elicit. This variety is at the foundation of the dynamic relationships that comprise service systems. As relationships and the nature of engagement change over time, so too does the service system. In this way, value and any associated value propositions also evolve over time.

Despite this, value has traditionally been studied as a singular phenomenological experience; it is typically viewed as an amorphous and fleeting emergence that is not situated in goods or things. Accordingly, recent studies have begun to underscore value as disparate from goods or things, or as an outcome of sets of processes (Normann and Ramirez 1998, Chandler and Lusch 2015). Because this is a rather new and different avenue of inquiry, it has not yet become clear how to best conceptualize value in this way, particularly with respect to service systems.

Synergetics offers a framework to this end; it outlines value as more than a passive by-product or emergence of processes. Synergetics proposes that value can be an active agent in evolving service systems when it, at times, behaves as an order parameter or organizing principle (Meynhardt, Chandler and Strathoff 2016). In this way, value can be viewed as a systemic property that, as it emerges, can evolve service systems. Because value comes about from the multitude of relationships among those involved in the “valuing”, these relationships are also related to value. Thus, although each individual relationship in a service system houses a distinctive nature of value, value exists amidst a sea, or context, of these relationships (Chandler and Vargo 2011). It is a characteristic or property of those relationships. Stated differently, value can change or become different in response to these relationships, as they change over time. Consequently, value informs how engagement and the relationships in a service system evolve.

Synergetics explains how and why this occurs. An interdisciplinary concept, synergetics outlines when and how order changes in a system (Haken & Mikhailov, 1993). Furthermore, synergetics asserts that systemic properties are not necessarily the sum of a system’s smaller parts: “They form a ‘gestalt’ which cannot be discovered by simply looking at the parts and adding them up” (Meynhardt, Chandler, and Strathoff 2016). Rather, systemic properties belong to the system as a whole but can influence different parts of the system differently. As a framework for exploring these influences, synergetics focuses on the self-organization or organic order in a system. It asserts that certain parameters can orient service systems to particular logics.

Integrating synergetics with service research, Meynhardt et al. (2016) propose nine systemic principles of value co-creation: *critical distance*, *stability*, *amplification*, *internal determination*, *non-linearity and feedback*, *phase transitions*, *symmetry breaking*, *limited predictability*, and *historical dependence*. These principles describe value co-creation from a systems perspective. Each of them coincides with a different phase or transition of a service system.

The systemic principles of *critical distance* and *stability* relate to systems that are at *equilibrium*. Specifically, critical distance refers to the propensity of systems to continue according to existing logics or orders. This is a phase when there is little change in a service system, when there is a sense of equilibrium. Meanwhile, stability refers to systemic resistances to perturbations or change. Referring to the same type of phase, the service system is stable, and the different components are synchronized which makes it difficult for perturbations to take root. In these situations, it can be argued that value is emergent from the stasis of the system.

Next, the systemic principles of *amplification* and *internal determination* relate to systems that are in *early transition*. Specifically, amplification refers to a state when fluctuations begin to randomly appear in a service system. These random fluctuations can be unexplained; they may occur then disappear without occurring again. Or, they may occur haphazardly without an apparent pattern. The effects of an unknown force or characteristic are being amplified in the system through the manifestation of these fluctuations. Relatedly, internal determination refers to the system’s response to external forces via changes or dynamics at a system level. More or less, these two systemic principles underscore that early transition consists of a

system's unique, complex, and indeterminable responses to external forces or jolts. These two systemic principles outline that systems respond to external stimuli in different ways; two systems can respond very different to the exact same external stimulus. In these situations, it can be argued that value is no longer emergent because the stasis or equilibrium has been disrupted.

Next, the systemic principles of *nonlinear loops* and *phase transitions* articulate *systemic evolution*. Specifically, non-linear feedback loops facilitate either additive and multiplicative effects in systems; they are the pivots that can significantly shift logics and orders in service systems. Through nonlinear loops, systems adapt to external forces and are able to shift the inner workings synchronized among components. During phase transitions, systems can “transition from one stable state to another stable state” such that one equilibrium is replaced by a different equilibrium. In these situations, it can be argued that value has begun to emerge as a different order takes hold in the system.

Finally, the systemic principles of *symmetry breaking*, *limited predictability*, and *historical dependence* outline how *new systemic orders* are realized. Simply put, “new orders are realized only after an emergence has become established as an order parameter”. Symmetry breaking refers to the evolution of emergences from seemingly inconsequential random fluctuations; only some fluctuations can become formidable order parameters that shape systemic components and properties. Limited predictability outlines that fluctuations can progress into order parameters, and that this progression cannot typically be predicted beyond the short-term. Moreover, historical dependence highlights that the future of a service system is best understood by looking to its past rather than looking to, or attempting to predict, its future. In these situations, value acts as an order parameter and organizes the service system. It enslaves, or consensualizes, the smaller parts of a service system (Meynhardt, Chandler, and Strathoff 2016).

### 11.3 Multi-Sided Platforms

Given the ubiquity of technology and social media, multi sided platforms are increasingly central to service systems in the new internet economy. Multi sided platforms are technologies, products or services that create value primarily by enabling direct interactions between two or more groups that are both customers of the multi sided platform (Hagiu 2014; Hagiu and Wright 2015). Multi sided platforms thus catalyze service systems by bringing two or more types of groups together.

Examples of multi sided platforms include eBay, Amazon, the Uber app, Sony's PlayStation, shopping malls, and credit cards. eBay for example is a multi sided platform that brings together buyers and sellers; without eBay direct interactions between buyers and sellers would not be possible. Similarly, credit cards enable direct interactions between retailers and their customers; without credit cards, retailers and customers would not be able to incur credit transactions. Other multi sided platforms include Facebook, Snapchat, and Netflix. Social media multi sided platforms often

depend on their users to both share content and consume content. All of this has become more prevalent in society because of information technology and cloud computing, which democratized the internet by enhancing its participatory nature.

Multi sided platforms work because they reduce search costs by helping disparate groups find or interact with one another, especially on the internet but also in real-time in real life. This is most apparent in the situation of Netflix where viewers can more easily find content because of the Netflix multi sided platform. After logging into a Netflix account, viewers are welcomed by a list of either their favorite content or recommended content based on viewing habits. On a different note, multi sided platforms reduce transaction costs by facilitating service fees rather than exchange or ownership fees. Netflix charges a flat monthly subscription fee, regardless of how much content is actually viewed. Consider how Facebook brings together content generators and content viewers; viewers can see content without necessarily owning the content, and, vice versa, content generators can share their content without necessarily collecting a fee from viewers. In these ways, multi sided platforms have proliferated service systems in the internet economy.

A concept from Economics, multi sided platforms are important to consider in the study of service systems because they explain economically how new actors are attracted to a multi sided platform service system: (1) to reduce search costs or (2) to reduce transaction costs. Furthermore, multi sided platform research emphasizes the network externalities that are characteristic of service systems. Network externalities have traditionally been overlooked in the service system literature, yet they are important because the value of an multi sided platform or service system depends on the number of customers in one group with respect to the number of customers in a different group. In other words, value typically increases with the number of customers in each group; for example, more content on Netflix generally attracts more viewers and thus increases the number of viewers of Netflix. This is a positive network externality that should create a cycle by which more and more actors (both content providers and viewers) join the Netflix service system. On the other hand, negative network externalities arise when the benefits of being associated with the service system decline as a result of increased numbers of actors. This could happen in the case of Netflix, for example, if the amount of content grew so large that the Netflix servers slowed down and caused viewers to become frustrated and leave the service system. It could also happen if the number of viewers grew so large that content became frequently unavailable due to licensing arrangements that limit the number of viewers per content.

As more service systems become centered on multi sided platforms it will be necessary to develop frameworks that explore how multi sided platform service systems evolve. Network effects can serve as a starting point for the study of this evolution. Thus, a deeper look into network effects can offer important insights in the study of service systems. To begin with, multi sided platforms are essentially value propositions; they are invitations to connect disparate groups into service systems (Chandler and Lusch 2015). For example, eBay is essentially a value proposition that invites engagement among buyers, sellers, products, and services; by accepting the invitation, buyers and sellers engage with and comprise the service

system. Their collective nature helps to define the service system. Accordingly, network externalities—either positive or negative—arise from the nature and number of buyers and sellers engaged with the value proposition. If eBay changes, so too would the collective nature of the buyers, sellers, and the products or services that they buy and sell. From an economics perspective, the quantity of buyers and/or sellers might change and this could influence the system as a whole.

By thinking about service systems in this way, the challenges that have become evident with multi sided platforms can also shed some light on the potential research opportunities related to the future, or propagation and evolution, of service systems. First of all, it has become difficult to evaluate the heterogeneity, or appropriate number of different groups, necessary to attract for a successful multi sided platform. In systems research, this has generally been regarded as a threshold or capacity issue. The heterogeneity issue however is different but related to these issues and also those of network externalities and number of actors within each disparate group (i.e., size of group). The effects of size and number on service systems and multi-sided platforms relate to more than just quantity. Aside from the number of groups as well as the number of actors within each group, consideration of variety among groups in its service system and the extent to which each group is different in terms of what is offered and what is being sought by those actors are also important factors. For example, typical Netflix content that has been offered tends to be professionally created content from big Hollywood studios that routinely create television shows and movies. What if Netflix began to offer amateur content such as independently created movies from international studios? How would this change the nature of the multi sided platform and the nature of the service system as a whole? What if Netflix began to offer user-generated content such as content shown on Facebook or Instagram? Each group that engages with a multi sided platform is characteristically different from the others, but what are the bounds (if any) of these differences? How might these differences be measured? Is there a limit to the sheer number of groups that make sense for a multi sided platform? To this end, what is the nature of value in multi sided platforms such as Netflix and how might this influence each group in the Netflix service system?

Second, it has been typically difficult to price services for a multi sided platform. Because multi sided platforms do not focus on ownership, they are more akin to the idea of incomplete products or servitization. With incomplete products, there is the idea of “freemium” in which the original product is given to customers for free; however, in order to fully enjoy the value of the original product, it is necessary to purchase add-ons and engage in microtransactions. With smart phone applications, this approach has become fundamental to enticing trial and sampling of new products and services. Relatedly, servitization refers to a shift from an emphasis on manufacturing to an emphasis on meeting customer needs through services, rather than products. An example of this would be offering an automobile service contract along with the purchase of a new automobile. Servitization entails looking beyond the purchase of a product to include the services, warranties, repairs, or upgrades that may transpire after an original product purchase. The process of preparing or transforming process for the “after-purchase” services is referred to as

servitization. Multi sided platforms often include long-term service features and value that can influence pricing.

In another illustration, massive multiplayer online games (MMOG) have begun to use the freemium model on mobile devices to engage and enhance their service systems. Traditionally limited to video game consoles, MMOGs have typically required the bandwidth of internet broadband services and the processing power of stand-alone video game consoles and such as Microsoft Xbox or Nintendo Playstation. However, in recent months, MMOGs such as Fortnite have become available on smart phones through cellular service in attempts to engage with players as they move throughout their days. The draw is the “freemium” app and players were quick to sample the new app; however, players became quickly discouraged when it became apparent that their progress would be hampered or slowed if they did not make additional purchases (i.e., microtransactions) of maps, weapons, or abilities. Furthermore, because the initial launch of the game required other players to already be playing the game (hence the massive multiplayer online game aspect), the game developers used artificially intelligent “bots” to “play” the game with first-movers to the multi sided platform. Unfortunately, as gamers became aware that bots comprised the majority of players in the service system, they became dissuaded from engaging with the freemium model of this multi sided platform. Kahn demonstrates that the perception of product completeness influences how viewers consumed the products. In this way, these service systems can be viewed as orienting around incomplete products.

Finally, the governance of a multi sided platform can greatly influence its success. In multi sided platforms, governance can range from no overarching control to complete and total control. In a multi sided platform that has no governance rules imparted by a central authority, the service system around that multi sided platform is implicitly coordinated by actors in the service system and the smaller parts organize the service system through consensualization. However, if a multi sided platform has a strong central authority, the smaller parts in the service system are enslaved; they must conform to the governance rules of the central authority. Amazon, a popular and successful multi sided platform at the time of writing, exerts quite strong authority on the service system that surrounds it and offers explicit governance rules. Like eBay, Amazon is an online marketplace that brings together buyers and sellers. However, Amazon integrates governance into their business model by encouraging behaviors that improve the service system overall; in other words, their pricing strategy encourages preferred behaviors from buyers (frequent purchases) and sellers (expedited shipping). Specifically, Amazon offers a flat monthly subscription fee to “prime” or preferred buyers which guarantees these buyers expedited 2-day shipping from “prime” preferred sellers. “Non-preferred” buyers and sellers are similarly encouraged to adhere to “good behaviors” through online reviews; however, the non-preferred groups are not required to behave in these ways and are thus subject to additional fees or steps in order to remain engaged in the service system. In a separate move, Amazon sought to further enhance engagement in its service system (i.e., govern the service system) with “dash buttons” that facilitate convenient and frequent engagement (i.e., purchases) by

removing the need to browse the web to place orders. A single button is pre-programmed with a single item purchase (e.g., laundry detergent) and wi-fi capability so that any item in the home can be mindlessly purchased with the simple push of a button. Similar attempts at governance include the smart-home assistant named “Alexa” which is a stand alone voice activated Amazon interface. By verbally announcing one’s needs or demands to Alexa, a buyer immediately engages with Amazon and the Amazon service system.

## 11.4 The Future of Service Systems

Synergetics offers a way to think about the various types of service systems that are now converging around multi sided platforms. It frames the future of service systems around nonlinear and dynamic parameters. This is important because it is not sufficient to merely acknowledge the role of time and the continuous connection among actors in a service system. Rather, it is necessary to explicitly think about the complexity involved when actors—including customers, organizations, and stakeholders—influence one another in unpredictable ways that are not explained by traditional economic theory.

Multi sided platforms, like Amazon, Xbox, or Facebook, are value propositions that join actors together as service systems. These platforms are not the service system; rather they are platforms that bring disparate actors together as service systems. The logic that is imparted into the service system by each of these multi-sided platforms influences the parameters of the service system, along with its propagation and evolution. By clarifying the governance mechanisms of each platform, it can become clear how each of these multi sided platforms might evolve in response to the service system. Conversely, it can also become clear how the service system evolves in response to the multi sided platform. This is because the multi sided platform essentially operates as an unfinished or incomplete product until a critical mass in the service system surrounds it. The multi sided platform simply cannot function without sufficient size and heterogeneity in its service system. In this way, multi sided platforms contribute to servitization in ways that do more than entice engagement. They inform the very nature of the service system as a whole. They can impart logics into a service system. Furthermore, inherent in the fundamental design properties of multi sided platforms should be considerations such as governance, pricing, and network externalities.

Because the study of service systems is essentially the study of value, it is important to consider the influence of multi sided platforms on value co-creation. The value of multi sided platforms is that they connect service systems together, however it can be argued that multi sided platforms are not valuable by themselves. For these reasons, the variety of pivots or modes associated with multi sided platforms are important for service systems. In the Amazon example above, governance is implicit in the pricing strategy. The pricing strategy can change the entire logic of the service system. Furthermore, Amazon also governs its service system by



offering a variety of value propositions that enhance connectivity in the service system; these include a smart phone application, a website, a button, or a voice-activated assistant (Alexa). Each of these value propositions elicits different responses and varying levels of engagement from both buyers and sellers. They coalesce service systems while contributing to the dynamic relationships that comprise the Amazon service system.

Although the multi sided platform provides the initial consensualization needed to emerge a service system, synergetics proposes that value can be an active agent in further evolving service systems. Because value emerges from the multitude of relationships centered on a multi sided platform, value is a property of the system. As any of the components of the service system changes over time, so too does value. As a result, multi sided platforms can transform engagement in service systems. Engagement depends on the external connections and the internal dispositions of an actor (Chandler and Lusch 2015). Temporal connections join actors and services over time. An example of a temporal connection is the existence of an actor that moves forward through time, connecting past, present, and future. On the other hand, relational connections join actors to one another. An example of a relational connection is a group membership such as an alumni status or a family. In these ways, actors can be connected through time and also with one another. These are two properties of engagement.

Dispositions refer to an actor's psychological states that are oriented toward the past, present, and future. Each of these influences how actors appropriate their connections, which are neutral on their own. This occurs when actors engage in service systems; by doing so, they adapt connections from the past, for the present, and position themselves for a particular future. These psychological states can influence actors to continually refocus their connections with respect to their perceptions of the past. Similarly, psychological states may influence actors to assert meaningful connections in the present. And, finally, psychological states may influence actors to draw on their connections in particular ways to move toward a desired future.

All in all, each of these five properties of engagement relates to connections (temporal and relational) and dispositions (past, present, and future). These connections and dispositions comprise engagement. When they are aligned and synchronized, an actor is fully engaged. When they are synchronized, value co-creation emerges and an actor is more closely aligned with a service system. However, it is typically difficult for these properties to remain synchronized. These properties often fall out of alignment. Alignment of these five properties shifts over time with respect to the actor, the service system, and value.

These considerations coincide with the Cynefin framework, which proposes a decision-making framework based on complexity and systems theory (Snowden 2002). The Cynefin framework outlines "domains" for decision-making, namely simple, complicated, complex, chaotic, and disorder. These domains range, generally speaking, from situations in which cause and effect are clear and distinct, to situations in which cause and effect are ambiguous or emergent. The framework is based on the recognition that each manager or decision-maker has a different

perspective on a phenomenon and thus may manage the situation differently with respect to his or her individual perspective. The Cynefin framework can be useful for thinking about how actors engage with service systems.

Synergetics offers a way to think about this. The systemic principles of *critical distance* and *stability* relate to systems that are at *equilibrium*. At equilibrium, the five properties of engagement are aligned. Also, at equilibrium, a multi sided platform facilitates value co-creation. This is because critical distance facilitates the propensity of the service system to continue according to existing logics or orders. And, the multi sided platform generally dictates the logic or order. Because this propensity is strong, the service system as a whole is resistant to perturbations or change.

However, in early transition phases of service systems, the systemic principles of *amplification* and *internal determination* describe, respectively, how fluctuations begin to randomly appear and how specific dynamics begin to arise from the unique parameters of a service system. In this way, a service system becomes unique and different from other service systems especially in response to external forces. If there is a multi sided platform at the center of the service system, it is typically a key component of these dynamics. These two systemic principles underscore that a system's unique, complex, and indeterminable response to an external force or jolt becomes apparent during the early transition phase. It becomes apparent through repetition of key systemic behaviors. Differences in these behaviors can help to reveal how disparate systems may respond differently to the same stimulus. At this stage, a multi sided platform can be at the center of multiple different service systems. A jolt in the multi sided platform, or a change in logic or repetition in the functionality of the multi sided platform, can send reverberations through to all the service systems that are connected to it. In this way, service system governance can be facilitated through a multi sided platform.

Next, *nonlinear loops* and *phase transitions* illustrate how *systemic evolution* takes hold in a service system. It is important to account for ways that service systems react back on themselves; synergetics outlines that this occurs through non-linear feedback loops, which serve as the pivots that shift logics and orders in service systems. As the loops ensue throughout the system, they can have smaller effects on certain components or they can have larger multiplier effects. In this way, service systems move from one state to another, and one equilibrium is replaced by a different equilibrium. It is important to note the multi sided platforms typically do not directly respond to changes because they are not typically the intended targets of changes. Instead, typically, relationships or actors in a service system change in response to an external force. In turn, then, the subsequent relationships and the other actors react or change in response to an external force, then influence the multi sided platform in some way.

Finally, *new systemic orders* are realized when the systemic principles of *symmetry breaking*, *limited predictability*, and *historical dependence* become evident. New orders are established when fluctuations have asserted different patterns, and other components of the service system become consensualized according to this new order parameter. With symmetry breaking, emergences evolve to become order

parameters that shape systemic components and properties. These emergences are unpredictable. That being said, limited predictability outlines that complete and comprehensive prediction of new systemic orders is not possible. Incidentally, the principle of historical dependence confirms that the past behaviors of a service system are the best predictors of the service system.

In all, as a system converges toward equilibrium and consensualizes its smaller components, the distinction among customers, employees, and machines become less clear. That is, customers, machines, and employees can all be viewed as value-creating actors who are engaging with a system. As this occurs, the distinctive boundaries of organizations will become less clear because platforms become the central focal point at which value-creating actors become organized. These smaller actors may no longer need the service(s) of traditional organizations. In turn, new ways of managing across projects and matrices will emerge.

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