Research Approaches to Service Innovation: Organizational Perspectives

Laura C. Anderson[1(✉)], Kelly Lyons[2], and Yuriko Sawatani[3]

[1] IBM Research – Almaden, 650 Harry Road, San Jose, CA 95120-6099, USA
lca@us.ibm.com
[2] University of Toronto, 140 St. George St., Toronto, ON M5S 3G6, Canada
kelly.lyons@utoronto.ca
[3] NUCB Business School, 1 Chome-3-1 Nishiki, Naka Ward,
Nagoya, Aichi 460-0003, Japan
yurikosw@gmail.com

Abstract. With the evolution of the world economy from manufacturing and goods to a services context, the focus of researchers and businesses alike has shifted to building an understanding of how to foster service innovation. Design techniques, such as design thinking, have been utilized to engage customers in service co-creation to shape their service engagement for maximum benefit and to introduce new ideas and innovative approaches. This paper focuses on research approaches to study service innovation in commercial organizations, and findings from those experiences. Insights related to data and methods, organizational ecosystems, customer interactions and employee engagement will be discussed, with particular focus on how these impact service innovations.

Keywords: Service innovation · Service design · HSSE · Human side of service engineering

1 Introduction

Service innovation is a complex concept that must be addressed from different perspectives. Research suggests that, in order to design service systems that are conducive to innovation, actors from diverse backgrounds and many worldviews are needed [10]. These actors must interact, collaborate, and be able to change roles and understand diverse and conflicting views and perspectives [10]. From an SD-Logic perspective, value cocreation is a key theme in service innovation [12]. All actors (including customers) play a role in value cocreation and innovation, as ideators, designers, and intermediators [12]. Opportunities to play these roles and to innovate in service organizations are increasing with advances in data-based capabilities [1].

Design techniques play an increasing role in service innovation [1]. For example, design thinking is a recent approach that has been applied to innovation in service contexts. In this paper, we define nine organizational and service science constructs that underly our understanding of service innovation in organizational contexts. We report on and summarize six presentations from a recent workshop on organizational

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perspectives of service innovation and relate the topics of the presentations to the nine constructs. The results highlight the variety of methods being applied to innovation design and the breadth of organizations contexts being affected.

2 Organizational and Service Science Constructs

We identified nine constructs that are important and relevant to our understanding of service innovation in organizational contexts. We identify key concepts from service science that help articulate and present aspects of service innovation: *service system*, *service innovation*, and *service design*. We also include general organizational constructs such as *people*, *organization*, *transformation* and the broader *ecosystem*. Finally, we note *method* and *data* which provide insight and understanding of the service and/or organizational activity and are important inputs into service design activities to shape the service experience. Figure 1 provides an overview of these *constructs* and their relationship to each other and service design. We consider each construct in more detail below.

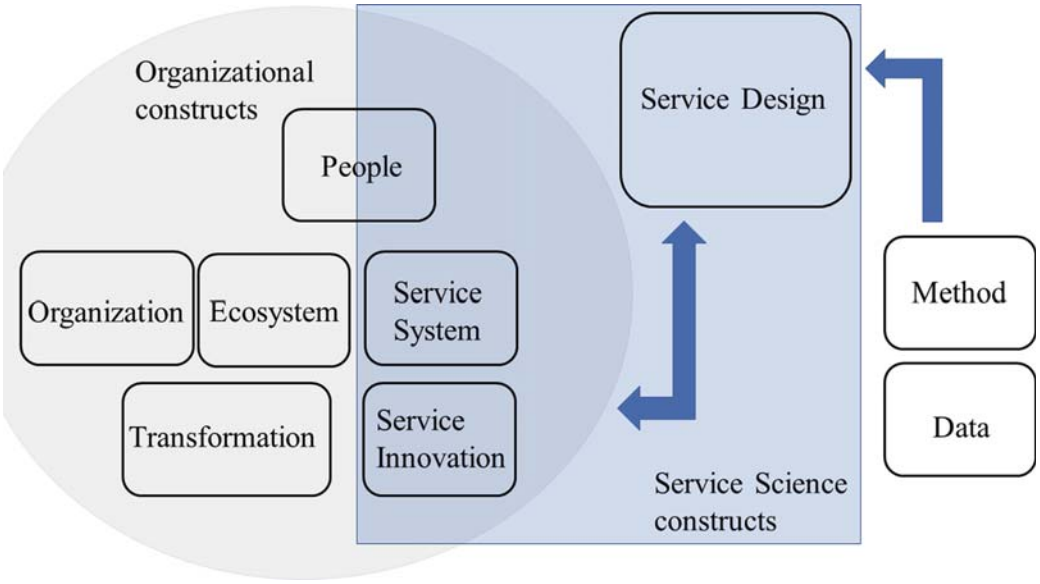

Fig. 1. Key constructs emerging from research approaches to service innovation

2.1 People

Recently, human centered design, especially design thinking is drawing attention in companies. The origin of design thinking is "designerly thinking" based on several academic research focusing on specific skills and abilities of professional designers, such as architects. Design thinking is regarded as a simplified version of designerly thinking [8]. Simon [16] defined the design as "to change the existing situation to a favorable one." Buchanan [4] refers to the characteristics of the nonlinear design process and

claims that the design process is a way of thinking to tackle "evil problems." Design thinking is gaining attention in companies because it focuses on people [7]. Design thinking, the basis of service design, empathizes with people, imagines what people think, and exposes essential problems. It is an important perspective for skill development (Sawatani) and employee engagement (Anderson & Kieliszewski).

2.2 Service Design

Service design adapts design thinking to the creation of service systems. Furthermore, service design cases and methods are discussed in companies and public services. The research area of service design has been extended from interface to interaction design since 1990. In interaction design and Human-Centered Design (HCD), the overall design is targeted for designing the user experience based on the product user interface and its use. The service design research community discuss not only the human-centered design and interactions but also service science [17, 15] and product-service system (PSS), and have expanded to service systems and service life cycles. The linkage among various objects, such as people, technology, organizations, information and the other social objects will form the relationship with innovation management (Wolf & Blomberg), employee engagement (Anderson & Kieliszewski), and service innovation (Lyons). Service design can be applied to these various relation visualization as well as evolving and analysing them.

2.3 Transformation

When adapting a solution created by design thinking or service design to a company, the company needs a transformation from the existing way. The domain of that transformation may be limited to one organization but may also extend to working with multiple organizations and other companies. Also, design thinking, and service design are not just solutions, but can also be integrated at the management or strategic level. New service systems are thus adapted and require enterprise transformation.

Introducing new technologies and skills into an organization requires choosing, adapting, assimilating and leveraging existing assets with new ones. In other words, transformation by introducing new roles (Alexander and Lyons) and building new relationships (Lyons) are important issues that frequently appear in our society.

2.4 Service Innovation

In general, innovation processes are defined as mechanisms for turning ideas into outcomes through the application of resources [2]. The SD-Logic view of service innovation puts a focus on the fact that those service innovation processes are collaborative, and the resources are not only applied but adapted and integrated in broader contexts [1]. A recent systematic literature review found that service system innovation is an underexplored area of service science [6]. Recent work has considered how people and social interaction enable service innovation [10] and how employee collective intelligence can be harnessed for service innovation in firms.

2.5 Organization

Organization is an important context for service businesses, because these internal and external structures provide process, measurement, and motivational frameworks for employees, customers, and stakeholders. As companies are influenced by macroeconomic and industry forces (Sawatani), they exert a resulting influence on the behavior of employees, customers, and stakeholders in order to survive and thrive. Creating and introducing innovation is a key differentiator between companies, and a key component of a successful business approach (Wolf & Blomberg). Organizations desire to create a corporate culture which enables their employees to innovate, and engagement – both work engagement and employee engagement – has been found to be an important factor in fostering innovation (Anderson & Kieliszewski).

2.6 Method

Our grounding in Service Science provides a rich inter-disciplinary foundation for the study of the intersection of organizations and innovation, and a diverse set of investigative and analytical methods. These methods provide focus on complex phenomena from different vantage points and with different affordances for insight. Drawing from Computer Science and Data Science, data-centric methods (Alexander & Lyons; Lyons) leverage digital data which is cross-organizational, longitudinal, and highly contextual to examine people, organizations, processes, and services in motion. These digital footprints and electronic records can be combined to form an ethnographic approach of study (Jackson; Wolf & Blomberg). Focus on the people component in organizations, particularly important motivational factors such as effectuation (Sawatani) and employee and work engagement (Anderson & Kieliszewski) provides insight and implications for other important ecosystem factors such as value co-creation (Lyons), organizational transformation (Wolf & Blomberg; Anderson & Kieliszewski), and technological innovation (Lyons, Alexander & Lyons, Wolf & Blomberg), and legal and organizational policy (Alexander & Lyons, Wolf & Blomberg). The presentations in this session focus on a range of contexts, from software engineering and open source communities (Lyons), corporate research (Anderson & Kieliszewski), large corporate enterprises (Sawatani), and industrial environments (Wolf & Blomberg, Jackson). These methods also provide options in defining the unit of analysis for study, which also provides an opportunity for new research insights.

2.7 Data

As data availability and analytics capabilities increase, there is considerable interest in using data to advance service systems [9]. Studies of service systems and service innovation make use of a variety of data and analysis techniques [Alexander & Lyons, Wolf & Blomberg]. In particular, artificial intelligence (AI) is a popular approach for making use of data to advance and innovate within service systems (Alexander & Lyons, Wolf & Blomberg). Other data-driven approaches have been applied to service system design (Anderson & Kieliszewski) service work processes (Anderson & Kieliszewski, Jackson) and exploring how data and data analytics are enabling service innovations within more traditional organizations [5].

2.8 Service System

Finally, the construct of service system from the service science literature [11] provides a unifying framework for these important components, and an abstraction to use in examining very complex entities. Just as service science has been the beneficiary of work from many other disciplines (e.g., business, management, computer science), the construct of service system is an important contribution to other disciplines concerned with people, organization, and information functioning in complex environments. A service system is defined as, "a dynamic value-cocreation configuration of resources, including people, organizations, shared information (language, laws, measures, methods), and technology, all connected internally and externally to other service systems by value propositions" [16]. Because a service system can be viewed at varying levels of granularity, cities, universities, companies, departments within companies, nonprofit organizations, government agencies, and even people can be viewed as service systems [12].

2.9 Ecosystem

Like service systems in service science, a service ecosystem in S-D logic is defined as, "a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" [17, pp. 10–11]. In an S-D logic ecosystems perspective, service exchange takes place among social and economic actors (actor-to-actor exchange) which includes more traditional client-provider exchange as well as broader configurations of actors [1, 17].

3 Synthesis of Session Presentations

The following six presentations in this session of the Human Side of Software Engineering (HSSE) track of the Applied Human Factors and and Ergonomics (AHFE) conference 2020 highlight the breadth and depth of current approaches to service innovation in organizational contexts:

1. Sawatani, Y., Effectuation model for large companies
2. Wolfe, C. T., Blomberg, J. L. Innovation-as-a-Service: Emergent Lessons from an AI Innovation Management Project
3. Alexander, R., Lyons, K. Barriers to Service Innovation using Data Science
4. Anderson, L. C., Kieliszewski, C. A., Service Design approaches to drive employee engagement
5. Jackson C., Anderson, L. C., Kieliszewski, C. A., Methodological Reinforcements: Investigating Work through Trace Data and Text
6. Lyons, K., Methods for Analyzing Service Innovation in Software Development

Figure 2 provides a consolidated view of the coverage of the six presentations across the nine constructs detailed in Sect. 2. The numbers in the first row indicate the specific key constructs (each corresponding to the secondary outline number in Sect. 2)

that are covered in each paper, as well as other descriptive information. This provides a view of the landscape covered, including the range of organizational contexts; the variety of service systems and organizational contexts explored; some study method details such as use of ethnography and focus on data science; the particular focus on employees, teams, and people; and the angle on innovation.

	Alexander & Lyons	Anderson & Kieliszewski	Jackson et al	Lyons	Sawatani	Wolf & Blomberg
Constructs addressed	1,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	1,5,6,7,8	1,4,5,6,7,8,9	1,2,3,4,5,8,9	1,2,3,4,5,6,7,8,9
Data Science	yes		yes			
Ethnographic methods		yes	yes			yes
Organizational context	Broad	Research	Research	Software Engineering	Large enterprises	Large, global technology & consulting firm
Service System		Company location	Scientific Research project	Open source software development community	Entrepreneur ecosystems, departments in a large org.	Firm, clients, industry
Employee topic		Engagement	Understanding individual & team activities	Understanding coordinated activities	Effectuation	Client and other actor relationships
Innovation angle	Data science barriers affecting service innovation	Enhance employee engagement	Using organic digital data to understand communication & work	Factors associated with innovation outcomes	Application of startup ideas	Innovation as a service

Fig. 2. Consolidated view of session presentations and key constructs.

It is clear that advances in data science and analytics are driving innovation in service systems and ecosystems. There are many different methods being applied to design innovations in organizational contexts including traditional social science methods (e.g., ethnography) and data and computer science approaches. The breadth of organizations being impacted span commercial enterprises, industrial settings, research, and community-based environments. This breadth and depth in contexts and approaches will only continue to expand as new analytical approaches emerge in the coming years, and learning is applied across disciplines and environments.

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