

Service innovation roadmaps as benchmarks for organizational learning

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Abstract The purpose of this paper is to better understand how responsible entities like people, organizations, regional governments can approach their learning and development strategies [15]. Despite all the heterogeneity in the respective "run-transform-innovate" contexts of the different responsible entities, they all have in common that they have to become "better future versions of themselves" to overcome their challenges [40]. Using the example of organizations, the concept of Service Innovation Roadmaps (SIR's) is introduced to broaden a discussion in this area that has so far been very technology-focused [15, 28, 40]. In order to identify and take into account new dimensions and to give greater consideration to other non-technological aspects as well, the research design of "theory adaptation" is chosen [16].

1 Introduction

Learning has proved so tricky to define that Liebermann (1993) [20] names learning "a term devised to embarrass learning psychologists, who tie themselves in knots trying to define it" [11, 20]. Many definitions of learning are in use in different disciplines like biology, psychology, social sciences, behavioral ecology, evolutionary theory, computer science, economics and other [4, 8]. The definitions vary widely both within and across disciplines. However, as the following examples from different disciplines indicate, it is also noticeable that some characteristics of learning are mentioned again and again across many disciplines.

In biology Liebermann (1993) and Goodenough et al. (2009) define learning as "a change in our capacity for behavior due to particular kinds of experience" [11, 20]; the adaptive value of social learning is seen in the time and energy it saves compared to "the business of survival by trial and error"[11, 20]. Alcock (2005) states learning as "the adaptive modification of behavior based on experience" [1, 4].

In psychological usage Thorndike (1931) noted that "in learning resides humanity's power to change, possibly the most important of all human gifts" [14, 50]. Howe [12, 14] takes this up and emphasizes the relationship between change and learning "change, and the ability to change, are at the heart of all the varied meanings and definitions that have been applied to the term „learning“. An organism that can change its characteristics and alter its activities has a huge advantage over forms of matter that cannot, the latter being tightly bound

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to the physical environment surrounding them. The power to change frees an organism from being fixed in place and function” [14].

Hall (2003) refers learning “to the process by which an animal (human or non-human) interacts with its environment and becomes changed by this experience so that its subsequent behavior is modified” [13]. De Houwer et al. (2013) understand “learning as ontogenetic adaption – that is as changes in the behavior of an organism that result from regularities in the environment of the organism” [8]. Similar Anderson and Coon emphasize the nature of learning as continuous process; learning is seen as “the process by which relatively permanent changes occur in behavioral potential as result of experience” [3, 12] or as “a relatively permanent change in behavior due to past experience” [7].

In social sciences Giddens (1984) considers learning as a contribution to the constitution of the society “as social actors, all human beings are highly ‘learned’ in respect of knowledge which they possess, and apply, in the production and reproduction of day-to-day social encounters” [9]. Sawyer (2005) also emphasizes the inseparability of the individual and the society within the context of learning: “rather than internalizing knowledge, the learner should be conceived of as appropriating or mastering patterns of participation in group activities. Learning involves a transformation of the social practices of the entire group and thus cannot be reduced to an analysis of what any one participant in the group does or knows” [37].

In economics McGowan emphasizes the following key points of learning in the context of change as “navigating a world of rapid learning, unlearning, and adaptation requires that we become comfortable with ambiguity and vulnerability, allowing us to become champions of human potential in learning tours filled with unknowns” [27]. Senge emphasizes the competitive relevancy of learning as “the ability to learn faster than your competitors may be the only sustainable competitive advantage” [38].

Across all disciplines the recurring aspect of learning is the acquisition of knowledge, skills, capabilities, values, preferences and behaviors or their adaption as a result of experience. Within the context of learning all responsible entities (humans and non humans) have to be seen as inseparable from their environment; as interacting, understanding, exploring (trial and error), experiencing for changing and adapting new behavior to overcome the challenges of their specific “business of survival”.

In this paper we focus on organizations as responsible entities that have to overcome their challenges and how they can approach their individual learning strategies. Based on the demonstrated cross-disciplinary learning characteristics it is not surprising that McGowan (2020) formulated the following challenge for organizations “as we enter the Fourth Industrial Revolution, the hyperfocus on productivity and value extraction shifts to embrace creativity, innovation, and value created by adapting faster and learning more than your competition. This shift from scalable efficiency that ruled the Second and Third Industrial Revolutions to scalable learning that is at the heart of the Fourth Industrial Revolution requires a new leadership style, one that inspires human potential” [27].

Senge concretizes in this context the basic meaning of a “learning organization” as “an organization that is continually expanding its capacity to create its future. For such an organization, it is not enough merely to survive. “Survival learning” or what is more often termed “adaptive learning” is important - indeed it is necessary. But for a learning organization, “adaptive learning” must be joined by “generative learning,” learning that enhances our capacity to create” [38].

The surprising aspect, however, is that the key to become a learning organization is seen almost exclusively in innovation and there in technology [5, 15]. But like in the other disciplines the operating systems of concern in learning organizations are “not purely technical in nature; they are rather strongly intertwined combinations of the social and the technical -

"sociotechnical systems" is a useful descriptor and a useful way to think about such institutions"[19].

Therefore, the purpose of this paper is to better understand how responsible entities like organizations can approach their learning strategies to overcome their challenges. That is, become "better future versions of themselves" in the way they sense and respond to social and economic challenges [15, 49].

2 Methodology

The research design of this paper is aligned to the research goal to demonstrate how responsible entities like organizations can approach their learning and development strategies.

A conceptual paper as methodology is chosen to bridge existing theoretical perspectives in interesting ways, link work across disciplines, provide multi-level insights, and broaden the scope of our thinking [10, 16]. Within this methodology "theory adaption" as research design is applied. Theory adaptation seeks to shift some elements of the existing domain theories by using other theories and concepts. Theory adaptation papers develop contribution by revising extant knowledge — that is, by introducing alternative theoretical concepts to propose a novel perspective [22].

To broaden the scope of thinking about "organizations learning strategies" and to come toward an integrated perspective Service Science and Service Innovation Roadmaps (SIR) are chosen as domain theories. Concepts of digital transformation (building blocks), institutional analysis and development (the IAD framework) and architecture (Service Dominant Architecture) are linked to provide cross disciplinary insights.

3 Domain theories: service science and service innovation roadmaps

Why is service so central in this context of organizational learning and so connected to every other important concept? The answer is because service is the basis of exchange (e.g., human cooperation, economic exchange). Service is at the core of value cocreation which makes every situation more beneficial and win-win for everyone involved. Therefore, service underlies social and economic development, and the wealth of people, businesses, and nations. Simply put, service is the application of resources (e.g., knowledge) for the benefit of another and connects each of us to the world around us [49].

3.1 Service science

Service Science emerged as an integrative area of study, defined as an interdisciplinary field of inquiry focused on fundamental science, models, theories, and applications to drive service innovation and well-being through co-creation of value [30]. Service Science combines business and technology understanding, integrating multiple disciplines such as social sciences, management, engineering and design, to create the basis for systemic service innovation [42, 48]. Service Science studies the evolving ecology of service system entities, their capabilities, constraints, rights, and responsibilities, their interactions and outcomes, and their learning to invest systematically in becoming better future versions of themselves [40,49].

Key construct in service science is the service system [24, 42, 45, 51]. A service system is a configuration of resources, like people, technology, information that are connected to other systems by defined value propositions [6, 23, 24, 41, 42, 47]. Spohrer et al. [46] define a service system as "an open system (1) capable of improving the state of another system

through sharing or applying its resources (i.e., the other system sees the interaction as having value), and (2) capable of improving its own state by acquiring external resources (i.e., the system itself sees value in its interaction with other systems). In this context, economic exchange depends on voluntary, reciprocal value creation between service systems (each system must willingly interact, and both systems must be improved)" [6, 23, 24, 41, 42, 47, 46].

The foundations of service systems are systems, operant resources, service value and economic exchange. Systems are understood as configurations of resources, including at least one operant resource, in which the properties and behavior of the configuration is more than the properties and behavior of the individual resources. Operant resources can act on other resources (operand and other operant resources) to create change. Service is the application of resources (including knowledge, competences, skills, and products) to make changes that have value for another (system). Value is improvement in a system, as judged by the system or by the system's ability to fit an adapt to its environment. Economic exchange is the optional, reciprocal use of resources for mutual value creation by two or more interacting systems [46]. Because resources and their application play a key role in value creation, their integration is one of the fundamental functions of a service system [21]. During their application in a value-adding process, potential benefits of a resource are transformed into an actual and specific benefit [21].

For modeling "service systems learning" Spohrer and Maglio [43, 45] developed a run-transform-innovate model based on March's (1991) exploration and exploitation model [25]. Aligned to the context of organizations March [25] explains organizational learning and upskilling as fundamental investment decision of an organization between exploitation of existing resources and exploration of new possibilities: A central concern of studies of adaptive processes is the relation between the exploration of new possibilities and the exploitation of existing capabilities. The term exploration includes things like search, copying others, variation, risk taking, experimentation, play, flexibility, discovery, innovation. The term exploitation includes such things as choice, production, efficiency, implementation, execution, habits, routines. Adaptive systems that engage in exploration are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas. Conversely, systems that engage in exploitation are likely to find themselves trapped in suboptimal stable equilibria. As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor [25].

Spohrer and Maglio extended March's two options approach and introduced the three options framework Run-Transform-Innovate (RTI) for analyzing and explaining learning in the context of responsible entities such as organizations [43, 45]. Run-Transform-Innovate is a terminology borrowed from IBM's CIO office [36, 39], and represents best practice decision making when investing for organizational change [17]. RTI is about: (1) Run - what to invest in doing routine activities, (2) Transform - what to invest in copying best practices from others (social learning), and (3) Innovate - what to invest in exploring and creating new knowledge and activities more adapted to future opportunities, that others may in turn try to copy [39, 40]. Innovate is often the riskiest, but also has the most potential for reward [45].

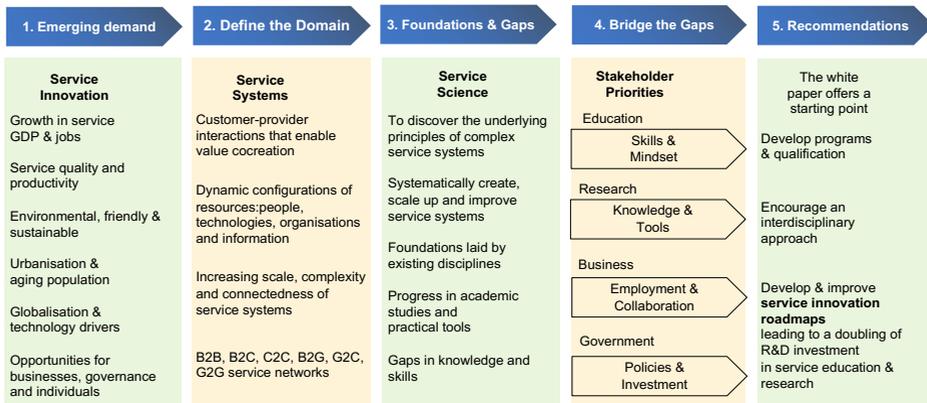
Each service system entity has a to decide about resource allocation that means to decide how many resources (e.g., time, effort, money, etc.) to allocate to run, transform, or innovate. Becoming more systematic about these investments should lead to accelerating value cocreation [45]. Within a world of diverse interacting service systems organizations as entities adapt to the changing knowledge of value (and value of knowledge) in the ecology. Service systems have run, transform, and innovate mechanisms to adapt and to improve value cocreation interactions [45].

3.2 Service Innovation Roadmaps (SIR's)

To advance service science, the Cambridge SSME (Service Science, Management and Engineering) report introduced 2008 the concept of Service Innovation Roadmaps (SIR) [15]. SIR's can be thought of as an attempt to make the "learning investment strategy" of responsible entities such as people, families, organizations, universities, cities, regional governments explicit. SIR's summarize a responsible entities plans and set benchmarks for their "upskilling" or learning investments. Responsible entities should consider the challenges and benefits of maintaining SIR's for their investment in their upskilling. SIR's are introduced by Spohrer and Maglio within the context of service science and as medium of operationalizing learning- and development strategies. They help responsible entities to better succeed through service innovation, while simultaneously upskilling towards a deeper understanding of service science [15, 40, 44, 45].

Grounded on the emerging relevance of service the term innovation is no longer almost exclusively seen in the context of technology but rather in the context of service systems [46]. Within service science, service innovation is defined as a combination of technology innovation, business model innovation, social-organizational innovation (such as upskilling people and providing better institutional arrangements for investing in a shared future and turning conflict into understanding and cooperation) with the objective to improve existing service systems and to create new value propositions for win-win interactions and change [15, 28].

In practice, SIR's are a modified version of the business model canvas that organizations can use to become more explicit about their Run-Transform-Innovate investment in learning and upskilling. Consistent with a positive, change mindset, they put service science in action for learners, innovators, and leaders [40].



University of Cambridge Institute for Manufacturing, Succeeding through service innovation: a service perspective for education, research, business and government. University of Cambridge Institute for Manufacturing (IfM) and IBM (2008), p.2

Fig. 1. SIR's - Succeeding through Service Innovation: A framework for progress

“How do SIR's relate to upskilling? As shown in figure 1 SIR's can help responsible (service system) entities invest more mindfully in learning and change” [40]. The competitiveness of entities like organizations will be dependent on their ability to develop their organization and this from the respective individual situation and context of the organization. In this sense organizational development is understood “as improving the ability to adjust, integrate and apply the organization's resources and capabilities [40, 45, 53].

4 Adapted theories and concepts

In the following, the topic of organizational learning is examined from the perspectives of three other theories and concepts to broaden the scope of thinking: 1. Vial's framework "building blocks of the digital transformation process" [52]; 2. Ostrom's "Institutional Analysis and Development (IAD) framework" [18, 31, 34], and 3. Warg's "Service Dominant Architecture" [54, 55].

4.1 Building blocks of the digital transformation process

Based on the review of 282 works, Vial developed a framework of eight building blocks of the digital transformation. The framework foregrounds digital transformation as a process where digital technologies create disruptions triggering strategic responses [52]. The framework analyzes the relationships of the eight overarching building blocks describing digital transformation as a process where digital technologies play a central role in the creation as well as the reinforcement of disruptions taking place at the society and industry levels. As shown in figure 2 disruptions (1,2,3) trigger strategic responses from the part of organizations, which occupy a central place in digital transformation literature. Organizations adapt by using digital technologies (3,4) to alter the value creation paths they have previously relied upon to remain competitive. To that end, organizations have to implement structural changes (5) and overcome barriers (6) that hinder their transformation effort. These changes (7) generate positive impacts for organizations as well as, in some instances, for individuals and society, although they can also be associated with undesirable outcomes [52].

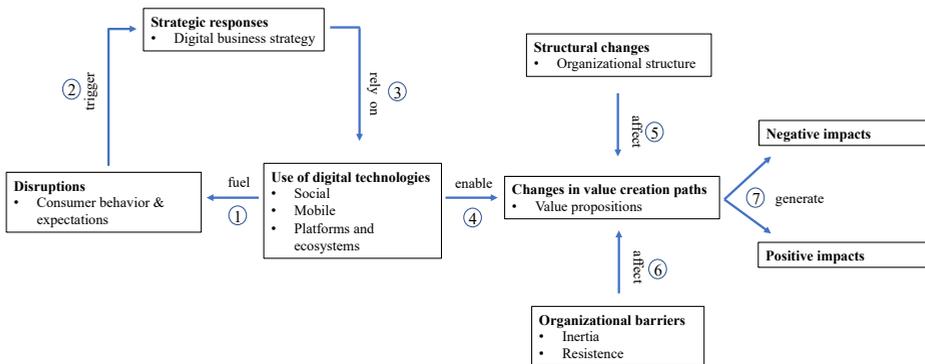


Fig. 2. "Digital transformation as process" Warg (2023), based on Vial's "Building blocks of digital transformation process" [52]

With reference to the concepts of learning presented in the introduction, the following parallels can be seen. Vial's framework describes the process by which the organization interacts with its environment. And the organization is thereby changed in its market relevance by the impact of new technologies, and it changes itself in terms of its value proposition and its structures. In this context, the organization experiences the impact of new technologies and starts the process of adaptive and generative learning. Triggered by new technologies,

adaptive learning in Vial's sense concerns the understanding, building and the application of new technologies in the context of new value creation paths and value propositions.

The degree of generative learning and the generative character of the new value creation paths depends on the extent to which structural adaptations and new value-adding pathways are designed and built to be helpful and generative in a constitutive sense for future adaptations. This means that the resources and capabilities built up for the new value paths are reusable and beneficial for the next adaptations.

4.2 Institutional Analysis and Development (IAD) Framework

“Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic. Institutional change shapes the way societies evolve through time and hence is the key to understanding historical change”[29]. Thus, institutions also shape adaptive and generative learning. Elinor Ostrom's IAD framework facilitates to analyze how institutions influence and shape action- and learning situations and thus organizational learning.

“The IAD framework is a general language for analyzing and testing hypotheses about behavior in diverse situations at multiple levels of analysis and concerns analyses of how rules, physical and material conditions, and attributes of community affect the structure of action arenas, the incentives that individuals face, and the resulting outcomes.”[32].

Starting on the left of figure 3 in the framework are the exogeneous variables that affect the participants, positions and actions of an action arena and by this its structure. The exogeneous variables include three clusters of variables [18]:

1. The attributes of states of the world that are acted upon in these arenas, e.g. the physical possibilities of actions [34].
2. The attributes of a community as all aspects of the social and cultural context within the action situation is located [26].
3. The third set of variables that specify the values of the working components of an action arena relates to the rules specifying positions, set of actions or outcomes [26,
4. 34].

From this point, the action arena is viewed as a set of variables dependent upon other factors. In the action situation responsible actors act on their own or as agents of organizations, observe information, select actions, engage in patterns of interaction, and realize outcomes from their interaction [26]. The action arena can be utilized to describe, analyze, predict, and explain behavior within institutional arrangements. The action arena is linked to the third area of the framework the “interactions & outcomes”. Outcomes are generated by a given action situation and available information about action-outcome linkages. Participants choose actions on the basis of their preferences, their information, strategic considerations, the expected outcome and the relationship between the action and the outcome [26, 35].

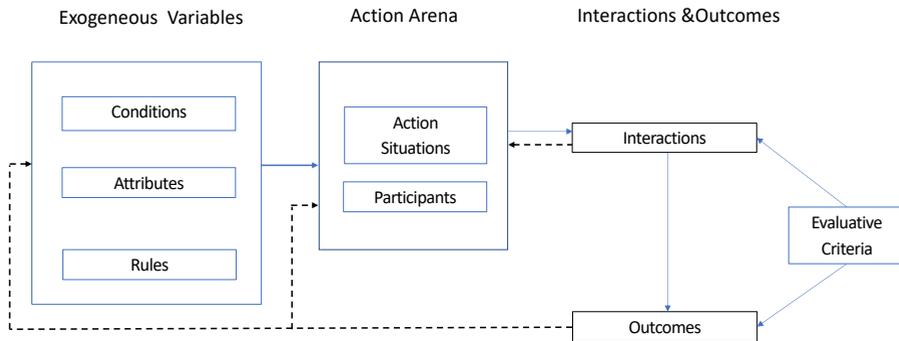


Fig. 3. “Extract of IAD framework” Warg (2023), based on Ostrom’s “Institutional Analysis and Development (IAD) framework” [18, 31, 34]

Rules specify the values of the working components within an action situation. As demonstrated in figure 4 the IAD framework describes the following rules [2, 26, 31, 34]: position rules that specify a set of authorized actions, boundary rules specify how participants enter or leave the positions, choice rules specify which set of actions are possible in the respective position, aggregation rules specify the transformation (function) from actions to outcomes, information rules specify the information available in the respective position, payoff rules specify how benefits and costs are assigned to outcomes and scope rules specify the set of outcomes. These rules become institutions through the constitution of regularized patterns of engagement and interaction.

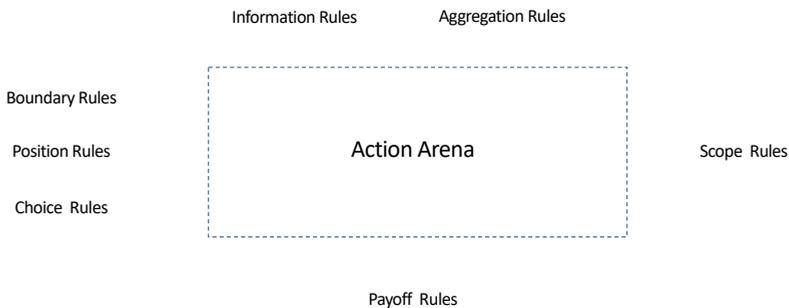


Fig. 4. “Rules” Warg (2023), based on Ostrom’s “Understanding Institutional Diversity” [31]

In terms of organizational learning, Ostrom's IAD framework allows responsible actors such as organizations to analyze, explain, and act out adjustments to their particular situation.

Actors become participants in a situation. Participation links actors to an action situation. In the minimal action situation, there is only one participant. “Positions are simply place holders to associate participants with an authorized set of actions” [34]. Examples of positions include organizations, employees, voters and citizens. In some situations, every participant holds the same position. In IAD framework analysis is undertaken about actions that responsible actors (e.g., organizations) that hold particular positions are likely to take, rather than focusing on individual personalities. Positions are place holders that associate participants with a set of authorized actions (employee, voter, judge, monitor) [2, 33]

4.3 Service Dominant Architecture (SDA)

Architectures exist within the culture of organizations and become dominant when they improve organizations' capabilities for adapting to change. SDA is an emerging architecture putting the concepts, logics and processes of service science and S-D logic into practice. SDA empowers responsible actors to act in the era of X+AI and in the context of openness, interoperability and connectivity in a meaningful way and to organize service as a transdisciplinary process of value cocreation. That is rearchitecting the operating architectures of organizations from goods based, reactive, and siloed to platform based, proactive, open, and AI-centric [49].

Service Dominant Architecture (SDA) provides an organizing logic for shaping organizations [49]. For this purpose, SDA operationalizes core concepts of Service-Dominant Logic and Service Science using design pattern as a configuration of five (service) systems:

1. System of Interaction: enables real-time interaction and service exchange between customers, providers, and other actors
2. System of Participation: enables actor-2-actor networks and the integration of external capabilities, solutions, services
3. System of Operant Resources: enables resource density and –orchestration and thus the strategically relevant capabilities to be built, combined and included in the (value) creation process
4. System of Data (Data Lake): enables building a data-based actor (e.g., customer) understanding from interaction
5. System of Institutions (SDA Service Catalog): The systems are supplemented by rules (institutions) that coordinate actors and enable or limit access to capabilities.

Applied by a responsible actor the SDA service systems facilitate to build and orchestrate capabilities in a systematic way. As shown in figure 5 the design pattern of the five SDA service systems facilitate:

- the process of value co-creation (connecting actors, resource integration, service exchange, setting rules) for building and application of value propositions, and
- as structure (configuration of service systems) the systemic building of resources and capabilities for developing, implementing and shaping Service Platforms and Service Ecosystems as output

Service Dominant Architecture (SDA)

Construction-Plan for Value-Cocreation on Digital Service Platforms

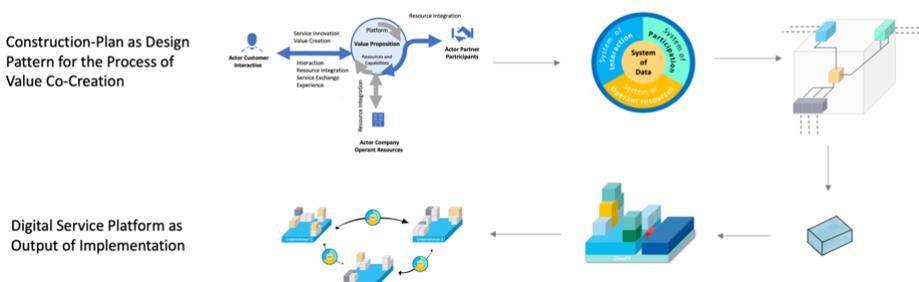


Fig. 5. Warg's Service Dominant Architecture (SDA) [49, 54, 55]

In terms of organizational learning SDA enables for more rapid change. Both adaptive learning, as the adaptation based on experiences made in the context of interaction with customers (system of interaction) or partners (system of participation), and generative learning, as the systemic adaptation and building of capabilities, are enabled. The purpose of SDA is to make organizations better – more agile, more sense-and-respond, better able to keep up with and drive meaningful human centered change in a fast-paced world.

5 New perspectives on SIR's

Service Innovation Roadmaps as an attempt to make a plan for an “organizational learning investment strategy” are introduced and characterized by the following steps. Driven by emerging demand for organizational learning and service innovations the relevant domains have to be defined on the basis of the specific run-transform-innovate situation and context of the organization. In a next step, the foundations and a should be reconciliation (gaps) should be presented. This will then allow priorities to be set and specific recommendations to be developed.

By using the methodology of “theory adaption” knowledge of Vial’s “building blocks of the digital transformation process [52], Ostrom’s “institutional analysis and development framework” [32] and Warg’s “Service Dominant Architecture” [49, 55] is applied to shift SIR’s and to propose novel perspectives.

Vial’s digital transformation process exemplifies the emerging demand for new technologies to drive the process toward new value creation paths and value propositions. In Vial’s case, the triggering factor is limited to digital technologies. however, the basic structure of the process can also be transferred to other emerging demand as triggering factors (figure 1). In this way, Vial’s approach can clearly concretize the process, interdependencies and value creation paths of SIR’s. It is to find the right questions along the process (see figure 2) such as: what describes the emerging demand? what impact does the emerging demand have on customer behavior and competition? what can the organization’s strategic responses look like? how can elements of the emerging demand be used for new value creation paths?

Elinor Ostrom’s IAD framework is used to analyze how institutions influence and shape learning and thus organizational learning. As a general language for analyzing and testing hypotheses about the behavior of responsible actors like organizations in diverse situations and at multiple levels of analysis [32]. Organizations as responsible actors become participants in situations. Rules like position-, boundary-, or choice- affect how organizations enter or leave positions and which actions are possible. Thus, rules are at the core of adaptive organizational learning by directly affecting action- and interactive situations. Referring to the SIR’s institutions are relevant for the mutual value creation of service systems, and for bridging the gaps from closed, static organizations to open, dynamic, experience driven learning organizations. Ostrom’s IAD framework allows responsible actors such as organizations to analyze, explain, and act out adjustments to their particular situation within the SIR’s.

Warg’s SDA as design pattern of five service systems can serve as a structure for both the process and the SIR’s output. Applied by responsible actors like organizations the systems become service systems entities facilitating to operationalize the core concepts of value cocreation and service science like: Resource-integration and resource density (system of participation, system of interaction, system of operant resources); access rights (system of institutions, service catalog); value propositions based on interactions (system of interaction, system of operant resources). Therefore, SDA is at the core of service science concepts and can serve both as a design pattern for the process of interaction based adaptive learning and as a structure and output of systemic capability building when implementing SIR’s.

6 Conclusion

In this paper we focus on the aspect of how responsible entities like organizations can approach their learning strategies. Based on the demonstrated cross-disciplinary learning characteristics it is shown that the hyperfocus of organizations shifts to embrace creativity, innovation, and value created by adapting faster and learning more than their competition. But it is not enough merely to survive. “Survival learning” or what is more often termed “adaptive learning” is important and has to be joined by “generative learning,” learning that enhances at the same time the capacity to create [38].

Service Innovation Roadmaps (SIR's) can be used by organizations to make the learning investment strategies explicit. Also, under consideration of the respective Run-Transform-Innovate investments in learning and upskilling. Consistent with a positive change of the mindset, SIR's put service science in action for learners, innovators, and leaders of organizations [40].

By adapting concepts of digital transformation (building blocks), institutional analysis and development (the IAD framework) and architecture (Service Dominant Architecture) novel perspectives on SIR's are provided and the scope of thinking about "organizational learning strategies" is broadened in this paper. Vial's approach opens up the perspective of the process. And thus, on the connection of the elements of the SIR's, their interdependencies and their combinations to new value creation paths. Ostrom's IAD framework allows responsible actors such as organizations to analyze and explain the organization's particular action situation and make adjustments to the rules to bridge the gaps identified with the help of SIR's. Warg's SDA can serve both as a design pattern for the process of interaction based adaptive learning and as a structure and output of systemic capability building when implementing SIR's.

In this way the different perspectives on SIR's can be suitable to help organizations to develop their learning strategies and to invest systematically and wisely in upskilling. The paper thus contributes to how responsible entities like organizations can approach their learning and development strategies.

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