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Service Innovation Capability: Proposing a New Framework

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***Abstract*—Service organizations face the challenge of offering their customers continuously improved or completely new services and, hence, require service innovations to sustain themselves in the market. We interpret the design and implementation of new or enhanced service offerings as a dynamic capability because the service organization is required to sense impulses for innovation, seize meaningful ways for change, and to finally transform its operational capabilities to the desired state. Accordingly, we propose a new framework which structures service innovation capability into the areas of sensing, seizing, and transformation. We further identify and describe the key activities in all of these three areas based on an analysis of existing literature. With this conceptual paper, we contribute to a better understanding of service innovation capability by proposing a novel framework which is grounded in dynamic capability theory. This framework is beneficial to both practice and academia. It offers an overview of service innovation capability areas and activities against which service organizations can critically reflect their service innovation initiatives. As for academia, it stipulates promising directions for future research.**

I. Introduction

SERVICE organizations require service innovations in order to experience sustained growth, raise the quality and productivity levels of services, respond to changing customer needs and expectations, or stand up to superior competitive service offerings [1]–[4]. They face the principle challenge to "offer the marketplace continuously improved, if not new, services." [5, p. 275] Service innovations are value propositions not previously available to the customer and result from changes made to the service concept and the delivery process [6]. Researching "the ways in which companies are innovating services" is considered to be a top priority for the science of services [7].

Several tools for service innovation or improvements have been proposed, including, e.g., service blueprints [8], [9], six sigma for service processes [10], and procedure models for service design (e.g., [2], [11]–[13]). Still, the development of new services is considered to be among the least understood topics in the service management and innovation literature [6]. What is lacking is a generic framework that depicts the constituents of service innovation capability [7], [14], [15].

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In this paper, we develop a generic conceptual framework of service innovation capability. Thereby, we respond to the call in the field of service science for general frameworks of service innovation (see, e.g., [15, p. 181]). However, we do not aim at adding another normative process model for service innovation, but draw on dynamic capability theory [16] to describe what actually constitutes service innovation capability in an organization. Service innovation has recently been studied from a dynamic capability perspective [14], [17], [18] and we tie into this school of thought. The framework we propose abstracts from the many normative process models for new service development (NSD) by identifying three key dynamic capability areas and according activities needed for successful service innovation.

The remainder of this paper is structured as follows. We provide the theory background in the next section concentrating on both service innovation and the understanding of service innovation as a dynamic capability. In section 3, we develop our framework which outlines service innovation as a set of abilities clustered in the areas of sensing, seizing, and transformation. In the last section, we draw conclusions, show the implications for research and practice, and provide opportunities for future research.

II. Theory Background

A. Service Innovation

A service is the application of competences for the benefit of another [19]. It is "a time-perishable, intangible experience performed for a client who is acting as a coproducer to transform a state of the client." [1, p. 240] Hence, the customer owns or controls inputs that the service provider is responsible for transforming according to mutual agreement [20].

The following characteristics are frequently mentioned when defining services or distinguishing services from manufacturing. Services are intangible and perishable [2], [21]. Furthermore, the production and consumption of services is not separable, i.e., both happen simultaneously because the customer is involved as a co-producer [2]. Finally, services are heterogeneous as they tend to differ in nature and quality from time to time due to different employees as well as varying customer needs and input [21]. In addition, a distinctive character of services is considered to be their process nature

[9], [21]. However, our understanding of service innovation is not limited by this perception. We agree with Vargo and Lusch that goods and services are not necessarily mutually exclusive [19].

Although early research on NSD frequently borrowed key concepts from the tangible product development literature [12], [15], [22], [23], it is argued that the development of a new service is at least different if not much more complex than the development of a new tangible product [13]–[15], [24]. To give an instance, changes to the service concept [25], i.e., the value proposition offered to the customer, and changes to the service process are mutually interdependent and considerably intertwined [26].

The management of service innovations comprises measures of both incremental (e.g., service enhancements or new constellations of existing service characteristics) and radical change (e.g., introduction of totally new services) [26]–[29]. Service concept and process changes can be driven by different causes, which include arisen or anticipated environmental changes, market opportunities and internal capability evolution [22]. In this article, the term service innovation refers to both the creation of a fundamental new service and the incremental change of existing ones. However, it excludes the customization of service processes during an ongoing service encounter.

The actual process of planning and implementing improved or new services is typically described as a deliberate affair in which organizations follow a formal, methodological procedure with well-defined steps [15], [22]. In this regard, numerous normative procedure models have been suggested to guide service organizations in defining their approaches to service innovation [11], [13], [30]. Such models comprise those activities, tasks, and information flows required of a service organization to conceptualize, develop, evaluate, and prepare services for the market [6], [30]. Many of these models outline a rather sequential process (e.g., [11], [30]) whereas other approaches emphasize the iterative nature of service innovations that involves multiple circles of process design and marketing program testing (e.g., [13], [31]). Generally, it is expected that there is a performance advantage for those service firms that have a formalized innovation process in place [6]. The actual take-up of normative NSD approaches in practice, however, is often considered to be limited [22]. Reports from practice show that "[service] innovation processes often gained a life of their own which broke all planned organisational patterns" [32, p. 445]. In the majority of service organizations, a distinct research and development (R&D) department does not even exist [15]. In essence, the service innovation process tends to be "interwoven with the capabilities embedded in the processes and routines throughout an organization" [14, p. 491].

Recently, some alternative frameworks have been suggested that aim at addressing the shortcomings of existing service innovation models and the plethora of normative, sequential NSD models in particular. Stevens and Dimitriadis [15], for instance, proposed a NSD model that focuses on organizational learning. Den Hertog et al. [14] draw from dynamic capability theory to identify six dynamic service innovation capabilities. Kindström et al. [18] and Fischer et al. [17] also refer to dynamic capability theory in order to explain how manufacturing companies can extend their solution portfolio through service innovations.

B. Service Innovation as a Dynamic Capability

The Resource-Based View (RBV) of the firm argues that organizations can be seen as collections of distinct resources [33-35]. Following this perception, resources are most commonly framed as "anything which could be thought of as a strength or weakness of a given firm" [33, p. 172], [33]. Moreover, we understand resources as an umbrella term covering both assets and capabilities. In this notion, assets are anything tangible or intangible that can be used by an organization [34]. In contrast, capabilities refer to the ability of an organization to perform a coordinated set of tasks for the purpose of achieving a particular end result: a process [36]. An example could be an organization having access to gold (asset), the machinery needed to mine gold (asset), and the ability to use this machinery in an efficient and effective way (capability). Hence, we understand capabilities as repeatable patterns of action that utilize assets as input [34], [36], [37]. The RBV argues that organizations that have certain assets and capabilities can achieve a competitive advantage as long as these resources fulfill the VRIN conditions, i.e., they must be valuable, rare, imperfectly imitable, and non-substitutable [38].

However, scholars argue that a mere focus on the VRIN attributes is not sufficient for sustained competitive advantage, as this view might under-emphasize market dynamics. A position of competitive advantage that an organizational resource generates today cannot be sustained as changes in the environment may lead to erosion of the resource or replacement by a different resource [39]. A stable resource configuration cannot guarantee long-term competitive advantage as organizations have to adapt this configuration to the market environment [40]. This argument is even stronger in dynamic market environments where there is "rapid change in technology and market forces, and, feedback effects on firms" [16, p. 512]. Hence, organizations need capabilities that enable them to adapt their resource configuration. These capabilities are called dynamic capabilities [16], [40]–[42].

TABLE I.
SYNOPSIS OF SERVICE INNOVATION FRAMEWORKS

Source	Sensing Activities	Seizing Activities	Transformation Activities
[2]	• Develop objectives for the service process	• Define process to be designed • Select design factors (i.e., process type, layout, environment, capacity, quality, IT)	• Build and test a prototype of the process • Implement the process
[11]	• Formulation of new service objectives and strategy	• Idea generation • Idea screening • Concept development • Concept testing • Business analysis • Project authorization	• Service design and testing • Marketing program design and testing • Personnel training • Service testing and pilot run • Test marketing • Full-scale launch • Post-launch review
[13]	• Feedback and learning • Strategic assessment	• Concept development • System design • Component design	• Implementation
[14]	• Signalling user needs and technological options • (Un-)bundling • Co-producing and orchestrating	• Conceptualising	• Co-producing and orchestrating • Scaling and stretching • Learning and adapting
[15]	• Dissonance	• Interpretation • Test	• Implementation/Adoption • Routinization/Adaptation
[30]	• Develop a business strategy • Develop a service strategy	• Idea generation • Concept development and evaluation • Business analysis	• Service development and evaluation • Market testing
[31]	• Audit the existing service system	• Assess the new service concept • Define the new service system "processes" and extent of change • Define the new service system "participants" and extent of change • Define the new service system "physical facilities" and extent of change	• Assess the impact of integrating service systems • Assess the internal capability to handle change
[43]	• Problem definition	• Problem resolution • Solution evaluation	

Hence, scholars differentiate two types of capabilities from one another: First, the basic functional activities of organizations are called *operational capabilities*. Such capabilities are, e.g., plant layout, distribution logistics, or marketing campaigns [39]. Operational capabilities are needed for the operational functioning of the organizations and relate closely to the original conceptualization of capabilities from the RBV [41]. With relation to the understanding of operational capabilities as the ability to perform a coordinated set of tasks for the purpose of the operational functioning of the organization [36], [41], [44] we understand the provision of services as an operational capability. Second, Teece et al. [16] introduced *dynamic capabilities* as the abilities of an organization to integrate, build, and reconfigure operational capabilities as well as external competences to address rapidly changing environments. Other scholars build on this conceptualization and argue that dynamic capabilities are "a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness" [41, p. 340]. Based on these arguments, we will understand dynamic capabilities as the firm's ability to integrate, build, and reconfigure operational capabilities for the purpose achieving a fit with the market environment. Building upon the understanding of providing services as an operational capability we can thus understand service innovation as a dynamic capability enabling the adaptation of service processes to changing environments.

Each dynamic capability contains sensing, seizing, and transformation activities [16]. In the context of service innovation, sensing refers to the identification of the need to change service operations or opportunities for service innovation, seizing refers to exploring and selecting feasible opportunities for change, and transformation is concerned with the implementation of changed (or new) services in the organization. In line with this perception, we argue that scholarly models for new service development, service engineering, service innovation, or service design can be seen as specific

descriptions of the dynamic capability service innovation. Eventually, all phases of such models can be mapped in one of the three classes of activities (Table 1).

III. Service Innovation Framework

We structure service innovation capability into three classes of activities: sensing, seizing, and transformation. Similar to recent research [45], we set out to identify different activities within each of these classes. For this purpose, we consult existing literature on NSD, (service) innovation, and organizational change.

Service innovation literature frequently suggests a differentiation between 'ideas' emerging within the early phases of an innovation process (sensing) and 'concepts' which are relevant to a later stage of the process (seizing/transformation) [11], [14], [30], [45]–[47]. In contrast to this perception, we see idea generation and concept development as being relevant for both sensing and seizing and thus propose a differentiation based on knowledge types. We refer to Berardi-Coletta et al. [48], who, in their paper on metacognition and problem solving, differentiate problem knowledge from solution knowledge. From a dynamic capability perspective, sensing addresses mostly problem knowledge due to its focus on identifying *that* a service innovation needs to be achieved. In seizing, on the other hand, primarily solution knowledge is of need because the activities in this class focus on identifying *how* this change is put forward within the organization. For the transformation phase we adopt the concept of transformation knowledge as presented by Pohl and Hadorn [49, p. 36] and we thus refer to "technical, social, legal, cultural and other possible means of acting that aim to transform existing practices and introduce desired ones".

In contrast to many of the available normative models for NSD, we deliberately restrain from prescribing a sequence in which the capability areas and activities should be linked to each other. They are ordered in a way that is intuitively comprehensible and may seem like the common waterfall model [5]. However, we consider the capability areas and activities of our framework to be relevant to all approaches to service innovation, including, for instance, iterative prototyping, as well as parallel or concurrent design [5], [22].

A. Sensing

Sensing refers to the management of different sources of information and knowledge that need to be translated into leading problems and unmet service needs before a more focused conceptualization of new service solutions follows in the seizing phase [14]. Literature suggests that service organizations should actively engage in sensing and establish formal processes for this [30]. A general differentiation can be made between sensing external and internal impulses for service innovation. Service innovation is traditionally considered to be triggered by a perceived gap between market requirements and service delivery [22], [24] or the option to translate technology developments into new service propositions [14]. Moreover, competitors may serve as an important source of ideas for new services [24]. The externally stimulated identification of impulses for service innovation focuses on market opportunities [50] and is in line with the original understanding of sensing capability as put by Teece [16]. In addition to this external perspective, the internally stimulated recognition of needs for change is also important [50]. The internal perspective implies that inefficiencies in current service operations might exhibit the need for change. Usually, such process weaknesses are identified by the service personnel within the organizations thanks to their direct involvement and comprehensive process knowledge. Another internal impulse can be the development of operational capabilities, sometimes even accidentally, for which there is currently no estimable market potential but which could be exploited by introducing new marketing concepts [22]. The inward sensing of service innovation impulses accordingly focuses on the avoidance of internal operational losses (e.g., opportunity costs that would occur if there are no returns from the operational capabilities) [22]. Hence, sensing is not limited to the outward look on customer needs, competitive service offerings, and technological options but also covers the recognition of internal deficiencies in service provision or the exploitation of available operational capabilities. Both the internal and external perspective of sensing mainly include three key activities: 1) scanning, 2) evaluation, and 3) detailing.

Scanning has been described as a major driver for innovation [14], [51], [52]. While most publications speak of environmental scanning and thus take a rather external perspective [14], we generalize this capability to comprise the observation of both internal and external impulses. Following Basadur et al. [53, p. 60] we define scanning as a process of "[…] continuously and deliberately discovering and surfacing new and useful problems to be solved". Den Hertog et al. [14] refer to this activity as an "intelligence function", which typically resides in marketing, new business development, innovation management or an IT department. Scanning may require the constant dialogue with customers, personnel, and technology providers [14].

Evaluating refers to the ability of an organization to quickly screen a particular opportunity or need for service innovation with regard to, for instance, the problem situation as a whole [43], business objectives [13], [54] or general feasibility [55]. This activity involves an initial decision making whether a sensed impulse is worth further detailing which is then followed by the development of possible solutions [15]. Such a decision is typically made long before an official development project is established [15].

The *detailing* activity refers to precisely defining the problem and elaborating side conditions (e.g., technology, legislation and cultural aspects) that need to be taken into account within the development of possible solutions, e.g., by means of new service processes [52] or service concepts [25]. Chai [43] refers to this step as "problem modeling and formation" which includes the definition of an exhaustive set of problem statements and the identification of functions that the new service should fulfill for the customer.

All three sensing activities are not to be seen in strict sequence as they may just as well be executed in an alternate or iterative manner.

B. Seizing

As for seizing, we also identify three main activities from literature: 1) solution development, 2) solution evaluation

and selection, and 3) solution detailing. In service organizations, it is typically cross-functional teams that seize the opportunity for service innovation and jointly develop new services through cooperation [12], [15].

The activity *solution development* refers to the service organization's ability to generate different potential solutions and thus to identify possible paths it could take in redesigning their service offerings according to the previously formulated problem. In service innovation literature this is referred to by notions such as service process design [2], concept development [30], [46], [47], problem resolution [43], building alternative solutions [15], or idea refinement [15]. The development of new solutions does not necessarily mean the creation of completely novel service concepts but may also consist in creatively rearranging existing services into innovative packages [30]. Basadur and Gelade [56] state that the innovation process involves both convergent and divergent thinking. Accordingly, we distinguish the rather divergent task of coming up with options for new service development (or packaging) from the more convergent activities of selecting a particular alternative. From this perspective, solution development can be considered a more divergent activity.

On the other hand, the activity of *solution evaluation and selection* is rather convergent in nature. Here, a company needs established procedures that allow for informed decision making and thus for selecting the most adequate solution for a specific problem. Research found that, e.g., team sizes and participation are important factors that influence this ability [57]. Possible solutions, for instance, can be selected based on a comparison with an "implementation-free description of the [ideal] situation after a problem has been solved" [43, p. 54]. Estimates of the new service concept's profitability usually also influence the selection to a large degree [46].

Similar to the third sensing activity, a *detailing* ability is also required in seizing. Rough-cut service concepts that are defined on an idea-level for new services are specified in detail. This involves the final determination of the to-be processes, procedures, facilities, information systems, participants, and behaviors that need to be put in place for the new service offering [3], [15], [24]. Here, the development of a comprehensive project plan for the implementation of the selected solution needs to be put forward and implementation project teams as well as control mechanisms have to be set up [15], [54].

As with seizing, the activities of sensing will evolve in an iterative process, stepwise refining and specifying the solution in actionable artifacts.

C. Transformation

Following Lewin [58], we divide transformation into the three activities of unfreezing, changing, and (re-) freezing. These activities are crucial as they path the way from ideas and concepts to lived new service operations.

Unfreezing refers to breaking up existing work structures which is an important aspect when implementing new service processes and interfaces to the customer. Preparations have to be made so that the acceptance of the new work practices can be achieved, e.g., by actively communicating the changes and benefits that result from them [59]. Furthermore, different types of resistance have to be addressed [60].
The *changing* activity refers to the actual implementation of the new service offering. The key question here is how fast, in which steps, at which locations and by what means new work practices are to be adapted within the service organization and the distribution network [15]. Often, prototypes of the new services are developed and tested before a full-scale introduction to the public happens [30].
Finally, the *freezing* activity relates to all tasks necessary to foster internalization of the newly implemented service processes. Here, for instance, continuous motivation [61] and trainings [11] have been identified as possible drivers. For the latter, Bashein et al. [62] state that once a new process is established "the people who will perform the processes need training – not only in the redesigned jobs but in new ways of working together." Furthermore, the use of information systems (because software works in a defined way) and the use of communication and promotion tools (through which customers adopt standardized expectations) can contribute to freezing a new service [15]. The goal of this activity is to achieve a routinization; this means that the personnel adopts the new service offering and transforms the explicit knowledge about what the new service is like and how to deliver it into tacit knowledge [15].

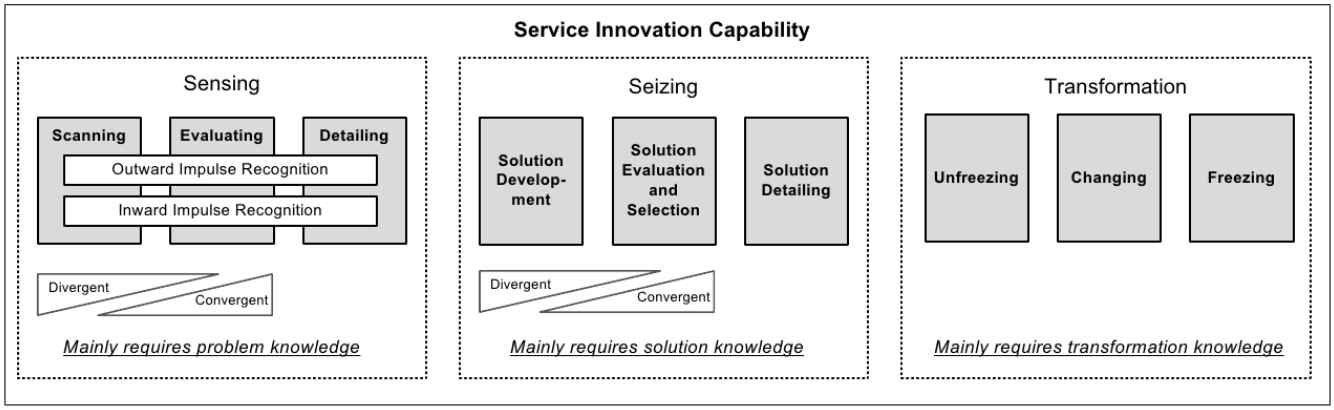

Fig. 1 Service Innovation Capability

IV. Conclusion

Within this research, we proposed a comprehensive model for understanding service innovation as a dynamic capability of an organization. Based on a literature analysis focusing on service innovation frameworks and procedure models for NSD we were able to show that the majority of existing models comprise activities that can be mapped to the capability areas of sensing, seizing, and transformation. Thus, dynamic capability theory was confirmed as a valid perspective on service innovation. We expect this new framework to offer several benefits for both theory and practice.

From a practical point of view, the conceptualization of service innovation as a dynamic capability helps to better understand the internal antecedents for service innovation within an organization. The presented framework could enable managers to adequately assess and evaluate their service innovation efforts with respect to their individual resource endowments and the market environment. Furthermore, the IT support for service innovation initiatives, which is considered to be lacking [5], could be adapted to fit the needs of particular activities within the framework, or to provide more general support for one of the capability areas of sensing, seizing, or transformation.

As for theory, our research contributes to the field of services science in providing a solid framework for the analysis of service innovation capability. A solid theoretical underpinning is oftentimes missing in related studies. Thus, understanding service innovation as dynamic capability is a valuable perspective, also for a wider array of research in this area, e.g., on how to foster service infusion and growth, create and maintain a service culture, enhance service design, and optimize service networks and value chains [7]. It opens up several possibilities of applying proven models from strategic management literature to the emerging and constantly growing research area of services science [1].

However, these contributions are beset with certain limitations. On the one hand, the presented research has to be classified as purely conceptual and, thus, lacks empirical evidence at this point in time. While the developed framework is grounded in theory, we generally describe possible capability areas of service innovation and explicitly do not give normative recommendations. As a theoretical model, the framework raises the following questions which have to be addressed in future empirical studies: What is the impact of every single capability area on service innovation capability as a whole? How can the success of service innovation as a dynamic capability be adequately measured? What is the impact of the dynamic capability on the business success of service organizations? Moreover, service innovation capability is reflected in collective activities. Hence, the aspect of collaboration shall be subject to further investigation. In this context, concepts from boundary spanning theory could provide a differentiated perspective on collaboration [63].

Hence, future research could (and should) focus on evaluating the specific implementations of the described activities in practice. In this regard, the support through IT and systematic methodologies that are possibly utilized for service innovation are of particular interest. Furthermore, by comparing new service development efforts and service improvement endeavors within an organization, research could investigate possible differences as regards the relevance of certain capability areas and activities.

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