

Three Factors to Sustainable Service System Excellence: A Case Study of Service Systems

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Abstract

*Prior service science work defines a service system as dynamic configuration of people, technology, organizations, and shared information from both service providers and clients that co-creates value [1]. Although such an abstraction is important, it does not directly address core issues we face in today's service industry, such as sustainable service excellence. This paper expands such prior service science work by analyzing how service systems evolve over time and what factors are critical to sustain service excellence. The paper identified and analyzed three factors attributing to the service system health throughout its lifecycle phases: **the instilling of the value co-creation concept in the service system, the balancing of innovation and commoditization dynamics, and the configuration of core resources in the service system, i.e., people, technology, organization, and shared information.** The analysis is derived from many real-world case studies in the information analytics service area. Key recommendations and lessons learned are presented as well.*

1. Introduction

Teboul declares that “we are all in services ... more or less” [2]. Maglio et al indicates that the service sector is the most active sector in the global economy today [3]. However, it is desperately “in need of innovation to grow” [3]. The dichotomy of the strong service vitality and the apparent struggle to grow is evident throughout industries. For example, today's enterprises in all sectors are looking for outsourcing services, ranging from IT (Information Technology) services to Human Resources, and business processes [3,12]. IT outsourcing is especially active and is becoming a well known global trend [4]. However, today the successes of such outsourcing service businesses are often ad-hoc, short-lived, and ill-understood, especially when the environment is complex and rapidly changing.

Service Science, Management, and Engineering (SSME) intend to study the theory and science behind such knowledge-intensive service activities in all areas of the economy [1, 3, 5, 6, 13, 14]. The goal of the SSME community is to offer systematic methodologies and

formal practices to enable sustainable growth and service excellence. In this paper we focus on the SSME service science abstraction as “the study of provider-customer interactions (engagements, provisioning episodes, service experiences, or moments of truth) that mutually create and, from at least the providers' perspective, allow the capture of value” [15], or “the study of service system origins and life cycles, especially interactions between and amongst service systems and the relative value of outcomes, as judged by stakeholder service systems.”

SSME models service engagements as systems that consist of service provider and clients that co-create value by dynamic configuration of resources and transforming the service target from one form to another. An IT company that offers IT outsourcing services to other companies by transforming their IT operations is one such example. Both parties extract values through the team work: The IT service provider creates new channels and offerings to the marketplace, while the clients gain IT efficiency and reduce cost.

This service system definition is insightful in two aspects: First, such systems include clients and service providers, and a network of resources, i.e., people, technology, shared information, and organizations, from both, without strong bias on either service providers or clients alone. Second, in service systems, all entities work together as a whole to **co-create value**, as opposed to simple goods-trading without co-invention. As defined in [14], “service system interactions (normatively) co-create value with other service systems, as judged by the service systems. Service systems have the ability to design value propositions that they propose to other service systems in order to realize value co-creation outcomes.”

The underpinnings of the service system definition imply that in order to grow and sustain outstanding services businesses, one must understand this value co-creation network of entities well. This paper takes a step in this direction by identifying and examining three major attributes of the health of service systems: 1. the value co-creation principle, 2. the balancing of innovation and commoditization activity dynamics, and 3. the configuration of service system resources, i.e., people, organization, technology, and shared information.

Moreover, we analyze these factors throughout service system lifecycle phases, i.e., the infancy phase when a service system was initially born as a service provider engages with a client without significant past experiences,

the maturity phase when the service system built up from such initial engagements become mature and hence observing on-going healthy growth, and the reincarnation phase when the growth leads to the birth or branch of new types of services or even new service systems. The reincarnation phase can also be considered as a reconfiguration and re-instantiation of resources from the service system network. Such a three-phase lifecycle pattern may recur many times as the service system evolves over time as shown in Figure 1.

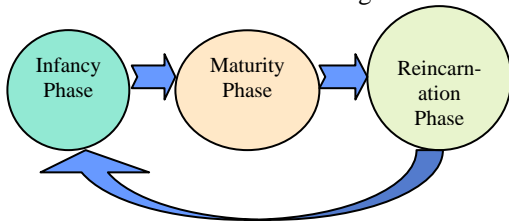


Figure 1. The lifecycle phases of a service system

Through our case studies, we illustrate that to ensure long term service excellence; the “*right mindset*” that anchors on **value co-creation** must be the guiding principle of all service system activities. Guided by such a mindset, “*right actions*” that balance the innovation and commoditization activities must be taken. Finally, “*right configuration of service system resources*” is critical to ensure that right actions can be taken (see Figure 2).

Our service system analysis was done through real-world service engagement case studies. In particular, we heavily draw upon our experience in the information analytics service area in the past six years. Although information analytics services have their own unique characteristics, we believe our analysis and observations are generally applicable to other service areas.

In the rest of the paper, we summarize the case studies used in this paper in Section 2. Then we elaborate on the three factors affecting the service system health in Section 3. Section 4 describes three lifecycle phases of a typical service system and how the three factors affect the system health in each phase. Section 5 summarizes key lessons learned and recommends best practices. Section 6 concludes and outlines the future work.

2. Case studies

To understand service systems, we capitalize on our experiences in information analytics service engagements. We have been developing information analytics methodologies and technologies over the last ten years [7, 8] and have engaged in a wide variety of information service engagements for the past six years. Our engagements range from pure consulting services that leverage information to offer insights into business processes and activities, to hosted information analytics

services, such as reputation monitoring and alerting by mining blogs and web content. We worked with many clients in different industries, e.g., distribution and retail, consumer products, financial services, government, and pharmaceuticals.

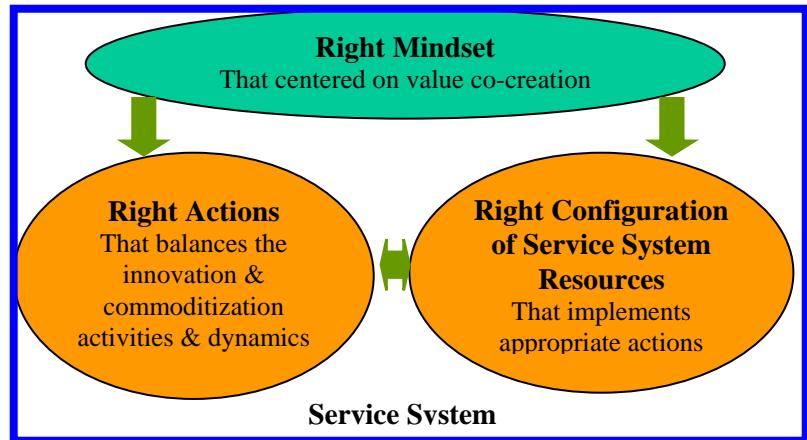


Figure 2. The three factors to Service System Health

Information analytics have several key characteristics that make it suitable to build a services business around. Text mining and business intelligence (BI) are emerging technology areas that target at deriving business insights and value from mining large amount of data inside and outside of enterprises. However, to effectively leverage analytics to derive business value, enterprises must leverage complex tools, e.g., BI tools, ETL tools (Extract, Transform, and Load) for information processing from different data sources, and Text mining tools (e.g., Autonomy, Business Objects, SAS, and Business Insights Workbench [7, 8, 9]). In addition, skilled analysts are needed to translate machine-generated insights into business insights using such tools.

The complexity of the tools and the skill requirements create new service business opportunities to companies that have such special expertise. For example, our team today leverages our analytical tools to offer a wide variety of information analytics services, e.g., market intelligence, brand and reputation analysis, and patent analysis. Note that **complexity** and **special expertise** are often two main factors that drive the creation of a service business. In this paper, we analyze several past information analytics service engagements we dealt with to drive an analysis of service systems.

3. The three health factors

To understand factors that affect service system health, we first model the service system as follows: We consider ourselves as the services provider. It contains a network of resources, i.e., people, organizations, technologies, and

information. In our engagements, people may include a project manager who copes with client relationships and contract negotiations, technical staff for technical delivery, and information analysts. Organizations are conceptual arrangements of people according to activities or functions, such as business development and technical development. Technologies include software and hardware tools, packaged analytics methodologies for specific problem domains. Information may range from different forms of communication, documentation, to public media messages. Services clients receive the services we offer. They have similar network of resources.

One service provider may provide services to multiple clients concurrently. Furthermore, one service provider may provide multiple types of service offerings or it may partner with other service providers to jointly provide a wide range of services. As a result, a service system could contain multiple service providers and clients. In our information analysis service engagements, such value chain partnering is wide-spread. We often partner with content providers to jointly offer analytic services to clients, as well as other technology or service providers from other IBM research labs or specific industries to enhance the overall service offering.

Throughout our engagements, we have been observing three common factors that work in concert to contribute to the long-term health of the service system: *1. value co-creation mindset, 2. balancing of innovation and commoditization activities and dynamics, 3. the configuration of service system resources, i.e., people, organizations, technologies, and shared information.* We elaborate on them in detail below.

3.1. Value Co-Creation

Value co-creation is the “**mindset**” of the service system which establishes and governs the intentions and goals in the service system. It also guides all activities. A healthy service system must always maintain a mindset that is focused on creating value collectively and for all parties inside and outside of the service system. When all activities are guided by a value co-creation mindset, the service system has the potential to gain and maintain its excellence over a long period of time. On the contrary, as soon as such mindset is lost, all activities in the system may lose the sense of direction. This typically leads to the degraded service performance, and ultimately the destruction of the service system itself.

Value co-creation mindset is a necessary condition to long term service system health, but it is not the sufficient condition, as the other two factors described later must also be present to **realize** the value co-creation goals. Without realizing actual value through some tangible artifacts such as improved business results, revenue,

growth, or scientific impacts, the service system health will eventually deteriorate.

Service system value co-creation is quite different from traditional product and good trading scenarios: Value co-creation in service system is *transformational, innovative, and experiential* for all parties involved in the system. Service system value co-creation focuses on transforming the system through co-creation of something innovative by leveraging special expertise, technologies, and collective efforts. The net effects often go beyond the service system itself, and reaching to the world at large. In [10], “Prime Movership” concept is introduced as a state of mind that is driven by the vision of a more effective larger system in which producers reposition themselves to enhance the process of value creation of its client.

In one of our past service engagements we worked with a consumer food client on a food analysis by mining wide range of data contents. By leveraging the clients’ domain expertise and our information analytics expertise, together we discovered a whole new food supply market that was completely ignored by the client for many years. The result of this work led to transformational business activities by the client. Meanwhile, the experience also transformed our approaches in utilizing information analytics to address real-world business issues.

In addition, the success of such co-invention activities led to high level of confidence and trust among all parties in the system. Our engagement grew significantly over the following two years. The service system initially started between two small research groups from the two companies working on specific business problems. It then expanded to multiple research groups in both companies, which then led to a research-to-research division collaboration. In the recent past, this engagement led to an enterprise-wide engagement, where the client and IBM are seeking for open innovation opportunities to bootstrap business vitality for two multi-billion dollar companies.

In general, the most successful engagements we had have been part of are the ones where we (the service provider) worked with the clients as a single team to innovate, tackle client problems, and deliver high quality and high value results. All such engagements brought tremendous values to us as the service provider, such as generation of new technologies, intellectual properties, and revenue. Similarly, clients gain significant values by effectively leveraging new technologies, methodologies, and our expertise to address real business problems.

On the contrary, if value co-creation is not faithfully abided by or manifested throughout the service system lifecycles, for example, clients or service providers may only seek one-sided benefits or the benefits to themselves but not to the world at large, it is impossible to sustain healthy relationships, let alone co-creating values. The examination of a few unsuccessful engagements (e.g.,

ended too soon or unpleasantly) revealed that although as the service provider, we have been particularly conscious in following through our value creation intention, there were no manifestation of such mindset in some cases. As a result, value co-creation became wishful thinking rather than reality, and the engagements ended with a limited life span. The manifestation of value co-creation versus value co-creation mindset is analogous to execution versus goal setting in businesses. It is not uncommon to see that businesses fail in execution although goals were grand.

The root-causes of such manifestation failures can be multi-faceted. In one case, an unexpected resource constraint led to little progress in the services engagement for an extended period of time. This not only cost the relationship with a significant client, but also our own ability to compete in the marketplace. In another case, our client did not participate in the overall engagements after the contract was signed. As a result, co-inventing was impossible. At the end of the one year contract, neither side gained any benefits. Even the monetary exchange came with the cost of a damaged relationship with an influential client and potentially stained reputation.

Clearly, value co-creation must not only be the guiding principle, but also be practiced rigorously throughout the service system lifecycles. This requires conscious efforts from all parties. Moreover, service system value co-creation is rarely instantaneous. It is a journey and a process that often requires patience and tenacity to mature. In this process, entities in the system experience the changes, transform and evolve under the guiding mindset of creating something valuable for all; even when it is not clear what is to be created. It is not hard to understand that open mindedness, innovative thinking, and discovery spirits are critical traits to this process.

3.2. Balancing innovation and commoditization dynamics

If value co-creation sets the mindset for the service system, the second factor, i.e., balancing of innovation and commoditization activities, defines **the activity dynamics** required to realize the value co-creation goals (or **the actions** that must be taken) for the service system. In general, a service provider must be able to innovate and provide differentiating value to clients that others cannot provide. Spohrer indicates that “often the key to successful interactions is that the provider has special knowledge, technology infrastructure, authority, relationships, history, or other competences that allow the provider to do for the customer what they cannot do for themselves, and no other competitor can do for the customer. Successful interactions are based on unique

value propositions that ensure the provider can exist, persist, and possibly thrive.”

On the other hand, to allow the service system to grow and scale up, appropriate level of commoditization activities must also be implemented. This is because often highly innovative activities also imply high costs and hence limit the growth of the overall system. Service commoditization could offset the cost by reducing the complexity and streamlining the operations. Yet, extreme commoditization is to be avoided also. Clearly the innovation and commoditization dynamics must be carefully tuned throughout service system lifecycles to ensure the overall and long term service excellence.

In the initial incarnation phase of a service system, a service engagement is formed between a client and service provider when neither side has much experience or knowledge of the other. Such a system demands a high level of innovation as well as intense engagement to ensure initial success. As the service system grows mature, the service provider becomes more and more skillful and efficient at certain types of operations. This is when service commoditization must be planned to enable the overall service system growth. The commoditization techniques range from standardizing service processes, developing software and hardware tools, to streamlining methodologies to enhance service delivery.

Commoditized services, however, also create a danger for others to compete easily. Today, as the IT outsourcing business becomes more and more mature, IT outsourcing services appear to be a rapidly commoditizing business. Many IT outsourcing service providers are competing purely based on labor and cost, making it hardly a sustainable model in a long run. As the commoditization value saturates, the innovation dynamics must grow. At some point, the service system will need to transform itself by offering new kinds of innovative services to the world. Such a balanced dynamics between innovation and commoditization is needed throughout different lifecycle phases to keep the service system grow and healthy.

3.3. Configuration of service system resources

With the understanding of the right mindset and the right activity mix around innovation and commoditization, the last factor that will ultimately ensure the service system excellence is the right configuration of core resources that can implement the desired actions. [14] defines four types of resources in service systems, i.e., people, organization, technology, and information. People and organizations are critical to carry out required tasks. Shared information and technologies are key ingredients to facilitate people and organizations in execution. Together they realize the value co-creation goals of a service system.

The changing dynamics of innovation and commoditization activities throughout the service system lifecycle phases creates challenges to create right resource configuration at the right time. As described earlier, in the infancy phase, innovation dynamics is high. Hence, highly skilled and experienced staff and simple organizational arrangements with flexible and powerful tools and necessary information are a must to ensure initial success. As the service system matures, low-cost labor may be brought in and trained to implement a well-thought-out solution coded by the experience staff. At this time, organizational hierarchy might have to be created in order to ensure orderliness of the business operations.

As service system phases out of the commoditization cycle and transitions into the next innovation phase, i.e., the reincarnation phase, innovation dynamics are on the rise again. At this time, new service areas may be created; hence people with different skills may need to be brought in. Without appropriate resource configuration, service system is unlikely to survive long.

Thus far, we have presented the three factors that attribute to the health of service systems. When all three factors are functioning perfectly, the service system will be healthy and can sustain its excellence for a while. When any of the factors is overlooked or is not functioning properly, the service system health will start to suffer. Clearly getting all elements of the three factors working well is non-trivial. It takes conscious and faithful efforts to maintain the right mindset at all times. It requires wisdom, skills, and experiences to be able to identify right balance of innovation and commoditization dynamics at the right time and implement it in a timely fashion with appropriate resource configurations.

4. Service system lifecycles

Service systems go through lifecycle phases as shown in Figure 1. We indicated earlier that no matter which lifecycle phase a service system is in, it is always important to maintain the right mindset of co-creating value. However, the dynamics of innovation and commoditization could change from one phase to another, as well as the optimal configuration of resources. We use a few real-world case studies to illustrate how the three factors affect the service system health at different lifecycle phases in this section.

4.1. The infancy phase

The service system infancy phase demands a high level of creativity to generate breakthroughs in order for the system to grow beyond this phase. From people and organization perspective, highly skilled, creative, open-minded, and mature individuals must be staffed. In addition, powerful and flexible technologies must be

available to allow fast adaptation to different client requirements, as well as effective information sharing.

Our initial engagement with the consumer food client is illustrative of such a pattern (as shown in Figure 3): Throughout the initial phase of the engagement, we conducted intensive and productive workshops with numerous follow-up working sessions to understand technologies, methodologies, business domains and problems. Our ideas transformed from the initial sketches on the “Napkin” from the dinner table to a real functioning analytics solution that not only addresses this client’s core business issues, but also many other clients’ in the similar domain.

The information analytics tools, i.e., Business Insights Workbench (BIW), that we leveraged in such infancy phase embedded over ten years of research and development. The tools have significant amount of flexibility and allowed for quick customization and adaptation to wide range of customer environments and scenarios. All of our early services engagements were staffed with data mining/text mining experts as well as experienced client relationship managers. Clients also configured their resources similarly. Both teams openly and frequently shared information.

In the consumer food engagement, the BIW team worked closely with the Consumer Food (CF) research and development (R&D) team in defining the problems and solutions. The team focused on a set of high impact problems that CF wishes to address and found significant insights after the initial project. Within six months, both teams built significant confidence in their ability to innovate and address real-world problems. This drove the project into the next phase as described below.

4.2. The maturing phase

Service system grows into **the maturing phase** as the service provider gains experience through working with one or more clients. Many initial First-Of-The-Kind innovation activities can now be coded into common, standard methodologies, processes, and tools, to enable fast services delivery to large number of clients.

In our case, after working with several clients in similar areas for some time, such as consumer products and customer care, we were able to devise standard workflow analysis and deploy solutions quickly with fewer customizations. In addition, we standardized tools and developed automation capabilities wherever possible. For instance, we recognized that one of the most time consuming activities in our engagements is to cope with processing and preparing contents for analysis. In our early engagements, the data preparation tasks typically accounted for >80% of the overall effort. Overtime, we have developed better processes and tools that reduced

content preparation time by an order of magnitude. As a result, we can support more clients with better quality.

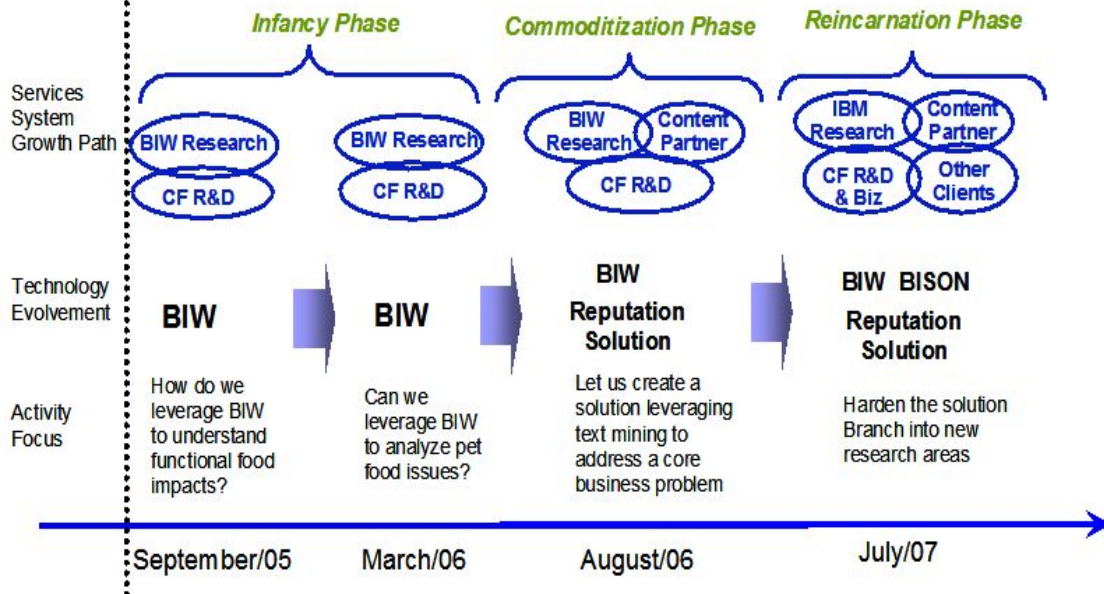


Figure 3. The service system lifecycle phases using the CP Engagement case study.

In the CF engagement scenario as shown in Figure 3, we transitioned into a commoditization phase by developing a solution for reputation monitoring and analysis purposes through mining public and company internal media information [16]. The solution is highly automated, streamlined, and targeted at specific but common business problem, i.e., reputation analysis and management. As a result, it received great attractions in the marketplace immediately after the initial releases. In merely 8 months after the initial release, we grew the client base and established partnership with other research labs in IBM and external content provider to jointly develop the solution. The success of the solution within the CF company itself also led to widely recognized value.

Although service commoditization allows for massive growth of the service system, it inevitably lowers the entry points for others to compete. To stay ahead of the competition, the service provider must strive to keep the commoditized service cost low through efficiency and low-cost labor, while starting to break new grounds through innovation. In our CF engagement case, our reputation solution competes with at least a dozen solutions in the marketplace. In order to differentiate and lead in this space, we continued to invest in the development and innovation to differentiate and enhance the overall competitiveness.

Notice that the maturing phase itself is changing constantly. The initial period of the maturing phase requires strong efforts and focus on commoditization. As competitors catch up and service commoditization saturates its value, innovation activity must increase.

Depending on the market and competitor situations, the length of commoditization phase can vary significantly.

In this phase, it is important to staff the system with right people and organizational structure, to keep the cost low as well as to scale up the business. Experienced staff can train new staff to deliver service to clients, while also spending time to create the next generation ideas. Complex tools and sophisticated processes are prohibitive to successful commoditization. Simplification, automation, and standardization are the norms. They enable reuse across multiple client engagements, as well as ensure consistency and stability of the service system growth. In our case, we grew our team from highly innovation-centric team to a more operation and delivery centric team to ensure delivery success and efficiency.

Clearly, services commoditization and innovation must be carefully balanced and managed throughout this maturing service system lifecycle phase. Service system could expand from one service provider and one client to multiple service providers and multiple clients. It is worth pointing out that in order for the service system to grow out of the initial phase, both clients and service providers must allow their engagements to go beyond their own enterprise boundaries to industries, other domains, and the world. Otherwise, the growth will only be bounded by the enterprise boundaries. In the CF engagement example, the reputation solution and BIW are widely applicable to other clients. Wise clients not only understand how they could be leveraged to enhance their own businesses, but also promote the use of such solutions by other clients, to stimulate new innovations. We believe these are healthy stimuli to the system.

4.3. The reincarnation phase

The service system undergoes a reincarnation phase to transform themselves through new innovations and breakthroughs as commoditization value diminishes. In this phase, the service system may enter into uncharted territory. In our cases, our engagements with different clients have taken us into many different information services domains, including patent analytics for pharmaceutical companies, market intelligence, and customer care analysis for CRM (Customer Relationship Management). Such transformations require service system to be extremely open and adaptive to new changes, including reconfiguration of resources.

The difference between this phase and the infancy phase is that some of the existing commoditized services business still needs to be maintained while the new services are created. As a result, from the overall service system dynamics perspective, we see an increasing of innovation activities and a ramping down or leveling off of the commoditization activities, and the resource mix is different from the initial phases.

In our CF engagement, we started entering the reincarnation phase after close to two years of collaboration, driven from the desire from both the client and the service provider to continue to innovate and create bleeding-edge technologies and solutions to address business problems in ways that were never thought of before. This led to new areas of interests such as opinion mining and sentiment analysis, while maintaining the existing capabilities. The client dynamics changed as well since new service capabilities widened the client base from different domains.

Figure 4 shows the overall three phases, and the typical characteristics of each phase in terms of the three factors and the service system components. As one can see, the value co-creation mindset must be deeply ingrained in all phases of service system lifecycles. In the infancy phase, the service system is small, simple, and innovation-centric. As the service system grows into the maturing phase, the system grows with more complex relationships with more clients and service providers. As a result, standardization, automation, and commoditization are needed to ensure orders and efficiency. Wider range of resources is needed as well. As the system grows into the next phase, innovation dynamics grows stronger, while existing commoditized services must also be maintained. Resources must be configured accordingly.

5. Recommendations and best practices

Over the course of our services engagements, we not only have started to observe the common health attributes

as described above and their effects in service system lifecycles, but also developed a set of best practices and lessons learned. We summarize them below.

1. Be open-minded, courageous, and adaptive. The spirit of discovery and innovation are critical to drive the service system growth, no matter which phase of lifecycle a service system is in.
2. Start service commoditization as early as possible, typically as soon as the common patterns of operations are observed. This will ensure service efficiency and allow business to scale up. A late-start on such activities when service system becomes unmanageably complex is undesirable.
3. Always maintain some levels of innovation activities to keep the system vitality alive, and grow it when the energy of the system becomes leveled off.
4. Wisely select, maintain, and grow services partners and clients, especially in the infancy phase. Since the service system health depends not only on the service providers' ability to deliver, but also the clients' ability to co-create, it is important to select the right partner and clients to work with, especially in the infancy phase when the system is vulnerable to failures. In the maturing phase, the size of the service system allows for some failures without huge impacts.

6. Conclusions and future work

In this paper, we presented three factors that affect service system health over the course of service system lifecycles, including maintaining value co-creation mindset, balancing innovation and commoditization dynamics, and configuring appropriate resources. The observations were derived based on case studies of services engagements we were part of in the past six years. We provided some best-practice recommendations based on our experience as well.

Although the key concepts described in this paper are easy to comprehend in theory, in practice, they can be difficult to realize. Each of the three factors operating in different lifecycle phases is worthy of in depth study. Such topics may include understanding the value co-creation artifacts and metrics, e.g., impacts to the world, the business, or the community, practices that help identifying the balance between innovation and commoditization activities, and methods to configure resources optimally. We plan to study these factors in depth in the future.

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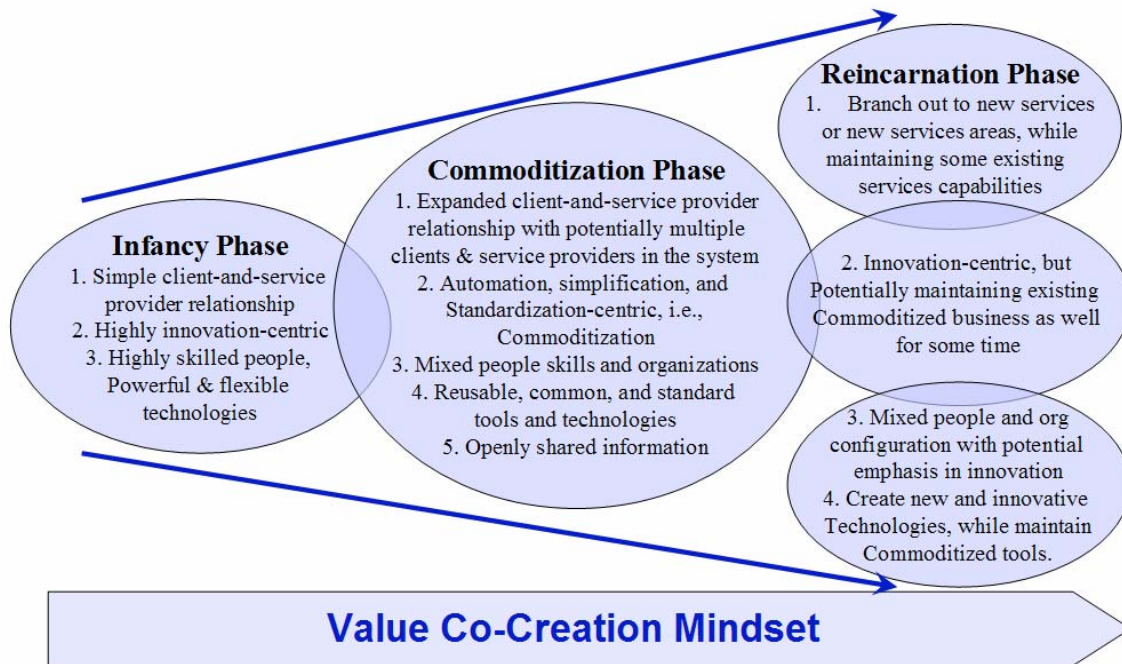


Figure 4. The characteristics of service systems in the three lifecycle phases.

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