Ambidexterity in Service Innovation Research: A Systematic Literature Review

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Abstract. Increased interconnectedness of multiple actors and digital resources in service eco-systems offer new opportunities for service innovation. In digitally transforming eco-systems, organizations need to explore and exploit innovation simultaneously, which is defined as ambidexterity. However, research on ambidextrous service innovation is scarce. We provide a systematic literature review based on the concepts of ambidexterity, offering two contributions. First, research strands are disconnected, emphasizing either exploration or exploitation of service innovation, despite an organizations' need to accelerate innovation cycles of exploring and exploiting services. Second, a new framework for ambidextrous service innovation is provided, inspired by the dynamism and generative mechanisms of the ontologically related concept of organizational routines. The framework adopts the perspective of a mutually constitutive relationship between exploring new and exploiting current resources, activities, and knowledge. The findings remedy the scattered literature through a coherent perspective on service innovation that responds to organizations' needs and guides future research.

Keywords: Exploration, Exploitation, Service Innovation, Organizational Routines, Ambidexterity

1 Introduction

Digital transformation is a buzzword [1], which describes "a technology-induced change […] that includes both the exploitation of digital technologies to improve existing processes, and the exploration of digital innovation" [2]. Digital technologies, i.e. devices that process a binary computational code and smart technologies, i.e. interconnected devices that share information and interact with its users and other devices [3], provide opportunities for innovative services [4]. A service is designed through a collaborative process by integrating knowledge and skills (operant) and tangible resources (operand) that provide value to actors in a service system [5]. A fundamentally new process or service offering—either in addition to current services or as change in the delivery process—is defined as a service innovation (SI).

The complexity and rapid speed of changing markets and technologies [6] increase competition as well. Organizations need to accelerate cycle-times of exploring new SI and exploiting them efficiently [7]. The management of dual capacities of exploring

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and exploiting is defined as ambidexterity [8]. Exploration is associated with radical SI to attain progress in changing service eco-systems [8]. However, new edgy services may not always be appealing to customers or take time to unleash their full potential, which can be risky for organizations [9]. While exploring SI, organizations need to exploit existing services through continuous improvement and increasing the efficiency of service processes [8]. Organizations like MySpace, studyVZ, or Vine that only focused on exploitation without exploring new value-adding features for their service portfolio have experienced declining user numbers and finally had to shut down their businesses. These cases demonstrate that organizational ambidexterity is an important capability in dynamic and digitally transforming service eco-systems [10].

Whilst organizations need to focus on exploring and exploiting SI simultaneously, research on SI is getting increasingly extensive and dispersed [11]. Previous literature reviews have pointed out that SI encompasses different aspects, such as New Service Development, Service (Systems) Engineering, and Service Management [6]. However, an integrated view on ambidextrous SI seems to be scarce [12], motivating our research question: "*To what extent are exploration and exploitation of SI covered in research?*"

The paper offers two main contributions. First, we identify a disjunction of SI literature with articles either focusing on exploration or exploitation. Second, we provide an integrative conception of the different research strands that uncovers the fundamental mechanisms of SI. We derive three propositions from a conceptual analysis and develop a framework for ambidextrous SI. The framework builds on dynamism and generative mechanisms, inspired by the concept of organizational routines—hereafter referred to as routines only. Routines are "recognizable patterns of interdependent actions, carried out by multiple actors" [13]. SI and routines are ontologically related since both are performed by multiple actors, are composed of some recognizable patterns of activity, and are endogenously changing. Further, the paradox of simultaneous competing pressures for exploration and exploitation activities has already been resolved in routines literature [6], helping to understand ambidexterity in SI as well and thereby, remedying the disjunction in SI literature.

The paper unfolds as follows: In Section 2, theoretical foundations of SI and ambidexterity are provided. Section 3 justifies the systematic literature review as research method. In Section 4 the results from the literature review are described and presented in a concept matrix. Section 5 continues with the discussion of insights resulting from the concept matrix. We derive three propositions that are used to develop a framework, which unifies scattered SI research through ambidexterity. The paper is concluded in Section 6 with the contributions to research, implications, and limitations.

2 Theoretical Foundations

2.1 Service Innovation Research

Service science is the study of service systems [14], which focuses on the co-creation of value within complex constellations of integrated resources, leading to innovative services [14, 15]. A service system is the basic unit of analysis [14], which describes "a

configuration of people, technologies, and other resources that interact with other service systems to create mutual value'' [16]. Value emerges through the use and application of resources within a service system [5]. SI emerged as a new concept during the 1980's in service science research [17]. At the same time, New Service Development research emerged in the Anglo-American literature. Soon thereafter, Service Engineering arose in Germany as another research stream that adopted approaches from product engineering to design a value proposition in a structured way [18]. Whereas Service Engineering encompasses models, methods, and principles to design individual services, Service Systems Engineering describes the design and development of another basic unit of analysis, i.e. service systems as integrated conglomerates of services, products, and information technology [16, 19]. SI, New Service Development, and Service (Systems) Engineering emanate from different research disciplines, but are often used interchangeably [20].

There are two alternative views for conceptualizing value and value creation, which are referred to as "value-in-exchange" and "value-in-use" [15]. Value-in-exchange refers to the output or distribution of service, focusing on a goods-dominant logic (GDL) view [15]. Value-in-use is defined in service-dominant logic (SDL) by describing that value is determined by a user's consumption [21]. Value is co-created jointly and reciprocally by multiple actors through the integration of resources and application of competences [15]. Hence, value evolves differently in exploring and exploiting products and SI. In the light of SDL, we refer to service as "the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself" [5].

In a digitally transforming eco-system, organizations need to engage in accelerating cycles of SI to expedite growth, improve quality of services, satisfy customer needs, and to be competitive [17]. SI describes both, a change of an existing value-proposition or a design of a new value-proposition [22]. This includes the configuration or reconfiguration of resources within a service system [23]. Innovation does not only create value for an organization, it also changes the eco-system in which an organization operates [9]. Hence, SI needs to be distinguished from an invention, since an invention has no inherent value [9].

The process of SI can be planned, as an outcome of development activities or emerge from an individual's actions [24]. A multitude of methods for planning and developing innovative services have been proposed [18]. Whereas initial methods suggested sequential or linear aligned steps to develop innovative services, more recent models rather propose iterative patterns for service design [17, 18]. Other research focuses on managerial frameworks with a focus on different resources, information, and knowledge for SI [4, 12, 17, 22, 23].

2.2 Ambidextrous Organizations in Digital Transformation

Organizations need to adapt to a changing eco-system and technological change [25], which causes conflicting requirements. On the one hand, organizations have to achieve innovation through the exploration of new competencies [26]. On the other hand, they have to be efficient by exploiting their current capabilities [26]. In early research, the

activities of exploration and exploitation have been seen as an incompatible trade-off [27]. However, focusing only on exploration will lead to low returns, whereas organizations that engage only in exploitation will eventually become deprecated [28].

More recent research introduced the concept of ambidextrous organizations. Ambidexterity refers to an organization's ability to be adaptive to changes for long-term success (*exploration*) whilst reducing variance and leveraging existing resources and capabilities efficiently (*exploitation*) [28]. Exploration and exploitation need to be well-balanced for the current continuance and future viability of an organization [25].

Until the late 1990's, ambidexterity was used to describe dual structures in organizations [29]. Some units of the organization were focused on searching and (re-) combining resources to achieve variation, while other units were employed for efficient alignment of organizational structures [26]. Ambidexterity was conceptualized as a temporal sequencing of exploitation and exploration [8]. However, in fast changing eco-systems, a periodically change by adapting new strategies and structures is ineffective [30]. Organizations need to engage simultaneously in exploitation ensuring current viability and devote sufficient attention to exploration to ensure the future viability [31]. In recent research, contextual ambidexterity has become prevalent, which is manifested in specific actions of individuals in organizations [29]. Contextual ambidexterity is the capacity to simultaneously demonstrate exploration and exploitation in each entity of an organization [29]. Since digital transformation requires removing organizational silos that work autonomously from other units [32], contextual ambidexterity is a crucial capacity of organizations. Thus, organizations continuously streamline current business activities and engage in innovation activities [8].

3 Research Method

The systematic literature review on SI is based on the methodological guidelines by Webster and Watson [33] and vom Brocke et al. [34]. We refer to Cooper's [35] taxonomy to cover a sufficient and representative degree of SI research (*Figure 1*) [34]. The focus is on both, methods and theories of SI since they are mutually constitutive. The goal is to gain a better understanding of the central concepts and thereby, identify issues and suggesting areas for further progress in the SI literature [35].

Features	Categories			
Focus	Research Outcome	**Methods**	**Theories**	Practices of Application
Goal	Integration	Criticism	**Identification of Central Issues**	
Perspective	**Neutral Representation**		Espousal of Position	
Coverage	Exhaustive	Exhaustive with Selective Citation	**Representative**	Central or Pivotal
Organization	Historical	**Conceptual**	Methodological	
Audience	Specialized Journals	**General Scholars**	Practitioners or Policy Makers	General Public

Figure 1. Positioning the Literature Review [35]

The perspective adopted for this literature review is neutral to provide a realistic representation of the current literature. A representative coverage of the literature by discussing the characteristics of SI makes the sample illustrative for a larger group of literature [35]. Although the audience of the review focuses mainly on IS scholars, we address researchers in service science, too. We conducted an iterative process for our literature search by defining and re-defining a search string and query structures through the course of the study. We started with scanning the literature to identify key terminology and synonyms. Since SI, New Service Development, and Service (Systems) Engineering emanate from different research disciplines, whose terms are often used interchangeably [34], we added the terms to our search string (see *Table 1*).

Table 1. Search String

("service" OR "service system" OR "services" OR "service science") AND ("innovation" OR "innovate" OR "innovativeness" OR "innovating" OR "invention" OR "creation" OR "create" OR "engineering" OR "design" OR "designing" "development" OR "develop" OR "new" OR "novel" OR "configuration" OR "configure" OR "organization" OR "organizing" OR "management" OR "process" OR "technique" OR "value cocreation" OR "value co-creation" OR "value proposition" OR "outcome" OR "resource" OR "exploration" OR "explore" OR "exploitation" OR "exploit")

Major contributions are published in leading journals and some conference proceedings [33]. Hence, we started by scanning the table of content and performed key word searches within these publications. The journals and conference proceedings were selected interdisciplinary, originating from the IS and Management discipline and were ranked as A+, A, or B according to the "VHB-JOURQUAL 3" ranking. Then, we extended the search within literature databases of AISeL, ProQuest, EBSCOhost, Google Scholar, Science Direct, and Web of Science. Afterwards, we conducted a backwards and forwards search to identify additional articles [33]. In total, the search yielded 1,145 articles. Duplicates were removed and articles that did not adhere to the following criteria were excluded: written in English, published in peer-reviewed scholarly journals or conference proceedings, address the focus mentioned in the taxonomy[1], and are available in full-text. Then, we performed an analysis of the title, keywords, abstract, and browsed the papers to identify, which articles are relevant for our review, leading to a sub-sample of 51. Lastly, we excluded research that was ranked lower than B level, narrowing down the literature to a final sample of 25 articles.

We followed the sequential model for structured content analysis by Mayring [36] to code the data. We filtered interesting aspects from the literature by using criteria and sub-criteria derived from theory [36]. Ten concepts were identified for which we defined coding rules [36]. Three researchers coded the articles independently. An initial inter-coder reliability [37] was achieved by calculating the average pairwise percent agreement ($A_0 = 0.815$), Fleiss' Kappa ($\kappa = 0.711$), average pairwise Cohen's Kappa ($\kappa = 0.712$), and Krippendorff's Alpha ($\alpha = 0.711$). Since all values exceed the critical value of $\alpha_{min} = 0.667$, sufficient congruence between the coders can be assumed.

[1] We excluded articles with GDL approach, such as product-service-systems that emphasize a transfer of physical items or temporary access to resources.

4 Conceptual Analysis of the Service Innovation Literature

To present a systematic review of SI literature, we compiled a concept matrix, which is presented in *Table 2*. The matrix is built on two main constructs of ambidexterity theory: exploration and exploitation. The main properties of exploration and exploitation are derived from ambidexterity literature, which are then clustered into three dimensions of service science: potential, process, and outcome [38] to guide the derivation of sub-concepts for analyzing the literature on SI more in-depth.

First, the potential of SI can be grounded in the intention of a new *strategic focus (1)* or *operational leverage (2)*. The potential for exploration is manifested in strategical positioning to gain a sustainable competitive advantage [39] while the exploitation potential is based on leveraging existing services by enhancing efficiency, productivity, or the service itself by changing its value proposition [10]. Second, the process of exploration and exploitation involves the use of resources, such as intellectual resources, organizational resources, technologies, and other assets [44]. Exploration is associated with search and *acquisition of resources (3)*, which are new to an organization or the strategic intent to newly combine internal and external resources to design innovative services [10, 20]. In exploitation the emphasis is on leveraging, adopting, and *reconfiguring resources (4)* that are already prevalent in an organization to capture opportunities in SI and extend existing services in day-to-day work [10]. In this regard, ambidexterity describes the ability of organizations to simultaneously exploit existing resources, and explore new resources for SI [59]. Exploration will require disruption and a *path-breaking approach (5)* by abandoning established services [41] to generate a new value proposition [59]. As opposed to exploration, exploitation is *path-dependent (6)*, since improvements and incremental innovation evolve from existing knowledge and routine-based experience [60]. Through the performance of task and activities new opportunities can emerge that trigger variations of the current services [61]. Third, exploration and exploitation often create divergent outcomes [61]. Even though both are important for the viability of an organization, exploration will rather lead to a *radical innovation (7)* whereas exploitation is associated with *incremental innovations (8)*, e.g. as improvements or extensions of service [30]. The focus of the paper is another concept of the analysis, in which we consider the articles that emphasize the design of an innovative *service system or value proposition (9)*. We also analyze whether *technology (10)* is mentioned in SI.

Some of the analyzed articles propose a framework that structures SI through a configuration of resources and use of organizational capabilities [22, 23, 39, 41, 43–45, 49–52, 55, 56]. An integrated framework that adheres to the opportunities of digital transformation is offered by Lusch & Nambisan [50]. Their framework is based on SDL and treats SI as a collaborative process occurring in actor-to-actor networks, in which individuals interact within a service eco-system [50]. Lusch & Nambisan [50] include service platforms, which enhance the efficiency and effectiveness of SI by de-coupling and re-combing resources to generate new value propositions. Thereby, technology can act as an operand resource—on which an operation is performed to produce an effect [5]—for supportive or enabling purposes and as an operant resource—that acts upon operand resources [5]—by creating novel opportunities for resource integration [50].

Table 2. Conceptual Analysis of Service Innovation Literature

Authors	Exploration					Exploitation				Focus	
	Strategic Focus (1)	Resources Acquisition (3)	Path-Breaking (5)	Radical Innovation (7)		Operational Leverage (2)	Resource Configuration (4)	Path-Dependent (6)	Incremental Innovation (8)	Scope (9)	Technology (10)
Andreassen et al. [39]						x	x	x	x	VP	x
Bessant & Maher [40]	x	x	x	x					x	VP	x
Beverungen et al. [18]	x	x	x	x						SYS	x
Bitner et al. [41]	x	x	x	x					x	VP	x
Breidbach & Maglio [23]						x	x	x	x	SYS	x
Chai et al. [42]						x	x	x	x	VP	x
Den Hertog et al. [43]				x		x	x	x		VP	x
Froehle & Roth [44]	x	x	x	x						VP	x
Helkkula et al. [45]						x	x	x	x	SYS	x
Höckmayr & Roth [46]	x		x	x			x			SYS	x
Jaakkola et al. [47]	x	x	x	x						VP	x
Kindström & Kowalkowski [48]						x	x	x	x	VP	x
Lipusch et al. [49]	x	x	x	x						VP	x
Lusch & Nambisan [50]				x		x	x	x	x	VP	x
Ojasalo & Ojasalo [7]	x	x	x	x						VP	x
Ordanini & Parasuraman [51]		x	x	x					x	VP	x
Ordanini et al. [52]	x	x	x	x						VP	
Patrício et al. [53]	x	x	x	x						VP	x
Patrício et al. [54]	x	x	x	x					x	SYS	x
Rubalcaba et al. [22]	x	x	x	x						VP	x
Russo-Spena & Mele [55]						x	x	x	x	VP	x
Salunke et al. [12]	x			x			x	x		VP	x
Srivastava & Shainesh [56]						x	x	x	x	VP	x
Teixeira et al. [57]	x	x	x	x						SYS	x
Yu & Sangiorgi [58]	x	x	x	x						VP	

Abbreviations: VP = Value Proposition, SYS = Service System

The third element of the framework is value co-creation by integrating existing resources of the service provider and the customer. Russo-Spena & Mele [55] extend the idea of co-creation by introducing the five "Co-s" model, which includes: co-ideation, co-valuation, co-design, co-test, and co-launch. Each "Co-" represents a phase of the innovation process resulting from dynamic and on-going interactions among resources, actions, and a group of actors who are interrelated via a dense network [55].

Other articles propose a linear approach [42, 46, 53, 54, 57] with discrete or consecutive steps or iterative approaches with multiple repetitions of the involved activities [7, 18, 48, 58] for developing innovative services. Ojasalo & Ojasalo [7]

develop a lean SI model for iteratively designing a new service through several improvement rounds until it is implemented. Each iterative cycle results in a minimum viable service that is deployed for customer feedback [7]. A different iterative approach is provided by Beverungen et al. [18]. The authors suggest an agile method that incorporates the recombination of internal and external resources to design an innovative service system [18]. The method is based on three phases: service system analysis, service system design, and service system transformation [18]. Each cycle of service system design results in a viable prototype that is either further improved or implemented [18], similar to agile methods in software development.

The conceptual analysis of the literature reveals three insights. First, previous research has mostly focused on either exploration or exploitation of SI. Few papers comprise sub-concepts of both, exploration and exploitation, e.g. in papers that are suggesting to use known and unknown resources for SI. Second, almost all articles consider technology as enabler for the design and delivery of innovative services. Only two articles provide a framework for designing and adopting an innovative service without explicitly addressing technology, neither as resource nor as an opportunity [52]. Third, most articles focus on creating, improving, or managing a value proposition and do not take a service system perspective. Only six articles consider a socio-technical system that comprises people, technologies, and other resources for value-creation.

5 Discussion

5.1 An Integrated View on Service Innovation

From the conceptual analysis we derive three propositions that describe how an integrated view of SI can be achieved. We acknowledge that exploring and exploiting SI are discussed as isolated concepts in the analyzed literature. However, exploration and exploitation should not be treated as a paradoxical tension or sequence of separate phases, but rather as continuum [61]. Ambidexterity theory provides a theoretical foundation that is already manifested in new product development [4]. However, exploring and exploiting SI requires a different approach, since services are designed through co-creation of value by multiple actors [23], integrate the knowledge and skills of multiple actors [5], and provide value through (temporary) access to resources (*value-in-use*) instead of acquisition (*value-in-exchange*) [23].

Our conceptual analysis reveals that SI can arise from both, strategic intent and operational activities. The constructive design of an innovative service is an exploratory process, aiming to design a new value proposition [63]. Managers can trigger innovation top-down through exploration by crafting a vision or strategy on how to design new services. Then, the services are implemented in daily work and become efficient [43]. Continuously adapting and improving services by using existing resources, knowledge, and processes refers to exploitation [20]. Employees have the knowledge needed to perform and improve services [22]. Further, they know the preferences of customers, which they can use to develop new services [22]. Employees can also deviate autonomously from a current service offering if they are faced with

unforeseen incidents, such as conflicts, resistance, specific customer requests, or the inability to carry out a service [22]. By adapting service to overcome constraints, incremental innovation is achieved, which may increase efficiency, effectiveness, or improve other organizational aspects [59]. Ultimately, strategic decisions for exploration are rooted in an organizations' resources and activities that are exploited [44]. Whereas, exploration promotes an organization's long-term viability, exploitation is indispensable to ensure short-term viability [61], resulting in our first proposition:
Proposition 1: Service innovation is a continuum of exploring new and exploiting current resources, knowledge, and processes.

The conceptual analysis also reveals that technologies create both, opportunities and challenges for SI [10]. On the one hand, this implies that technology and rapid-innovation contexts can generate strong pressure for organizations to introduce innovative changes in a value-proposition [6]. On the other hand, a new value proposition can be explored through deliberately searching and acquiring technological resources, which are then translated as a technological option into a value proposition, e.g. as a self-service [43]. Technology can offer an infrastructure that provides communication, collaboration and/or computing capabilities to support innovation [64] and thus, serve as enabler for service processes [4], e.g. web-based services such as shipment tracking of a postal office or online streaming services. Further, it can be adopted for exploitation by incrementally changing the value-proposition, e.g. through customization, as new ways for customer interaction, or by service extension [43].

While the importance of technology for SI is emphasized in many articles, the role and use of technology is divergent. Often, technology is used as an enabler providing the infrastructure, neglecting the innovation potential that is inherent in technology [4]. The continuous development and launch of new digital and smart technologies, such as smartphones, artificial intelligence, or big data trigger the design of innovative services creating a first-mover-advantage. Therefore, we propose that:
Proposition 2: The acquisition and configuration of technology offers a dual potential, as enabler and as trigger of SI.

SI is mainly studied by focusing on designing or enhancing value propositions, in which consumers participate in the development of service through co-creation of value [5]. However, against the backdrop of digital transformation new perspectives on value creation are needed [46]. A service system's perspective helps to understand SI comprehensively [23]. A service system incorporates resources, e.g. technologies and multiple actors that are connected by a value proposition and shared information [15]. Actors develop innovative services through a collaborative process of sharing and accessing these resources within value networks, i.e. service system configurations [23]. For example, Airbnb has designed a service system by leveraging technology and using the properties of their users as resources to provide customers a new innovative value-proposition. Thereby, Airbnb has become the largest global lodging company and brand today for cheap and efficient traveling without owning any properties [65]. A service system perspective can remedy the disjunction of research in exploring and exploiting SI, constituting our third proposition:
Proposition 3: A service system perspective provides a unified research perspective for service innovation.

5.2 Ontology of Ambidextrous Service Innovation

As exemplified in *Table 3*, most articles emphasize that SI is achieved through the interaction of multiple actors (e.g. client and provider, producer and co-producer, or a network of employees or customers). The process of interaction among multiple actors to co-create value is manifested in recognizable patterns of activities [66]. The analyzed articles provide explicit patterns—presented as frameworks, guidelines, methods, or models—that can be used by actors to explore and exploit SI.

Table 3. Exemplary Definitions of Service Innovation

Author	Definition
Breidbach & Maglio [23]	"Service innovation is service system reconfiguration. […] A service system is composed of multiple entities that interact to cocreate value."
Patricio et al. [54]	"Service innovation can be defined as a new process or service offering that is put into practice by an organization, and is adopted by, and creates value for one or more actors in a service network."
Rubalcaba et al. [22]	"A service innovation can be the outcome of innovation networks in which different agents cooperate to coproduce a service-based innovation result."

In addition to a formalized pattern of SI, the interaction between multiple actors can lead to variation in a value-proposition [66]. Employees can leverage and adapt existing services autonomously or as co-creators of value in cooperation with customers, e.g. to remedy inefficiencies in service provision [22]. Further, employees provide knowledge to elicit the formalized design of a new service. This interdependency can be described as generative mechanisms of adapting existing and experimenting with new patterns of activity to achieve SI. The involvement of multiple actors, the presence of recognizable patterns, and the generative mechanisms of exploration and exploitation mirror the concept of routines [66]. Routines are defined as "recognizable patterns of interdependent actions, carried out by multiple actors" [13]. Hence, SI and routines share the same ontological basis [66]. Further, theories to solve the dilemma of simultaneous competing pressures for exploration and exploitation activities have already been framed in routines literature [6]. From routines' theory, we derive insights on the reinforcing processes of exploration and exploitation for ambidextrous SI.

Routines are effortful accomplishments that are continuously and endogenously changing [13]. The dynamism of routines stems from two components that are recursively related: ostensive and performative aspects. The ostensive aspects represent the schematic form of a routine, whilst the performative aspects embody the actual enactment of the routine that is carried out by specific people, at specific times, and in specific places [13]. Ostensive and performative aspects form a mutually constitutive relationship, in which the ostensive aspects enable and constrain the desired performance of a routine whereas the performance of a routine creates and recreates the ostensive aspects [13]. Hence, an incremental variation in the performance can lead to a change of the ostensive aspects and consequently alter the overall routine. Analog to routine's theory, we emphasize a constitutive relationship of exploration and exploitation in SI, as illustrated in *Figure 2*.

The exploration of a new value proposition constitutes the basis for providing innovative services efficiently. Exploration enables and constrains exploitation in day-to-day work (1). In turn, multiple actors who exploit SI in their routines help to create and recreate the exploration of innovative services (2). This perception is in line with *proposition 1*, that SI can be described as a continuum of exploring new and exploiting current resources, knowledge, and processes.

In routine theory, external changes, e.g. a new technology, can induce the need to transform a routine by changing the ostensive aspect [67]. A radical, path-breaking, and strategic transformation of a routine in response to changes in an eco-system refers to the exploration of new routine patterns. Employees can also deviate in their performance from a standard routine by integrating external resources in their daily work or through reflective self-monitoring, which both refer to exploitation [13]. Likewise, actors are searching and acquiring technologies to explore new innovative services (3). The effect of technology that is radically new to the organization is mainly disruptive (4). When multiple actors are exploiting SI, they can also reconfigure a service (5) by selecting and integrating existing technology to adapt the value-proposition (6). These findings are in line with *proposition 2*, stating that the acquisition and configuration of technology offers potential for both, as enabler and trigger of SI.

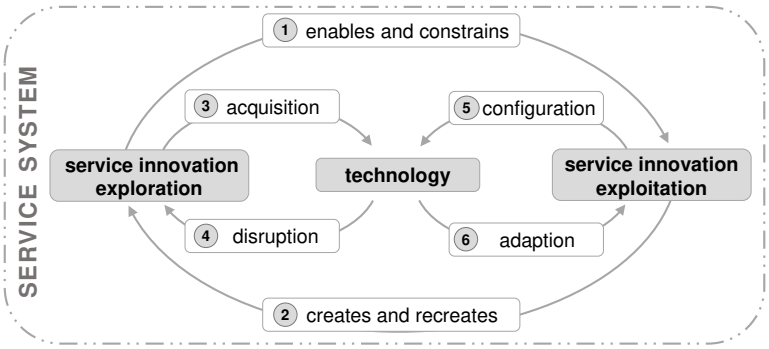

Figure 2. A Systematic View on Ambidextrous Service Innovation

Finally, routines are generative and continuously emerging systems with internal structures and dynamics [68]. A routine represents the interplay between ostensive and performative aspects, the role of artefacts (e.g. technology, rules, and methods), and interaction of multiple actors in shaping these dynamics [68]. By taking a system's perspective, internal dynamics of convergence and divergence among the elements within the system can be observed [68]. Likewise, SI can be viewed as a system (7) that consists of different resources, i.e. people, technology, organizations, and shared information [23]. Within a service system, multiple actors create and co-create mutual value through interaction by sharing and accessing resources [23]. A systematic approach is in line with *proposition 3*, stating that a service system perspective provides a unified research perspective for SI. The findings are summarized in a systematic and unified framework of ambidextrous SI. The framework provides an ample perspective on SI that is characterized by endogenous change. Thereby, the identified gap between distinct strands of research in SI is remedied.

6 Conclusion

Digital transformation provides opportunities for developing innovative services, but also challenges organizations to accelerate innovation cycles of exploring and exploiting new services. The capacity for exploring innovative services while simultaneously exploiting them efficiently is defined as organizational ambidexterity.

Based on a systematic literature review, this paper offers two main contributions. First, despite the need for organizational ambidexterity in practice, we identify that literature on SI consists of two strands of research focusing either on exploration or exploitation. Second, a framework for ambidextrous SI is provided that remedies this disjunction of exploration and exploitation in research. The framework is based on the dynamism and generative mechanisms of routines by adopting the perspective of a mutually constitutive relationship between exploring new and exploiting existing resources, activities, and knowledge. Thus, exploration of innovative services enables and constrains exploitation in day-to-day work. In turn, SI that is exploited in day-to-day work of employees can create and recreate the exploration of innovative services. The framework provides a systematic approach that incorporates technology as an opportunity for designing new and improving existing services. We develop a systematic view on ambidextrous SI that provides a coherent perspective on SI in research and adheres to the demands of organizations, which need to accelerate innovation cycles of exploring and exploiting services simultaneously.

Limitations of this study refer to the coverage of literature that is representative instead of exhaustive. In fact, we only considered peer-reviewed journals and conference proceedings that were published in English. Further, even though inter-coder reliability surpassed the critical value, we cannot assure that other researchers might come to a different assessment of the concepts.

Researchers can use the framework as impetus or guidance to study SI rather as a continuum instead of two distinct concepts. We are eager to see whether our findings can be extended to a broader set of literature and if there are synergistic effects between exploration and exploitation. Our framework can serve as guideline for organizations that can use, test, and assess our theoretical findings in different SI scenarios. Further, we would like to encourage future research to develop theories and methods for ambidextrous SI that take a system's perspective in order to meet organizational demands in a digitally transforming service eco-system.

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