

Translational Systems Sciences

Volume 6

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In 1956, Kenneth Boulding explained the concept of General Systems Theory as a skeleton of science. He describes that it hopes to develop something like a “spectrum” of theories—a system of systems which may perform the function of a “gestalt” in theoretical construction. Such “gestalts” in special fields have been of great value in directing research towards the gaps which they reveal.

There were, at that time, other important conceptual frameworks and theories, such as cybernetics. Additional theories and applications developed later, including synergetics, cognitive science, complex adaptive systems, and many others. Some focused on principles within specific domains of knowledge and others crossed areas of knowledge and practice, along the spectrum described by Boulding.

Also in 1956, the Society for General Systems Research (now the International Society for the Systems Sciences) was founded. One of the concerns of the founders, even then, was the state of the human condition, and what science could do about it.

The present Translational Systems Sciences book series aims at cultivating a new frontier of systems sciences for contributing to the need for practical applications that benefit people.

The concept of translational research originally comes from medical science for enhancing human health and well-being. Translational medical research is often labeled as “Bench to Bedside.” It places emphasis on translating the findings in basic research (at bench) more quickly and efficiently into medical practice (at bedside). At the same time, needs and demands from practice drive the development of new and innovative ideas and concepts. In this tightly coupled process it is essential to remove barriers to multi-disciplinary collaboration.

The present series attempts to bridge and integrate basic research founded in systems concepts, logic, theories and models with systems practices and methodologies, into a process of systems research. Since both bench and bedside involve diverse stakeholder groups, including researchers, practitioners and users, translational systems science works to create common platforms for language to activate the “bench to bedside” cycle.

In order to create a resilient and sustainable society in the twenty-first century, we unquestionably need open social innovation through which we create new social values, and realize them in society by connecting diverse ideas and developing new solutions. We assume three types of social values, namely: (1) values relevant to social infrastructure such as safety, security, and amenity; (2) values created by innovation in business, economics, and management practices; and, (3) values necessary for community sustainability brought about by conflict resolution and consensus building.

The series will first approach these social values from a systems science perspective by drawing on a range of disciplines in trans-disciplinary and cross-cultural ways. They may include social systems theory, sociology, business administration, management information science, organization science, computational mathematical organization theory, economics, evolutionary economics, international political science, jurisprudence, policy science, socio-information studies, cognitive science, artificial intelligence, complex adaptive systems theory, philosophy of science, and other related disciplines. In addition, this series will promote translational systems science as a means of scientific research that facilitates the translation of findings from basic science to practical applications, and vice versa.

We believe that this book series should advance a new frontier in systems sciences by presenting theoretical and conceptual frameworks, as well as theories for design and application, for twenty-first-century socioeconomic systems in a translational and trans-disciplinary context.

More information about this series at <http://www.springer.com/series/11213>

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Editor

Service Innovation

Novel Ways of Creating Value in
Actor Systems



Springer

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Preface

Background for the Topics of the Book

Services started to dominate the economic landscape of developed countries in the 1970s. Early research into services, which soon emerged, focused both on the macro-level issues of sectorial development and on the managerial issues of service business. The former approach produced broad and systematic analyses about the growth and prospects of different service sectors (Gershuny and Miles 1983). The latter approach was the basis for the formation of the first actual school of thinking in the area of services: service marketing and management (Grönroos 1982; Lovelock 1982). After the mid-1980s, the linkages between manufacturing and services started to arouse interest, too: researchers found out that external service inputs are essential for production and also manufacturers themselves provide services in addition to material products. Consequently, studies on “producer services” (Wood 1986) and “servitization of manufacturing” (Vandermerwe and Rada 1988) gained ground rapidly.

The development of information and communication technologies (ICT) had a strong influence on services in several sectors. This was reflected in service research, particularly in the early research into service innovation. Barras’ model of the “reverse innovation cycle” has often been mentioned as the first service innovation theory (Barras 1986). According to it, the innovation cycle in service sectors is the converse of the traditional industrial cycle: process innovation precedes product innovation. Service firms adopt new technologies in order to increase the efficiency of their processes and later the quality of service. At the final stage, wholly new service products are developed. Barras’ model is important due to its pioneering nature; however, it ignores those service innovations whose core is not the utilization of technology. It does not analyze service innovations for their own sake but examines the impacts of technological innovations on services (cf. Gallouj and Weinstein 1997).

A prerequisite for the emergence of genuine service innovation theories was a change in the general innovation paradigm. In the 1980s, the mainstream of innovation theories focused on radical inventions in material products and suggested that these inventions can be most efficiently promoted via intraorganizational R&D (Kline and Rosenberg 1986). As novelties in services are usually incremental and created in practical business operations – often in the customer interface – they were not compatible with these views. However, in the end of the decade, there strengthened a new perspective which questioned the separate R&D process as a norm and the nature of innovations as exceptional “events.” A number of researchers argued that the majority of innovations emerge in the developmental work that takes place in the everyday practice of enterprises and are essentially affected by market demands. A new use of preexisting possibilities is characteristic of innovations and is often discovered in production and sales activities (Dosi 1988). Interaction capabilities and coping with uncertainty are important because innovation processes are increasingly collaborative and complex in nature (Lundvall 2002; Lundvall and Johnson 1994).

These views relied on the broad perspective that Schumpeter (1934, 1942), the classic in the field of innovation research, had suggested several decades ago but which had given way to a narrow, science-based, and linear innovation paradigm. The “rediscovery” of Schumpeter was an important driver for the studies on innovative outputs that are not tangible. More specifically, it was crucial for the emergence of research into service innovation (Howells 2004). On the other hand, research into service innovation contributed to the further development of the broad neo-Schumpeterian view. During the 1990s, both approaches developed to some extent hand in hand. Many characteristics that were first identified among service providers were later perceived to characterize industrial companies, too. An example is the intermingling of innovation activities with other organizational functions, e.g., marketing and training (Preissl 2000). The central role of incremental innovations, which earlier was regarded as a specificity of services, turned out to be essential in many high-technology companies that create innovations by recombining existing pieces of knowledge (Kim and Mauborgne 1999). Service researchers have also pointed out that behind a minor visible change there may be widely applicable cognitive inputs (Gallouj and Weinstein 1997).

After the emergence, the contribution of service innovation research has been twofold. On the one hand, it has provided new insights about the nature of innovation as an economic and societal phenomenon. On the other hand, it has analyzed organizational strategies from the innovation viewpoint and examined the management of innovation processes. Often the studies have aimed to understand both the phenomenon and its managerial implications.

In the early stages, many service innovation studies focused on modeling a service and the outcome of innovation. The most well-known model is the characteristics-based approach by Gallouj and Weinstein (1997), which describes a service as a combination of technical, competence, and final characteristics and identifies different types of innovations (incremental, additive, recombinative, etc.) as changes in these characteristics. In addition to researchers whose background was in (neo-Schumpeterian) innovation theories, modeling was carried out by service

marketing scholars. These scholars did not use innovation terminology but applied the concept of new service development (NSD) to analyze the prerequisites of success in the creation of novel services. Thus, the management of the service innovation process was in the spotlight in these studies. However, due to its immaterial nature, the target of development – an individual service – needed modeling, too. An extensively applied model is that of Edvardsson and Olsson (1996), which regards the creation of prerequisites for a well-functioning customer process and attractive customer outcome as the core task of NSD. The prerequisites are crystallized in the description of a service in terms of the concept, the process, and the system (resources).

Starting from their managerial focus, NSD studies produced several models for the implementation of a successful innovation process. The majority of these models followed the footsteps of the new product development (NPD) studies, which relied on the linear innovation paradigm and had developed a more specific “stage-gate approach” based on it (Cooper and de Brentani 1991). A strong emphasis on the intraorganizational work before the launch was typical in both NPD and NSD models throughout the 1990s. In the beginning of the next decade, Alam and Perry (2002) presented the first model which included customer collaboration as an essential part of NSD. Thereafter, NSD studies have increasingly emphasized customer orientation and interpreted it, not only as a practice of listening to the customer’s voice but also as a practice of engaging customers in concrete developmental activities.

Scholars with an innovation theoretical background have put less emphasis on the detailed modeling of service innovation processes. Instead of that, an important contribution has been the analysis of the integration of various innovation activities at the organizational level. The concepts of “balanced empowerment” (Sundbo 1996) and “strategic reflexivity” (Sundbo and Fuglsang 2002) highlight the ways in which service organizations typically manage (and should manage) their innovation efforts as a whole. Balanced empowerment aims to explain how innovation activities can be fostered in a context which does not include a separate R&D function. The role of strategy and management are crucial here: they should both stimulate and channel innovativeness among the individual actors and answer the questions “why, when, and how to innovate.” Strategic reflexivity highlights the reflections on the purpose of the organization and the goals of actors, as well as the interpretations of the interplay with the environment. It also points out the importance of reconciling top-down and bottom-up processes in innovation.

In 2004, Vargo and Lusch challenged the basic problem formulation in service research by suggesting a new approach: service-dominant logic (S-D logic). According to it, service (singular) should be separated from services (plural). The former refers to the process of using one’s competences for the benefit of another party, while the latter are conveyors of competences and in this sense comparable with goods. In the S-D logic, the concept of service is equally important in the case of both goods and services and includes value cocreation between the provider and the customer as its core phenomenon. Value is not inherent in goods or services but becomes realized only when the customer uses them. Before value can be realized,

the input from a single provider has to be linked to other inputs, some of which are obtained from the market, others based on public sources or provided privately. Thus, the role of the customer as a value creator manifests itself in the integration of contextual resources. Relating customers to their contexts broadens the perspective from the provider-customer dyad to multiple actors and to actor networks in which value is created mutually and reciprocally (Vargo and Lusch 2011).

The approach of S-D logic is not totally new. The conceptual difference between services as offerings and service(s) as their outcome (benefit provided to the customer) was already made by Hill (1976). More recently, the characteristics-based model of Gallouj and Weinstein included the idea that services provide service: the authors use the concepts of “final characteristics” (benefits) and “service characteristics” as synonyms. In service marketing, the central role of the customer has been a core claim for several decades (Grönroos 1990; Edvardsson and Olsson 1996). There are, however, important contributions and novelties in S-D logic. They are included partially in the managerial implications that follow from viewing the customer as resource integrator. Even more important is the view that manifests itself when we move from the consideration of individual service relationships to the level of markets and the economy. S-D logic is not primarily a service theory but a theory about the emergence of use value. Even though its “intellectual home” is in service marketing, it has adopted many of its basic arguments from social sciences. In this way, it has built bridges between different scientific discourses in service research.

From the viewpoint of innovation, S-D logic is interesting and important in many respects. First, its basic premises are compatible with the neo-Schumpeterian thinking about innovation. Common points are the embeddedness of innovation in everyday business activities, emphasis on the institutional arrangements surrounding the efforts of value creation/innovation, multi-actor perspective, and interest in knowledge and skills behind concrete outputs. Second, S-D logic has boosted the search for alternative process models in innovation. The approach of effectuation in particular has gained ground as a more flexible innovation practice compared to the linear stage-gate models. It suggests replacing predetermined goals with an approach that begins from available means and via expanding cycles of resources allows the goals to emerge in the course of action (Read et al. 2009). Third, S-D logic has paid particular attention to the institutionalization of innovations (Vargo et al. 2015), which is a much less understood area compared to the creation and diffusion of innovations.

An important aspect in S-D logic is the adoption of a system view in value creation and innovation (Vargo and Lusch 2011). In recent years, a holistic stance has gained ground in service research also generally: it has been understood that the dynamic interactions between individual technological and service innovations are essential. A system view and system methods are needed in order to analyze the complex phenomena that result from these interactions. Systems include several characteristics that make their behavior counterintuitive and result in failures of seemingly obvious solutions (Sterman 2000). Feedback is a central characteristic: decisions of the actors trigger others to act, which alters the next decisions of the

original actors. It is also common that small, random perturbations are amplified by feedback. Another characteristic concerns the difficulty of identifying cause-effect relationships as causes and effects are often distant in space and time. Finally, systems are constantly adapting and self-organizing: actors change their behavior as a result of learning. These complexities remain unnoticed if different outputs, outcomes, and related performances are analyzed separately.

A transfer of focus from individual goods and services toward the analysis of systems is taking place at several levels. In businesses and organizations, the development of integrated solutions includes a system perspective. Integrated solutions are a bundle of physical products, services, and information, seamlessly combined to provide more value than the parts alone. A network of actors is usually required to provide these kinds of solutions (Brax and Jonsson 2009). More macro-level systems have also attracted increasing attention (Ahrweiler 2010). They are essential because the current social, economic, and environmental challenges are too big to be solved via individual product and service innovations created in individual organizations. The concept of system innovation refers to the simultaneous development of organizations, technologies, services, and network relationships. The novelty created is not restricted to a new outcome, but also the knowledge sources and the ways to interact during the innovation process are new. A crucial question is how to combine various innovations effectively and disseminate them rapidly based on the collaboration between different organizations (Harrison et al. 2010).

The broad topics of innovation in individual services, in the context of value cocreation, and in systemic constellations have fostered the emergence of multiple specific research areas. In the mid-1990s, studies on producer services led to the “discovery” of KIBS (knowledge-intensive business services), which were found to be important facilitators of innovations in other companies and organizations (Miles et al. 1995). Since then, KIBS research has continued as one of the most active subareas in service innovation research. Sector-based innovation studies have broadened and deepened. For instance, studies on industrial services have helped to reduce the distinction between goods and services. Studies on public innovation have provided insights on the role of grassroots employees as transmitters of user input into organizations (Sørensen et al. 2013). In the newest literature, the grand societal challenges are clearly visible. The role of services in sustainable development has aroused growing interest and is linked to the new opportunities that digitalization provides for citizen empowerment.

Simultaneously with the multiplying topics in service innovation, the theoretical frameworks have become more versatile. Examples of the approaches that are actively studied are practice theories and experience-based theories. A typical trend is also the growth of interdisciplinary linkages: concepts are transferred to new contexts. An illustrative example is the concept of “bricolage” which was originally applied in anthropology but is now used as a process model in service innovation (and besides effectuation is a promising alternative to the linear model). Its core is in the co-shaping of an emerging path – blurring the boundaries between design and implementation (Fuglsang 2011).

This book discusses in more detail the topics described above. The book is divided into three sections. The first section provides an overview on service innovation as a research topic, including both the perspective of services as offerings and the approach of S-D logic: service as value cocreation. Further, this section connects the analysis of service innovation to the analyses of social and system innovations. The second section focuses on the management of service innovation, which is examined from the viewpoints of business models, innovation practices, service experience, and customer interface. The third section illustrates specific themes that have been topical in service innovation research during the recent years. It studies first the role of services in the sustainability efforts. Thereafter, it brings to the fore new insights concerning innovation in various service sectors: public services, industrial services, and KIBS. The book ends up with a chapter that tackles the relationship between internationalization and innovation – a topic whose significance is continuously growing.

Structure of the Book

The first section of the book includes four chapters. Ian Miles opens the book by depicting in Chap. 1 broad trends and major themes in the service innovation literature during the last 20 years. Using a bibliometric analysis, he reviews the development from the neglect of service innovation to the prominence and recognition of this phenomenon. He also specifies further the broadly used categorization into assimilation, demarcation, and synthesis views on services and manufacturing through a separation of techno- and servo-focused approaches. Techno-assimilation considers services to be fundamentally similar to manufacturing, while the servo-assimilation (actually S-D logic) regards service as a pervasive economic phenomenon – the end result of all economic activity. Techno-demarcation focuses on the role of technology in service innovation, while servo-demarcation highlights the peculiarities of service innovation as compared to manufacturing innovation.

In Chap. 2, Heiko Wieland, Stephen Vargo, and Melissa Akaka apply the S-D logic to examine the role institutions and institutional arrangements in innovation – tackling the question of how and why particular innovations succeed and others do not. They highlight the significance of market innovation which does not automatically occur when new value propositions in the form of new technologies or products are introduced. Essential for market innovation is the “stabilization” of new practices through institutional work. The authors suggest a service ecosystems perspective as a way to zoom out from the firm level to the broader level of actor networks. On the other hand, they also emphasize the significance of zooming in: analyzing deeper resource integration and value creation practices in microlevel contexts of nested interactions. Finally, examining the interplay of micro-, meso-, and macro-level phenomena often reveals intra-institutional inconsistencies and contradictions that slow down or prevent the emergence of common interpretations necessary for the acceptance of new value propositions.

Also Chap. 3 applies a systems perspective. The aim of this chapter by Kyoichi Kijima, Marja Toivonen, and Sampsa Ruutu is to provide starting points for the development of a dynamic innovation model of service ecosystems, on the basis of the views included in the neo-Schumpeterian framework and the S-D logic. In order to do this, the chapter combines the panarchy concept of the general systems theory and the approach of transition management. Panarchy explains the occurrence of both stability and change in complex systems. Variability and novelty are periodically generated in these systems due to internally accumulated resources or due to external conditions that change the dynamics of the system. Panarchy illustrates how service ecosystems develop via adaptive transition and how they also experience phase transitions which move them into a qualitatively different state. The approach of transition management is used for the analysis of contents issues. The specific issue examined in Chap. 3 concerns paradigmatic shifts in the European public sector: the transition from public administration to new public management (NPM) and further to the emerging network governance.

Chapter 4 authored by Luis Rubalcaba studies the relationships between service innovation, social innovation, and system innovation. The focus is on social innovation which – after the general characterization and definition – is analyzed from the service perspective. On the other hand, the chapter suggests that the approach of social innovation can enrich the study on service innovation as it is not restricted to the context of markets but takes into account the public and third sectors, too. In addition, social innovation highlights solving the urgent social problems of today. Several common points between the concepts are identified in the chapter. First, the outcomes of social innovation are often new services. Second, a great part of social innovations take place in service sectors. Third, the participatory processes characterizing social innovation require service coproduction and co-innovation. Fourth, service innovation can be considered a dimension behind the processes of social innovation. Based on the analyses, three features are identified as characteristic of social innovations: prevalence of social goals, social means (complex systemic coproduction), and service and non-technological innovations (besides possible technological outcomes).

The second section of the book moves the discussion toward the management and practice of service innovation. In Chap. 5, Matthijs Janssen and Pim den Hertog combine the frameworks of service innovation and business model. The starting point is the six-dimensional service innovation framework developed earlier by the second author. According to the authors, this framework actually corresponds to the well-known business model canvas by Osterwalder and Pigneur (2010) – both also reflect the evolutionary theory. The main research question in the chapter is: which innovation capabilities are needed when developing a service-based business model? Five core capabilities (also evolutionarily inspired) are suggested, and hypotheses on their relationships to innovation dimensions are tested using a large-scale survey. As most hypotheses are confirmed, the authors conclude that the approach provides guidance to innovate service-based business models.

Chapter 6 includes a practice-based approach to innovation. Tiziana Russo-Spena and Cristina Mele highlight that innovation is not only an outcome or a

result of deliberate activities but first and foremost a collective doing of actors, produced in working activities on a daily basis. Concepts like “bricolage” are near to this practice lens. The authors use the term “innovating” to emphasize the dynamic and emergent character of the phenomenon. This term is conceptualized as a texture of practices that seamlessly interweave relationships and actions. Networking and knowing are essential practices that emerge in actor-to-actor interactions during innovating. A case study in the area of healthcare is included in the chapter and shows concretely how innovating occurs as changes in practices and in their related elements (actors, resources, activities).

In Chap. 7, Antonella Carù, Laura Colm, and Bernard Cova argue that innovation in services can emerge through the creation of memorable experiences for customers. More specifically, the chapter analyzes the role of an innovative servicescape: the physical, social, and virtual environment in which a service process takes place. Servicescape is examined as a platform able to support activities in different cases of presence and involvement of the customer and the employee: self-service, interpersonal service, and remote service. Based on case vignettes representing these differing circumstances, the authors suggest three main findings. First, servicescapes have to be continuously improved due to the evolving customer needs. Second, the importance of servicescapes themselves should be highlighted: they are more than a setting for service processes. Third, technology is central regarding both the providers and customers; firms should realize that also customers hold considerable technological potential which can be explored and capitalized.

Silvia Gliem and Christiane Hipp continue the discussion on customer encounter in Chap. 8 by focusing on the impacts of ICT. They state that many studies have mapped the customers’ attitudes toward technology, while the actual usage of technology has been examined much less. ICT in particular has influenced strongly, not only on “trimming” the back office service activities but also on facilitating the front office service encounters: services can be delivered faster, more accurately, and at a higher quality. However, the know-how required in ICT usage among the frontline employees and customers has been analyzed rarely. The authors propose ICT literacy as a useful concept for further research to shed light on ICT as a means of value creation in services.

The third section of the book discusses topical themes in service innovation research. In Chap. 9, Faridah Djellal and Faiz Gallouj analyze the role of services and service innovation in the promotion of environmental sustainability. The authors argue that the supposed immateriality of services, which seems to favor their natural sustainability, is a myth. In order to justify this argument, the chapter provides a profound theoretical analysis of the materiality of services. Materiality may be included in the service medium or target, in the physical spaces of production or consumption, in the production factors, or in coproduction relationship which often requires mobility (transport facilities) and infrastructure. On the other hand, the authors emphasize that materiality is not an intrinsic characteristic of services but a social construction whose degree depends on the output conventions adopted (the same holds true in the case of goods, too). Consequently, even though “naturally green services” is a myth, the greening of the economy is possible

via services and service innovation. This can occur through greening strategies within service sectors and/or through the dematerialization of goods by adding service components in them.

The next three chapters analyze innovation in different service sectors: the public sector, manufacturing, and KIBS. In Chap. 10, Lars Fuglsang and Jon Sundbo examine service innovation in the public sector. They outline the characteristics and conditions that in the public sector differ from market-based service sectors. The concept of innovation capabilities is used as the core concept for comparing private and public service innovations. Partially, the capabilities needed are the same in both sectors. However, public service systems also require some specific capabilities due to their linkages to political systems. Innovative coproduction with users and the involvement of employees and their bricolage are important capabilities in both private and public services. A specific feature in the public sector is the importance of public value and the obligatory aspects included in the role of employees: they have to deliver services even in wicked or complex situations.

In Chap. 11, Christian Kowalkowski studies innovation in industrial services from the viewpoints of offerings, processes, and business models. As a starting point, the author identifies the basic difference between new product development and new service development. While product development is generally “back heavy,” service development is “front heavy.” The former emphasis means that abundant resources are needed for prototyping and technology development. The latter approach focuses on market introduction, pilot testing, and securing the skills, systems, and infrastructures for sales and delivery. In terms of service offering innovation, the chapter presents a taxonomy based on service focus and revenue model. The service process design is analyzed using a typology with two dimensions: diversity of demand and customer disposition to participate. Finally, three business model archetypes – equipment supplier, availability provider, and performance provider – are discussed in the context of service innovation.

Chapter 12 by Jiang Wei and Dan Zhou examines the important topic of KIBS and innovation. An interesting additional aspect is the empirical context of the study: the emerging KIBS sector in China. Previous research has highlighted the role of KIBS in innovation systems, suggesting that KIBS act as sources, carriers, and facilitators of innovation. This study aims to provide a more specific understanding about these roles in relation to manufacturing. It also explicitly links the analysis to the viewpoint of innovation system. In China, the influence of KIBS on manufacturing is a key question when their role in the innovation system is evaluated. The authors use an input-output framework and curve estimation to explore the relationship between KIBS input and manufacturing innovation in China. The results indicate that there is a positive relationship between these variables. KIBS mainly play a role of knowledge coproducer and knowledge disseminator in the Chinese innovation system.

The final chapter (Chap. 13) in the book is authored by Patrik Ström and Robert Wentrup. It discusses the interaction between internationalization and innovation – two mutually enforcing processes. More specifically, the chapter examines how firms within new sectors, such as Internet service providers, make use of their

internationalization as a way to compete for innovation. The chapter opens up the spatial aspects of how internationalization is conducted and what firms are looking for at specific locations to facilitate their innovation process and obtain a sustainable competitive advantage. Two mini-cases of Internet service providers reveal the importance of connections between the firm level and the macroeconomic structures within regions and knowledge clusters. Regional development policy helps to promote the firm-level development by creating an environment that supports innovation. It also improves attractiveness for foreign firms wanting to expand abroad and take advantage of knowledge clusters or centers of excellence.

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