How to Overcome Organizational Inertia by Shaping Institutions and Value Propositions: an Analysis of the Impact of Service-Catalogs

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The paper analyzes how companies can shape and establish institutions to take advantage of the opportunities of digital ecosystems for the transformation and development of their organizations. As part of broader polycentric networks, companies are connected with other actors through value propositions, shared institutional agreements and mutual value creation. In detail, we study how the shaping of institutions with the help of service catalogs can be used in a purposeful way to remove barriers to changing the value creation paths and by this to overcome organizational inertia.

1. Introduction, Problem Identification and Motivation

Digital technologies enable the creation of new value propositions aligned with customer behavior and expectations. That value propositions are increasingly based on the provision of services engaging customers to become active participants in a process of value creation (Barrett, Davidson, Prabhu, & Vargo, 2015). Digital technologies empower companies to transform from selling physical products to selling services as an integral part of their value proposition or to complement them in order to meet customers' needs by offering innovative solutions. At the same time, digital services enable data to be collected in the course of value creating interactions (Wulf, Mettler, & Brenner, 2017). A prime example for altering the value creation path and for the creation of new value propositions through the use of digital technologies is Netflix, whose business model was originally based on the rental of movies stored on physical media. Over the years, Netflix moved away from this value proposition and became the first major provider of video streaming services. More recently, Netflix has used data collected from the use of its streaming service (interaction) to better understand what content viewers like and how it is consumed to help produce its own content (Hastings & Meyer, 2020). The example demonstrates the potential of digital technologies and digital transformation to generate disruptive innovations and to new value creation paths that can significantly change existing value propositions (Vial, 2019).

Digital transformation encounters organizations as a process in which digital technologies cause disruptions that trigger strategic responses to change value creation pathways (Vial, 2019). Referring to (Demirkan, Spohrer, & Welser, 2016) digital transformation can be described as the profound and accelerating transformation of business activities, processes, and competencies to fully leverage the changes and opportunities brought by digital technologies and their impact across

society in a strategic and prioritized way. The core building blocks of this process are the use of digital technologies, disruptions in consumer behavior and expectations, strategic responses affecting the value creation paths and changes in organizational barriers and structure and the outcome as impacts (Vial, 2019). Digital service platforms and service ecosystems offer an organizing logic for the actors to exchange service and facilitate access to capabilities thus play a central role in the implementation of these building blocks (Teece, Pisano, & Shuen, 1997). Service platform and ecosystem strategies are characterized by how the alignment of actors and activities is organized to materialize a focal value proposition (Adner, 2017; Lusch & Nambisan, 2015).

One of the biggest obstacles to digital transformation, especially in terms of exploiting the opportunities offered by digital service platforms and ecosystems, is organizational inertia. Inertia prevents transformation where existing resources and capabilities act as barriers. Organizational inertia, for example, is often a characteristic of incumbent companies that are deeply embedded in existing relationships with customers and suppliers. In particular when companies as actors experience successful times, organizational “lock-in” effects occur with regard to the technologies, processes and the social norms and rules in use (institutions). Arthur and others have already outlined a phenomenon of organizational inertia by describing that increasing returns lead to a "lock-in" effect of incumbent technologies and rules and discourage the adoption of potentially better alternatives (Arthur, 1989; Foxon, 2002). This motivated our core research question: “How can organizations overcome inertia as barriers to new value creation paths by shaping institutions?”

2. Research Design

Our research focuses on the key question of how companies can shape institutions and institutional arrangements to overcome inertia and foster organizational development. Overcoming inertia will depend on the organization's ability to evolve. Organizational development is understood as improving the ability to adapt, integrate and apply resources and capabilities (Warg & Zolnowski, 2018). As organizations are embedded in broader social networks, this issue is closely related to how organizations can remove existing barriers and boundaries, which are also the result of their current practices, processes and structures, in order to take advantage of the opportunities offered by digital ecosystems. Our research focuses on the relevance and the impact of institutions on the process of service exchange with other actors in actor-to-actor networks as well as on the resulting ability of the organization to better integrate, apply and use resources.

On the basis of this analysis, we examine the requirements that a solution must fulfill in order to foster organizational development and new value propositions through the shaping and establishing of institutions.

Referring to our research objectives we believe that a combination of the Design Science Research Methodology (DSRM) and the Case Study Methodology is valuable for our research result.

We apply the Design Science Research Methodology (DSRM) for two reasons. On the one hand, it serves as a widely accepted framework to address the design product and the design process (Baskerville, Baiyere, Gregor, Hevner, & Rossi, 2018; Hevner, March, Park, & Ram, 2004; Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008; Walls, Widmeyer, & El Sawy, 1992). On the other hand, as a methodology that views design as an "act of creating an explicitly applicable solution to a problem" (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008).

We complement the DSRM with an embedded single case study. By analyzing different use cases within a single case study and using more than one perspective, we aim to gain a better understanding of the relevance of the solution created (Bass, Beecham, & Noll, 2018; Yin, 2018). Referring to DSRM (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008) our research proceeding is divided into six activities which are presented in the following briefly in general as well as for our key question.

Activity 1: Problem Identification and Motivation
How can organizations overcome inertia as barriers to new value creation paths by shaping institutions and institutional arrangements?
Activity 2: Define Objectives of a Solution
Our goal is to define the core elements of a generic solution pattern to overcome the challenges of organizational inertia within service ecosystems through institutional design. For this purpose, the modes of action for the co-creation of value propositions in service ecosystems are analyzed on the basis of the relevant theoretical foundations and concepts. We draw on Social Sciences (IAD framework, Coleman´s boat), Service-Dominant Logic and Service Science. On this theoretical basis, a generic solution pattern is created to represent the requirements and objectives of a solution. The implementation of a generic solution pattern should enable us researchers to check the extent to which the solution achieves the goal to overcome organizational inertia within service (eco) systems with the help of shaping institutions.
Activity 3: Design and Development
Following the understanding of design (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008) as an act of creating an explicitly applicable solution for our research question (problem) of "how companies can use the possibilities of service ecosystems by shaping institutions?". Therefore a service catalog as applicable solution for the establishment, change and shaping of institutions is designed.
Activity 4: Demonstration
The demonstration of the solution is based on an embedded single case study. For this purpose, different embedded use cases within the Service Dominant Architecture case study are analyzed to demonstrate the relevance of the service catalog from more than one perspective. Analyzing implemented artifacts – as embedded subunits will be used to demonstrate the suitability of the solution for shaping institutions.
Activity 5 Evaluation
The evaluation of the embedded single case study examines to what extent the service catalog is suitable for achieving the objectives of solution.
Activity 6: Communication
Our results will be communicated to the relevant scientific and practitioner communities e.g. on conferences, in projects or user groups.

3. Theoretical Foundations for Deriving Objectives of Solution

The way companies view the nature and process of digital transformation and the establishment of innovation has changed significantly in the last years. Whereas innovation itself and its attributes used to be the desired outcome, innovation is now input and one part of a value proposition that actors experience as value in use. Innovation development has also freed itself from organizational boundaries and increasingly relies on collaborative action as value cocreation within actor networks (Chesbrough & Rosenbloom, 2002; Lusch & Nambisan, 2015; Prahalad & Ramaswamy, 2004).

In order to identify the essential mechanisms of acting and value cocreation in actor networks as a prerequisite for digital transformation and overcoming organizational inertia, we will draw on theoretical foundations and concepts of: IAD framework, Coleman´s Boat, Service-Dominant Logic and Service Science.

3.1. IAD framework and Colemans Boat

With her research and studies, Ostrom developed a broader theory of institutional arrangements related to the effective governance and management of common-pool resources (Ostrom, 1990). One recognition was that society and its rules (institutions) are designed to optimally transform resources into goods, not how to preserve or increase commons. As a consequence the design of the institutions themselves is seen as the craft of long-term process design which requires the involvement of actors (Ostrom & Helfrich, 2012). With her research and the resulting design principles, Ostrom has shown that it is possible to treat resources by using appropriately designed institutions in a way that they become more when they are shared (Ostrom & Helfrich, 2012). An important concept for analyzing and understanding institutions is the Institutional Analysis and Development (IAD) framework. The framework is structurally detailing the action situation relevant to actors as participants in specific situations. For further detailing, we structure the framework into the following three areas: “exogeneous variables”, “action arena” and “interactions & outcomes”.

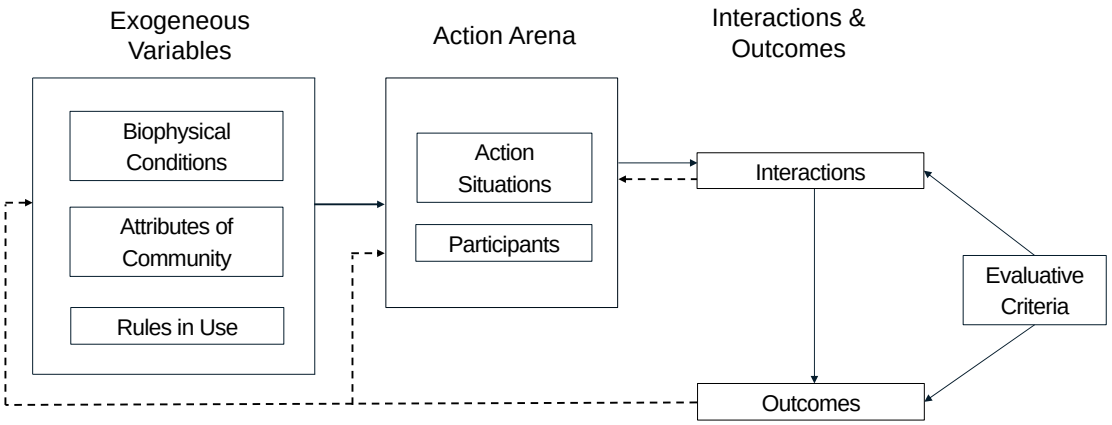

Figure 1 Ostrom`s Institutional Analysis and Development (IAD) framework (Kiser & Ostrom, 1982; Ostrom, 2005; Ostrom, Gardner, Walker, Walker, & Walker, 1994)

Starting on the left 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 (Kiser & Ostrom, 1982): 1. The attributes of states of the world that are acted upon in these arenas, e.g. the physical possibilities of actions, the producibility of outcomes and the linkage of outcomes to actions depend on the physical world and its transformations (Ostrom, Gardner, Walker, Walker, & Walker, 1994). 2. The attributes of a community as all aspects of the social and cultural context within the action situation is located (McGinnis, 2013). 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 (McGinnis, 2013; Ostrom, Gardner, Walker, Walker, & Walker, 1994).
From this point, the action arena is viewed as a set of variables dependent upon other factors. In the action situation individuals act on their own or as agents of organizations, observe information, select actions, engage in patterns of interaction, and realize

outcomes from their interaction (McGinnis, 2013). 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 (McGinnis, 2013; Rudd, 2004).
The relationships among the various parts of the action situation are represented within the following figure. Rules effect the working components of an action situation which is embedded in rules. Therefore it is helpful to link and explain rules corresponding to the action situation they constitute (Li, Van Den Brink, & Woltjer, 2016; McGinnis, 2013; Ostrom, 2005).

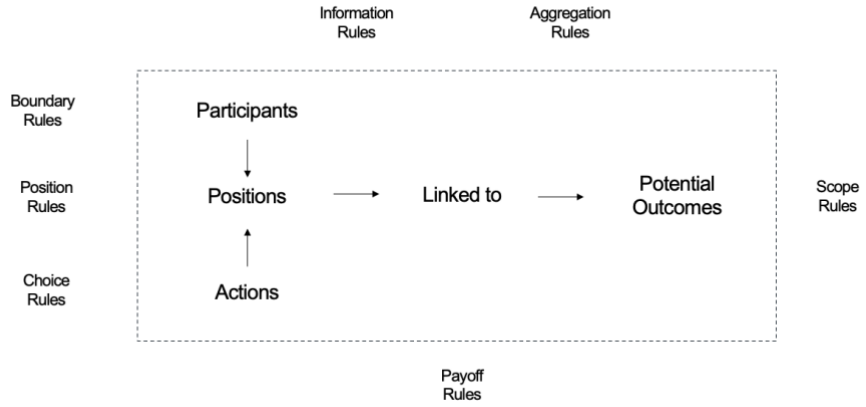

Figure 2 Rules as exogenous variables directly affecting the elements of an action situation (Ostrom, 2005)

Rules specify the values of the working components within an action situation. The IAD framework describes the following rules (Aligica, 2006; McGinnis, 2013; Ostrom, 2005; Ostrom, Gardner, Walker, Walker, & Walker, 1994): 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 by changing the costs and benefits associated with alternative actions and by making available options that would not be feasible to any one individual acting alone.
By providing a systematic way to think about the macro-micro relations the central motivation of Coleman´s boat and the associated microfoundation movement is to “unpack collective concepts to understand how individual-level factors impact macro level and how the action of individuals leads to emergent, collective, and macro level outcomes and performance, and how relations between macro variables are mediated by micro actions and interactions” (Felin, Foss, & Ployhart, 2015).

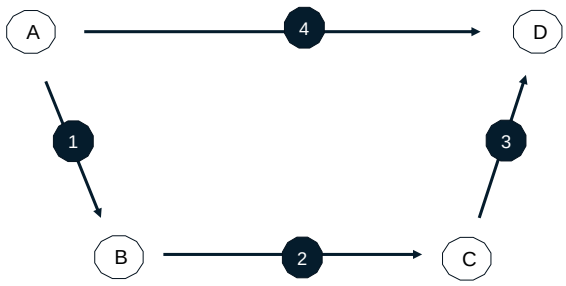

Figure 3 Coleman´s boat (Coleman, 1990)

The nodes (A) and (D) refer to the macro facts that might be cited as causes of social, economic or organizational phenomenon. On the macro level (D)´s are the macro facts to be explained. It is relevant to note that (A) and (D) represent not the whole macro level but only a part of it. Coleman´s scale of macro is flexible and can scale from two persons to organizations and nations (Coleman, 1990; Frosch & Warg, 2020; Ylikoski, 2016).
Arrow 1 between (A) and (B) reveals that the condition of (B) at the micro level changes when the condition of phenomenon (A) at the macro level changes. Arrow 1 shows that phenomenon (A) is a condition according to which the actor directs his actions. (A) can be the exclusive cause or only a reason for the actor's engagement and change in the state of (B). Arrow 2 illustrates how actors' actions bridge state changes of resources (B) and outcomes of new combinations of resources as engagement properties (C).
Arrow 3 then demonstrates how a new macro phenomenon is aggregated out of the sum of engagement properties and that the relation of (C) and (D) is one of logical implication (Frosch & Warg, 2020; Ylikoski, 2016). As pointed out Coleman´s boat is the visualized result of macro-micro explanations where changes in macro level initiate observable actions on micro level. Individual actors adapt the new context with action (arrow 2, micro-micro level) and the transformation and aggregation of these outcomes describes how macro level changes (arrow 3, micro-macro level) arise.

3.2. Service-Dominant Logic and Service Science

In the last decades, Service-Dominant Logic (Vargo & Lusch, 2018; Vargo & Lusch, 2004) and Service Science (Spohrer et al., 2019; Spohrer & Maglio, 2008) have been establishing from different perspectives the foundations for a uniform understanding of service, service exchange, value cocreation and the systemic functioning of service platforms and ecosystems. This worldview transcends the output-based division (dichotomie) into goods and ‘services’ of the goods-dominant logic of the past: service – as the application of competences (goods, services, skills, knowledge etc.) for the benefit of another – is considered to be the fundamental basis of economic exchange (Maglio, Vargo, Caswell, & Spohrer, 2009; Vargo & Lusch, 2018).
The Service-Dominant Logic (S-D Logic) grounding of service ecosystems identifies the core elements of mutual service provision in actor-to-actor networks (Vargo & Lusch, 2016) and is partially conceptualized in terms of institutions and institutional arrangements for coordinating value co-creation (Vargo, Akaka, & Vaughan, 2017). (Vargo & Lusch, 2018). According to S-D Logic, service is always provided in interaction between different actors and results in a unique value. Following this, service is defined as the application of resources (in particular knowledge, skills and competences) to make changes that have value for another. S-D Logic ”[…] is focused

on the interaction of the producer and the consumer and other supply and value network partners as they co-create value through collaborative processes" (Lusch & Vargo, 2008). The interactive relationship during value co-creation results in added value that improves one's own state or condition. For the process of value co-creation the integration of resources is a central concept (Edvardsson, Skålén, & Tronvoll, 2012; Peters, 2016; Vargo & Lusch, 2004). In this process actors are natural or legal entities capable of acting on potential resources and by this carrier of operant and/or operand resources (Löbler, 2013). Operant resources, such as competences, are those that act upon other resources to create benefit; while operand resources are those resources which must be acted on to be beneficial, such as natural resources, goods and money (Constantin & Lusch, 1994; Vargo, Lusch, & Akaka, 2010). Organizational development and innovation pertains to service systems in action, such that actors integrate and act on available resources to create value for themselves and others in new and better ways (Caridà, Edvardsson, & Colurcio, 2019). For this S-D Logic serves as a meta-theoretical framework for explaining the process of value creation through service exchange among multiple resource-integrating actors forming institutionally coordinated service ecosystems (Vargo & Lusch, 2016, 2018).

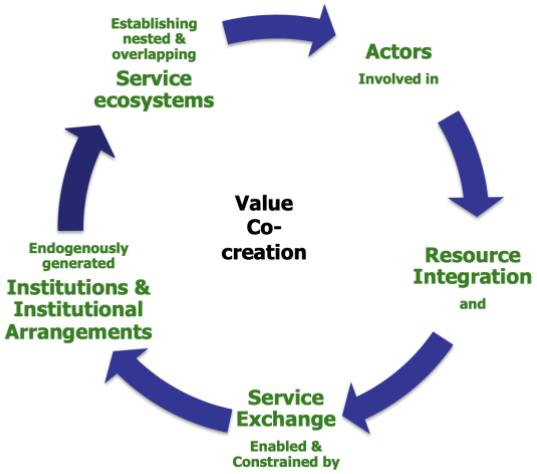

Figure 4 The narrative and process of S-D Logic (Vargo & Lusch, 2016)

The idea of resource networks contributes to the understanding of value creation. Its consideration sometimes lacks a critical characteristic of systems and structures, which are dynamic and potentially self-adjusting and thus simultaneously functioning and reconfiguring themselves. "That is, each instance of resource integration, service provision, and value creation, changes the nature of the system to some degree and thus the context for the next iteration and determination of value creation. Networks are not just networks (aggregations of relationships); they are dynamic systems" (Giddens, 1984; Vargo & Lusch, 2011). In this context of dynamic systems the aspects of how structures arise as well as the effective value co-creation functioning at the different micro-meso-macro levels of service networks and service ecosystems (Vargo & Lusch, 2018), still represent key areas of service research.

Based on S-D Logic, Service Science grounds the nature, scientific understanding, management principles and engineering discipline needed to understand and improve service and dynamic emerging structures (Maglio & Spohrer, 2008; Spohrer, Vargo, & Maglio, 2008). With the service system as complex socio-technical system a new unit of analysis is introduced by Service Science (Spohrer, Maglio, Bailey, & Gruhl, 2007). Referring to the interactive character of service that involves at least two entities - one

applying competence and another integrating the applied competences - these interacting entities are called service systems. More precisely, service systems are defined as dynamic value co-creation configurations of resources, including people, organizations, shared data (language, laws, measures, methods), and technology, all connected internally and externally to other service systems by value propositions (Spohrer, Vargo, & Maglio, 2008). Therefore from Service Science perspective service (eco) systems can be described as a structure of interconnected service system entities. Moving toward a general theory of service (Spohrer, Fodell, & Murphy, 2012; Vargo, Akaka, & Vaughan, 2017), the following distinctive characteristics of service (eco) systems are defined (Caridà, Edvardsson, & Colurcio, 2019; Spohrer, Maglio, Bailey, & Gruhl, 2007; Vargo & Lusch, 2018):

- service (eco) system as complex socio-technical system,
- service (eco) systems are relatively self-contained and have fuzzy boundaries,
- actors are relatively self-adjusting, as they show adaptive behaviour,
- actors are resource integrators,
- actors are coordinated and connected by shared institutional logics,
- service exchange in service (eco) systems results in mutual value creation.

In the context of actor coordination and service exchange S-D Logic has clarified the understanding and role of institutions as routinized, coordinating mechanisms, and becoming essential to understanding value co-creation: “As actors within a service ecosystem are cognitively distant from each other, shared institutional arrangements are necessary in order to coordinate their otherwise unrelated behaviour (Axiom 5)”(Vargo & Lusch, 2018). Institutions are the human-made rules, norms and beliefs that provide stability and meaning to social life by constraining and enabling collective action (Scott, 2014). They can be understood as the implicit and explicit ‘rules of the game’ (Milgrom, North, & Weingast*, 1990), which coordinate resource integration and service exchange among actors (Edvardsson, Kleinaltenkamp, Tronvoll, McHugh, & Windahl, 2014; Vargo & Lusch, 2016).

3.3. Generic Pattern and Objectives of a Solution

The following figure summarizes the core elements of the theoretical foundations as generic solution pattern.

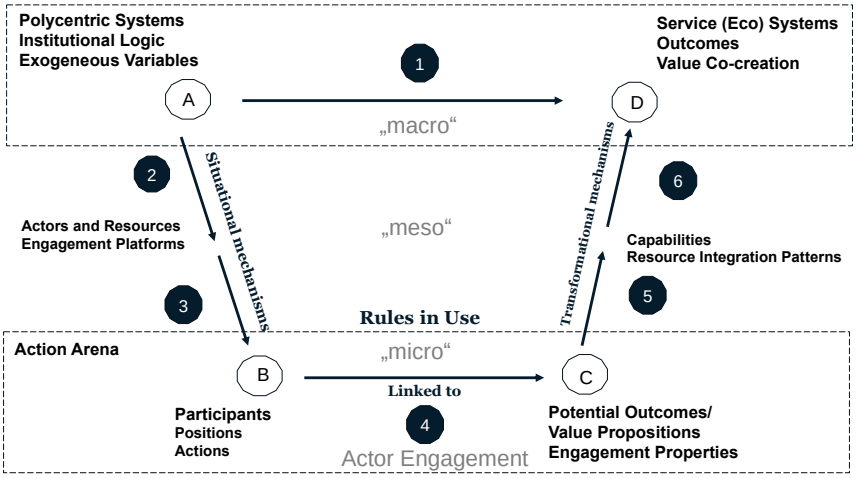

Figure 5 Generic Pattern of Actor engagement; source Warg, Hans 2021 modified of: Coleman 1990, Ostrom 2009, Storbacka et. al. 2016

Storbacka et al. (2016) anchor and reveal the causes of the more abstract macro (ecosystem and institutional logic) concept of value co-creation with micro (actor engagement) and meso (sets of actors and their resources, e.g. organization) level mechanisms. At the macro level, the phenomenon of (B) value cocreation, outcomes and service (eco) systems based on (A) polycentric systems, institutions and exogenous variables then is evident.
Arrows 2 and 3 show how, as a result of changes at the macro level, situational mechanisms lead actors and other resources to engage on platforms. This leads to the change of positions and action possibilities in the action arena on the micro level (B). Linked to value propositions as potential outcomes actor engagement and engagement properties are fueled (C).
Actor engagement interconnected by value propositions triggers transformational mechanisms using platforms and leads to the emergence of various resource intgration pattern at the meso level (Arrows 5, 6). Transformational mechanisms in combination with new resource configurations as a result of the integration of resources lead to resource density, new capabilities and value cocreation on the engagement platform at the meso level. Fostered by resource integration pattern actor-to-actor networks arise and transform themselves by value cocreation and service exchange to service (eco) systems. Service (eco)systems arise at the macro-level (Storbacka, Brodie, Böhmann, Maglio, & Nenonen, 2016) if the resource integrating actors are connected by shared institutional agreements and mutual value creation (Spohrer, Maglio, Bailey, & Gruhl, 2007; Vargo & Lusch, 2018).

According to the domain theories of Social Sciences (IAD framework, Coleman´s boat), Service-Dominant Logic and Service Science we derive five objectives for overcoming organizational inertia with the help of institutions:

Objectives to overcome organizational inertia	**Description**	**Source**
actor engagement	fostering actor engagement and new situational mechanisms	(Ostrom, 2005, 2010), (Storbacka, Brodie, Böhmann, Maglio, & Nenonen, 2016), (Spohrer & Maglio, 2008), (Coleman, 1990; Vargo, 2011)
rules in use	changing the rules in use of the action arena	(Giddens, 1984; Kiser & Ostrom, 1982; Ostrom, 2005; Vargo & Lusch, 2016)
actor-to-actor networks	empowering actor-to-actor networks by offering resource integration pattern	(Koskela-Huotari & Vargo, 2016; Spohrer & Maglio, 2008; Spohrer, Piciocchi, & Bassano, 2012; Vargo, Akaka, & Vaughan, 2017; Warg, 2020)
resource density	enabling resource-integration; resource-density and resource-orchestration	(Lusch & Nambisan, 2015; Spohrer et al., 2019; Zolnowski & Warg, 2018)
service exchange	pave the way for resource application and service exchange	(Moeller, 2008; Vargo, Koskela-Huotari, & Vink, 2020; Vargo & Lusch, 2004)

Table 1 Five Objectives to overcome Organizational Inertia with the help of Institutions

4. Solution Design and Development

According to the five objectives derived out of the generic pattern for actor engagement and the objectives of solution, we demonstrate and evaluate a solution design based on different embedded use cases within the Service Dominant Architecture case study. Within the embedded single case study of the Service Dominant Architecture (SDA) as design pattern used to develop engagement platforms and service ecosystems (Warg & Engel, 2016; Warg, Weiß, Engel, & Zolnowski, 2016; Weiß, 2019) we analyze and demonstrate the relevance of a service catalog as set of institutions to establish rules and social practices for actor coordination and resource integration. And in this way, the appropriateness of a service catalog for overcoming organizational inertia. For this purpose, we first describe the generic (solution) design pattern of Service Dominant Architecture that is already in use at a number of companies as the target architecture for their platform- and ecosystem-development. We then demonstrate the relevance of the SDA service catalog for overcoming organizational inertia. Finally we evaluate the extent to which the “five objectives to overcome the organizational inertia with the help of institutions” were achieved.

4.1. Generic Solution Pattern: Service Dominant Architecture

SDA was derived from the knowledge base of the domain theories Service Science, S-D Logic and Institutional Economics with the aim of putting the findings, logics and processes into practice by enabling actors in the process of value cocreation. Used in practice SDA enables entities to purposeful build up capabilities and to engage in the process of service exchange and value co-creation (Warg & Engel, 2016; Warg, Weiß, & Engel, 2015). SDA can be viewed from a conceptual and an applied perspective:

(1) firstly, SDA as design pattern (Alexander, 1977; Gamma, 1995; Gamma, Helm, Johnson, & Vlissides, 1995) or virtual order in the understanding of a structure (Alexander, 1977; Gamma, 1995; Gamma, Helm, Johnson, & Vlissides, 1995; Giddens, 1984) of five systems (Cardoso et al., 2015; Luhmann, 1984; Spohrer, Vargo, & Maglio, 2008).

(2) secondly, SDA as tangible structure instantiated by at least one entity (Giddens, 1984). The instantiated structure consists of five systems including the SDA service catalog as system of shared institutional arrangements (Spohrer, Vargo, & Maglio, 2008). SDA applied within an actor-to-actor network facilitates the process and coordination of service exchange and mutual value creation (Vargo & Lusch, 2016).

In the following the systems of SDA are introduced (Warg, Weiß, Engel, & Zolnowski, 2016; Warg, Weiß, & Engel, 2015):
1. *System of Operant Resources*: The system of operant resources is the heart of the SDA design pattern. It represents the workbench, where the various resources and capabilities are brought together and processed. For this, this system applies certain logics or processes. In line with S-D Logic, the focus is on intangible capabilities, previously defined as operant resources (like competence, knowledge, skills, software code), which are used and brought together to (co-) create value propositions. These value propositions are dependent on the achievable level of resource density. A high resource density positively impacts the emergence and creation of innovative and relevant value propositions.

2. *System of Interaction*: The system facilitates value in use and value in context by enabling the application of capabilities bundled in value propositions. Interaction enables resource integration and service exchange between actors.
3. *System of Participation*: The concept of co-creation includes other (external) actors as co-producers of the value proposition. In this process the system of participation enables actor-to-actor orientation and the participation of other actors by coordinating actors and facilitating the process of resource integration.
4. System of Operational Data Stores (*Data Lake)*: From an actors (e.g. organization) point of view, data received and generated by interacting with other actors (e.g. customer) should be systematically recorded and evaluated in real time. In this way, data and knowledge about the preferences and the context of other actors like customers can be build up continously.
5. System of Institutional Arrangements (Service Catalog): As rules, institutions enable the coordination of actors and the access to and use of resources. In conjunction with SDA design pattern, institutions enable the coordinated creation of solution designs by connecting actors, and enabling the integration and application of resources.
The (design) patterns as architectural framework of SDA are summarized in the following figure.

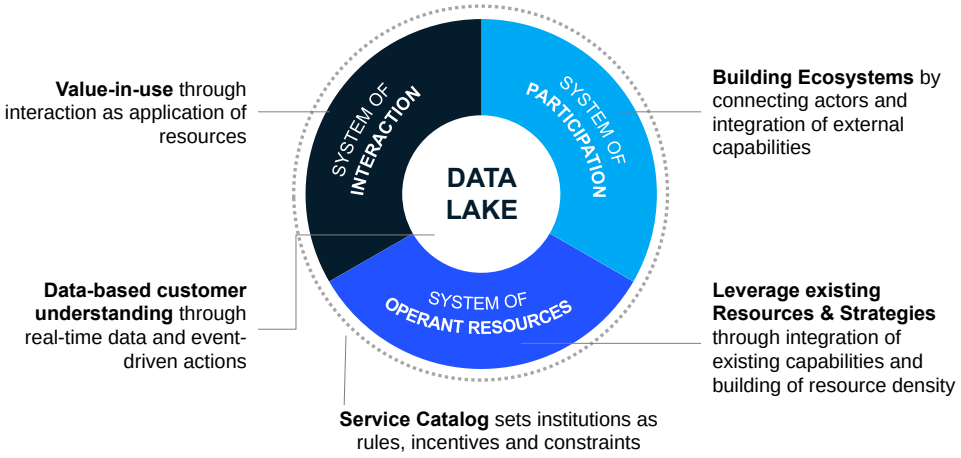

Figure 6 Design Pattern as Architectural Framework of Service Dominant Architecture (SDA) (source: IfSD.hamburg)

SDA enables the value co-creation process first on the level of “virtual order” as design pattern and then as material instantiation of an entity by engaging in service exchange. By engaginging in service exchange the design patterns are "animated" with operand and operant resources and become Service Systems (Spohrer, Maglio, Bailey, & Gruhl, 2007) by creating mutual value.

4.2. SDA Service Catalog

The purposeful building of capabilities is facilitated by enabling the integration and orchestration of resources and setting the institutions for participation and coordination. For this, the SDA Service Catalog enables to capture (integration, participation), exchange (interaction), and orchestrate actors and resources in a meaningful way.

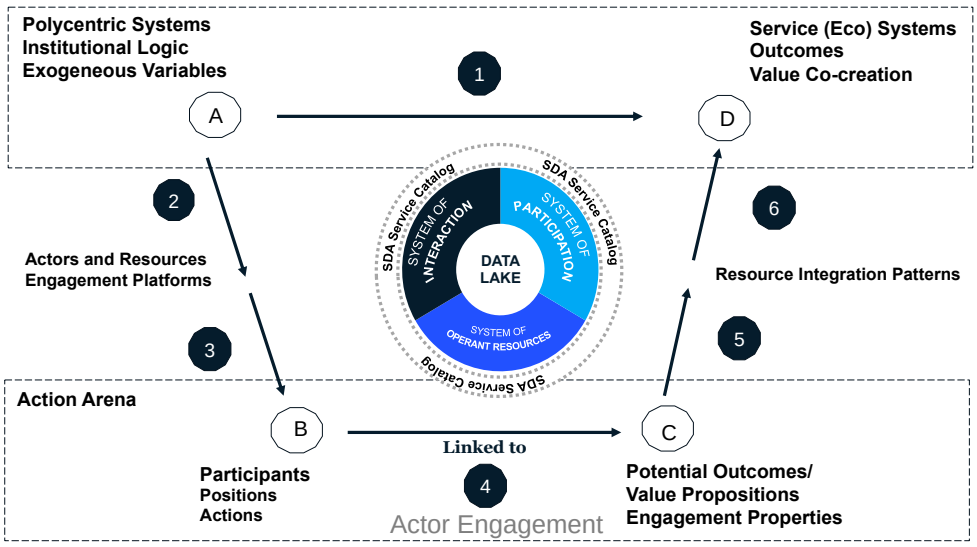

Figure 7 SDA Service Catalog (Warg, Hans (2021))

The institutions of the SDA Service Catalog are accessed via the SDA portal; it bundles individual institutions as well as sets of institutions up to already established service catalogs. As rules, institutions enable the coordination of actors and the access to and use of resources. In conjunction with the SDA Service Systems, institutions enable the integration and application of resources.

5. Demonstration

The working of the SDA Service Catalog is illustrated below on the basis of exemplary institutions and two embedded use cases within the SDA case study.

Examples of (single or sets of) institutions within SDA service catalog	**description**	**relevance for actor engagement**	**source**
spotify backstage	- software developer portal - software and tool catalog - (micro-) service overview - service ownership - documentation - authorizations	- standardization of (micro-) service creation and documentation - makes it easy to create, maintain, find and use (micro-) services	(Lines, 2020) (Backstage, 2021)
Health Level 7 (HL 7); Fast Healthcare Interoperability Resources (FHIR)	- standards to achieve healthcare systems interoperability - health information exchange standards	- health information exchange - interoperability	(Bender & Sartipi, 2013)
ICD code	- international classification of deseases and related health problems - more than 1.6 million clinical terms interpreted - multilangual design facilitates global use	- health (deseases) information exchange - interoperability	(Treede et al., 2019)

Table 2 Examples of Institutions within SDA Service Catalog (Warg, Hans (2021))

5.1. Embedded use case: software development (spotify backstage)

Software developer teams have to handle large numbers of tools, technical interfaces, and code. Especially in mature companies with a large number of development teams and business units, it becomes difficult to keep track of all these things. Documentation, data models, and architectures have to be findable, reusable and conform to the corporate strategy. Every existing piece of software must be maintained and meet organizational standards e.g. for security and quality. Although solutions like tools exist to help address these challenges, they are often redundant, scattered across different locations, and difficult for developers to find. For example, software code is stored in tools like GitHub, code quality is measured in tools like SonarCloud, documentation is stored in tools like Confluence, and security events are tracked in tools like DefectDojo. As a result, teams spend more time searching for the right information and coordinating which tools to use, rather than building and testing code.
Backstage as a catalog of services accessed through a portal integrates all independent developer tools and the relevant information into a single user interface. Like an app store for all developer tools, backstage creates a standard for code development across all phases. All informations and tools (docs, services, API's) are easy and quick to find: e.g. API documentation and plug-ins, unified display and management of deployments, fast documentation. Personalized landing pages support the developer in software development, maintenance as well as error and license monitoring.

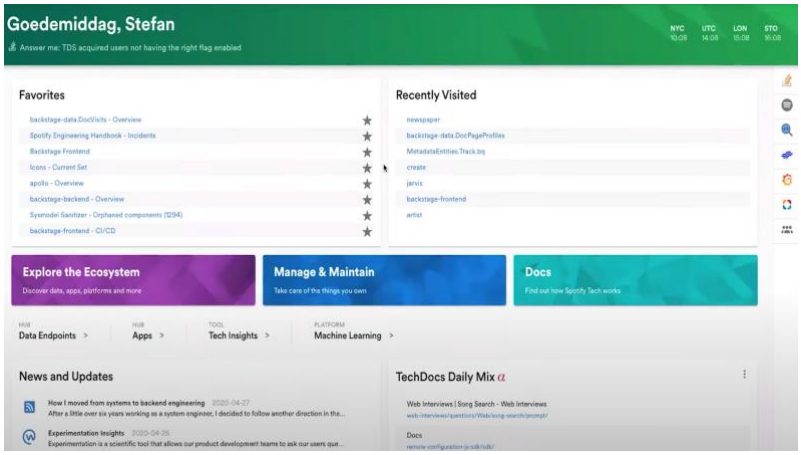

Figure 8 Personalized Developer Portal on basis of Backstage

The advantages of backstage in combination with the provision as open source lead to a rapid increase of the user community. Besides individual developers, companies like netflix or zalando already use backstage and thus contribute to further institutionalize the Backstage.

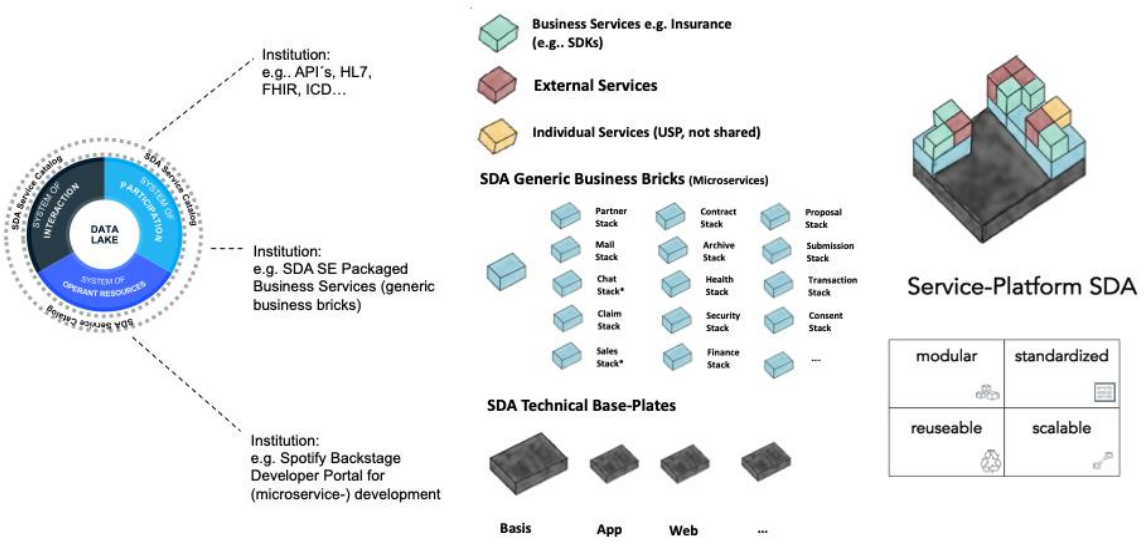

Figure 9 Institutions for Software Development

In the context of SDA, the Backstage institutions are part of the SDA service catalog and the basis for software (microservice-) development. These are expanded by so-called packaged business capabilities (Natis, 2021) as generic business functions. This refers to cross-industry functions such as partner management, contract management or consent management. Finally, there are industry-specific institutions such as HL 7 (Health Language) for exchanging healthcare data between different stakeholders.

5.2. Embedded use case: stroke prevention (ai4medicine)

As described by (Zolnowski & Frey, 2020) ai4medicine is a personal health advice service for stroke prevention in Germany. The underlying prediction model was developed with machine learning algorithms based on clinical data (Berlin Charite) from patients with an increased risk of stroke. Stroke prevention offers both a high patient benefit and opportunities to improve customer relations for partner companies, all the way to reducing benefit expenses for health insurance companies.

The business model of ai4medicine is based on the use of the app with which customers are comprehensively supported in reducing their stroke risk. Based on a risk assessment, customers receive recommendations for behavioral changes that lead to a minimization of the risk of stroke. With this offer, targeted behavioral changes are made to the customer that reduce the risk of stroke. To enable the offering, ai4medicine has to combine clinical and epidemiological data on stroke and domain knowledge to develop and train artificial intelligence models. These models build the basis of the value proposition and enable evidence-based, AI-powered stroke prevention strategies. The application requires customers to use their devices and install the mobile app.

In addition, partners such as insurance companies can provide historical health data of the customer to further improve data quality and individual stroke prevention. Partner companies can integrate ai4medicine with their existing mobile apps. In addition, existing interoperable health data from waereables, for example, will be connected and integrated. This eliminates the need for the user to manually enter the data.

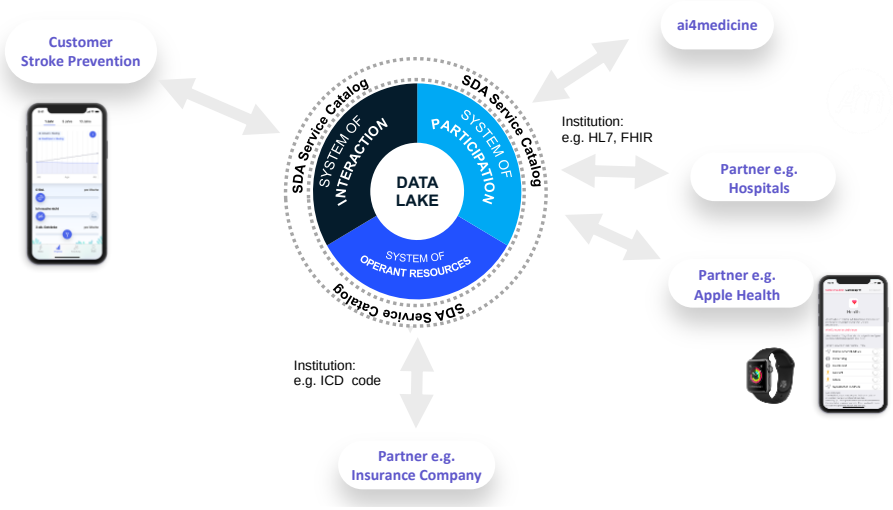

Figure 10 Institutions for Health Data exchange

Health Information exchange standards like Health Level 7 (HL 7), Fast Healthcare Interoperability Resources (FHIR) or the International Classification of Deseases (ICD) are established institutions to achieve healthcare systems interoperability. These institutions align actors by enabling actor coordination and resource integration (Adner, 2017).

6. Evaluation

The two use cases show how institutions combined with modern digital technologies empower organizations to change processes and behaviors. In addressing this, all five objectives for overcoming organizational inertia are impacted.

Objectives to overcome organizational inertia	**Institution within SDA Service Catalog**	**Impact**
actor engagement	- Combination of SDA design pattern implemented as service platform (engagement platform) and - Institutions as rules for actor coordination and resource integration	fostering actor engagement and new situational mechanisms
rules in use	- SDA generic business bricks; Spotify Backstage developer portal, industry-specific institutions like HL7, FHIR, ICD codes, API plug ins	changing the rules in use of the action arena; reuseability
actor-to-actor networks	- SDA service systems as engagement platform - Resource integration pattern (system of participation)	empowering actor-to-actor networks by offering resource integration pattern
resource density	- SDA service systems as resource integration pattern; - institutions to foster interoperability	enabling resource-integration; resource-density and resource-orchestration
service exchange	- modular, standardized, reuseable (micro-) services and generic business bricks (packaged business services)	pave the way for resource application and service exchange

Table 3 Evaluation of the Impact of Institutions on overcoming Organizational Inertia

The interplay of modern technologies, reuseable packaged (technological and business) capabilities, and institutional agreements improves organizational development understood as the ability to integrate, adapt and apply resources and capabilities (Warg & Zolnowski, 2018). Actor engagement and service exchange facilitate resource density and network effects and enable to overcome the “lock-in”effects of incumbent technologies and business practices.

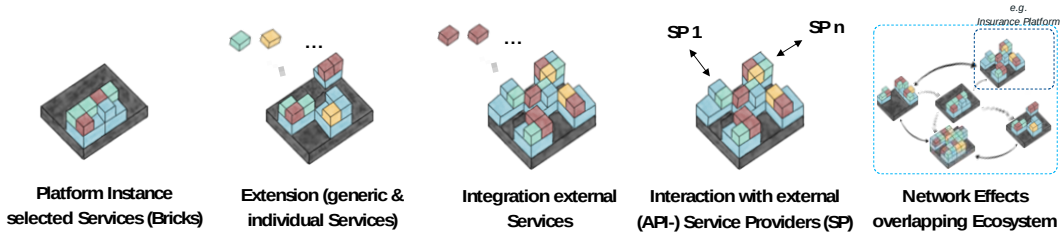

Figure 11 Service Exchange and Network Effects

7. Findings and outlook

The research question of this paper is “how can organizations overcome inertia as barriers to new value creation paths by shaping institutions?”.
Based on the domain theories of Service Science, Service-Dominant Logic, Social Sciences and the IAD framework the paper elaborates that overcoming organizational inertia requires the orchestration of state-of-the-art technologies, business capabilities and the coordination of actors to change processes and socio-technical practices.
On behalf of the single case study of Service Dominant Architecture with the embedded use cases of Spotify Backstage and ai4medicine, the relevance of service catalogs for actor engagement, shaping institutions as rules in use and service exchange is demonstrated.
Within service (eco) systems service catalogs have strong impact to overcome the "lock-in" effects of incumbent technologies and business practices by finding, adopting and institutionalyzing better technologies, business capabilities and processes as socio-technological practices.

8. Figures

9. Tables

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