

Capabilities for Digital Platform Survival: Insights from a Business-to-Business Digital Platform

Completed Research Paper

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Abstract

A digital platform is viewed as the central point of gravity within its business ecosystem to facilitate value co-creation processes among its business ecosystem's constituent actors. Considering the specificities of business ecosystems, we spotlight digital platform survival to investigate digital platforms' sustained viability and growth. We posit that digital platform survival is contingent on its owner's capabilities to ensure efficient and effective value co-creation processes among the digital platform's constituent actors on both service system and service ecosystem levels. Building on the inherent control-generativity dualism of digital platforms and through investigating an established business-to-business digital platform, we identify four key capabilities for digital platform survival. While two capabilities (system orchestration and system reformation) reflect the owner's ability to facilitate value co-creation processes on the service system level, the other two capabilities (ecosystem preservation and ecosystem diversification) reflect the owner's ability to facilitate value co-creation processes on the service ecosystem level.

Keywords: Digital platform, Digital ecosystem, Capability, Value co-creation, Digital platform survival, Single case study

Introduction

"Understanding of what causes a [digital] platform to succeed while others fail is still lacking. [...] Studying the conditions in which some [digital] platforms thrive and grow while others fail is of value to both research and practice." (De Reuver et al. 2017, p. 7).

Apple, Alphabet, Microsoft, and Amazon have become one of the world's most valuable companies (Statista 2017). Each is marked by a *digital platform* (e.g., De Reuver et al. 2017; Parker et al. 2017; Tiwana 2015)—

a building block, providing an essential function to a technological system, which acts as a foundation upon which other firms can develop complementary products, technologies, or services (Gawer 2011, p. 2). While few digital platforms thrive and grow, such as those of Apple (*iOS*), Alphabet (*Android*), Microsoft (*Windows*), or *Amazon.com*, many others fail to sustain in the long run. A prominent example of digital platform failure is Microsoft's operating system *Windows Phone*. In 2013, Microsoft acquired Nokia's *Devices and Services* division in a last attempt to leverage its extant mobile operating system. In 2017, Microsoft discontinued its support for *Windows Phone* (Briegleb 2017) with only 0.2 percent of all smartphones running the *Windows Phone* operating system (Gartner 2017).

Notwithstanding existing investigations on digital platforms' evolution (Tiwana et al. 2010), business models (Giessmann and Legner 2016), innovation (Lyytinen et al. 2016), and competition (Tiwana 2015), a thorough understanding of what delineates a digital platform to survive and grow in the long run while others fail is still lacking (De Reuver et al. 2017, p. 7). To bridge this void, we investigate *digital platform survival* that reflects a digital platform's state of sustained viability and growth (Josefy et al. 2017). Seeking to leverage digital platform survival, we particularly focus on pivotal capabilities that digital platform owners should possess—in relation to third-party communities and end user organizations. In this study, capability refers to the ability to repeatedly perform or achieve certain actions or outcomes that relate either directly or indirectly to a firm's capacity for creating value (Grant 1999). For instance, a hospital's capability in cardiovascular surgery is dependent on integrating the specialist knowledge of surgeons, anaesthetist, radiologist, operating-room nurses, and several types of technicians. Similarly, a digital platform owner's capability in leveraging digital platform survival is dependent on integrating the owner's, partners', end user organizations', and further stakeholders' resources.

Our quest for such capabilities rests on the premise that third-party communities (e.g., digital platform partners) extend traditional notions of value creation in firms. That is, while digital platform owners must continue to carefully manage the value they create internally, they must as carefully obtain capabilities to manage value creation that occurs externally (Parker et al. 2017). In distinction to mere outsourcing, owners grant access to the digital platform and relinquish product specifications to little-known, loosely-coupled third parties. Thereby, owners seek to attract an entire ecosystem containing third parties, which are capable of serving as development, sales-force, or consulting partners of the respective digital platform to provide requested services by end users (e.g., Ceccagnoli et al. 2012; Sarker et al. 2012). Thus, value is co-created by the owner, partner, and end user organizations. To account for these multiple, varied, and interdependent actors co-creating value in ecosystems (Ceccagnoli et al. 2012; Han et al. 2012; Sarker et al. 2012), we employ the *value co-creation* concept (Galvagno and Dalli 2014; Payne et al. 2008; Ranjan and Read 2016). Specifically, we draw our conceptual foundation on value co-creation's core constructs from a service-dominant logic perspective in service science (Vargo and Lusch 2016a; Vargo and Lusch 2016b; Vargo and Lusch 2017; Wilden et al. 2017). Building on the *value co-creation* concept to study *digital platform survival*, we posit that value co-creation plays a pivotal role in leveraging digital platform survival.

Overall, this research draws on, integrates in, and extends digital platform research (*targeted literature*) (Constantinides et al. 2018; Reuver et al. 2017). We specifically study digital platforms' survival (*phenomenon of interest*) through the vantage point of value co-creation (*employed theoretical lens*) (Ranjan and Read 2016). To answer the research question "*Which digital platform capabilities account for value co-creation to leverage digital platform survival?*", we study an established business-to-business (B2B) digital platform for enterprise software—one that has thrived globally since its launch in 2012. To this end, we provide detailed empirical account and analysis of a digital platform's key capabilities (namely, *system orchestration*, *ecosystem preservation*, *system reformation*, and *ecosystem diversification*) to leverage digital platform survival (*resulted insights*).

The study's remainder is structured as follows. The following section synthesizes digital platform literature as the research background and value co-creation literature as the conceptual foundation. After explicating the employed research method, we present the resulted insights. The last section discusses the capabilities for digital platform survival and concludes.

Research Background and Conceptual Foundations

In this section, we first provide an overview of digital platform research. We then introduce the value co-creation concept as the study's conceptual foundation in investigating digital platform survival.

Research Background: Digital Platforms

The use of the term *platform* has proliferated in both IS and management research (De Reuver et al. 2017; Thomas et al. 2014). To organize prevalent discourses, we follow Thomas et al.'s (2014) synthesis of platform research streams. They represent a continuum from predominantly *firm-internal* platforms—comprising organizational platforms (e.g., consulting, outsourcing) and product family platforms (e.g., machine tools, consumer electronics)—to increasingly complex *firm-external* platforms—comprising market intermediary platforms (e.g., credit cards, telecoms, online auctions) and platform ecosystems (e.g., Internet). In the context of *digital* platforms, contemporary organizations interactively and jointly operate in actor-to-actor networks comprising an owner, partners, end users, subcontractors, regulators, and other stakeholders that extend the operations of an organization beyond its organizational boundaries (Friend and Malshe 2016; Parker et al. 2017). Residing in the firm-external end of platform research (Ceccagnoli et al. 2012; De Reuver et al. 2017; Parker et al. 2017; Sarker et al. 2012; Tiwana 2015), we ground our research on the premise that *digital platform survival* is contingent on the availability and contribution of a critical mass of actors within each of the relevant actor roles of the respective *ecosystem* such as owner, partners, and end users (Grover and Kohli 2012; Parker et al. 2017; Tiwana 2015). Each of these actor roles offer complementary resources to the respective ecosystem to serve a wide range of end users and to satisfy various requirements (Wareham et al. 2014).

Nevertheless, due to a multitude of actors' engagement in the ecosystem, digital platform survival becomes considerably depend on the digital platform's capabilities to *simultaneously* allow for structural stability (exploitation)—to reliably serve networked business activities—and for change and innovation (exploration)—to make the ecosystem attractive and open for more actors (Ghazawneh and Henfridsson 2013). Thus, to thrive and survive in the long run, digital platforms require a delicate balance of control by an owner (**control**) and autonomy among the other independent actors (**generativity**) (Ciborra et al. 2000; De Reuver et al. 2017; Henfridsson and Bygstad 2013; Lusch and Nambisan 2015; Tan et al. 2015; Tilson et al. 2010). Extant literature approaches generativity and control as a *duality* (Farjoun 2010; Tilson et al. 2010). That is, the paradoxical combination of control and generativity presents the requirement of digital platforms *simultaneously* being governed by the owner's centralized control and distributed actors' autonomy (De Reuver et al. 2017). Apple's ecosystem, for instance, offers a restricted and stable portfolio of multiple and interdependent hardware, software, and organizational resources (*control*). iOS devices require signatures for firmware installation, intended to verify that only latest official firmware is installed. Simultaneously, Apple relinquishes detailed product specifications to developers that can flexibly explore new application opportunities (*generativity*). The *generativity-control* paradox is thus central in understanding digital platform survival (Ghazawneh and Henfridsson 2013).

Table 1. Key Concepts in the Context of Digital Platform Survival

<i>Digital Platform</i>	A building block, providing an essential function to a technological system—which acts as a foundation upon which other firms can develop complementary products, technologies or services (Gawer 2011).
<i>Owner</i>	Natural or legal entity that designs, implements, maintains, and/or manages a digital platform (Tan et al. 2015).
<i>Partner</i>	Natural or legal entities that augment the platform with modules, services, or sales channels (Sarker et al. 2012).
<i>End User</i>	Natural or legal entities that use the resources available on the platform (Parker et al. 2017).
<i>Ecosystem</i>	A complex network of actor-to-actor interactions, which is mediated by a <i>digital platform</i> (offered by digital platform's <i>owner</i>) and becomes increasingly accessible to a wide range of <i>end users</i> through complementary resources offered digital platform's <i>partners</i> (Wareham et al. 2014).
<i>Survival</i>	An entity's state of sustained viability and growth (Josefy et al. 2017).
<i>Control</i>	Owner's mechanisms to encourage desirable behaviors by third-party actors, and <i>vice versa</i> (Tiwana et al. 2010).
<i>Generativity</i>	A self-contained digital platform's capacity to generate new outputs, structures, or behaviors endogenously through uncoordinated third-party actors and without deliberate platform owner planning (Lyytinen et al. 2016).

Beyond the technical aspect, digital platforms are socio-technical phenomena and viewed as a central point of gravity within their business ecosystems. For instance, Android and iOS have become the cornerstone and the *raison d'être* of their respective mobile telecommunications ecosystems. Through exploiting digital technologies, digital platforms facilitate the integration of resources among multiple, varied, and interdependent actors in different roles. Since these actors *and* their relations evolve over time in varied patterns and rates of change (Tiwana et al. 2010), digital platform survival is considerably dependent on

how the relation between different actors with various roles (e.g., owner, partner, end user) are dynamically configured to *jointly* create value for very specific needs of specific end users (Sarker et al. 2012). Therefore, the nature of value creation in ecosystems is networked, emergent, and contingent on the digital platform's capabilities in getting together a critical mass of diminutive resource sets (Grover and Kohli 2012; Tan et al. 2015). In case of malfunction, these specificities can substantially impede digital platform survival (De Reuver et al. 2017). Thus, digital platform survival is highly dependent on its owner to ensure efficient and effective value co-creation processes among different actors in the ecosystem (Friend and Malshe 2016; Grover and Kohli 2012). The concepts related to digital platform survival that represent our understanding in this study are summarized in Table 1.

Conceptual Foundation: Value Co-creation

As elaborated in the preceding section, digital platforms derive much of their value from the business ecosystems they serve. That is, digital platforms become more valuable and can sustainably grow when more actors join the ecosystem to co-create value through their complementary business and technological resources (De Reuver et al. 2017; Parker et al. 2017). Thus, we employ the *value co-creation* concept as theoretical lens (Galvagno and Dalli 2014; Payne et al. 2008; Ranjan and Read 2016) to account for the networked value creation in platform ecosystems (Ceccagnoli et al. 2012; Han et al. 2012; Sarker et al. 2012). It captures the collaborative *processes* of reciprocal value creation among various actors in actor-to-actor networks (Lusch and Nambisan 2015; Parker et al. 2017). More specifically, we draw on a service-dominant (S-D) logic perspective on value co-creation processes (Vargo and Lusch 2004; Vargo and Lusch 2008; Vargo and Lusch 2016a; Vargo and Lusch 2017). We opt for S-D logic since it provides a well-defined and unified theoretical core of value co-creation. S-D logic conceptualizes value co-creation through core constructs, namely *value*, *actor*, *resource*, *service system*, *institutional arrangement*, and *service ecosystem*. Table 2 summarizes our understanding of value co-creation in this study.

Table 2. Value Co-creation's Core Constructs from an S-D Logic Perspective	
<i>Value</i>	A product/service's value is fundamentally determined in <i>use</i> during its application in a specific context (Vargo et al. 2008).
<i>Actor</i>	Any social and economic agent, who provides input to and takes advantage of value co-creation (Spohrer 2011).
<i>Resource</i>	Tangible, passive, and static resources (<i>operand</i>), but also intangible, active, and dynamic functions of human ingenuity and appraisal (<i>operant</i>) (Akaka and Vargo 2014; Lusch and Nambisan 2015).
<i>Service System</i>	Dynamic configurations of resources, including people, organizations, shared information (language, laws, measures, methods), and technology to provide a particular service to particular end users (Maglio et al. 2009). A service ecosystem is a network of different service systems.
<i>Institutional Arrangement</i>	Sets of interrelated humanly devised rules, norms, and beliefs that enable and constrain actors' actions and that make actor-to-actor exchange predictable and meaningful (<i>institutional logics</i>) (Vargo and Lusch 2016a).
<i>Service Ecosystem</i>	Self-contained, self-adjusting systems of mostly loosely coupled social and economic actors connected by shared institutional logics and mutual value creation through service exchange (Lusch and Nambisan 2015, p. 162).

According to S-D logic, in the process of value co-creation, actors integrate resources in *service systems* that are configured by institutional arrangements through which *service ecosystems* endogenously emerge (Vargo and Lusch 2016a, p. 3). S-D logic views a **service system** as an instance of a value co-creation process (e.g., caller, callee, telecommunications operator) embedded in a service ecosystem (e.g., Vodafone's telecommunication ecosystem). Therefore, service system conceptualizes the system (micro) level of resource integration within a subset of actors in a service ecosystem in which actors jointly create a particular service instance for a given set of end user organizations (Maglio et al. 2009).

In turn, S-D logic views a **service ecosystem** as the set of all loosely-coupled actors *potentially* available to instantiate and configure a value co-creation process (Beirão et al. 2017, p. 234). A service ecosystem thus captures a system of service systems in which exchange flows take place both within and among service systems, ultimately interweaving a multitude of service systems into a larger ecosystem. Therefore, while service systems constitute the micro-foundation for value co-creation through observable actor engagement, service ecosystems constitute the macro-foundation of value co-creation through connecting *all* mostly loosely coupled social and economic actors by shared institutional logics (Storbacka et al. 2016).

Research Methodology

In this section, we describe our research design, the chosen case of a digital platform for enterprise software, and the approach we adopted to collect and analyze empirical data.

Research Design

Capabilities for digital platform survival are poorly understood (De Reuver et al. 2017), which can be partially ascribed to a paucity of in-depth studies on digital platforms, in general, and on the capabilities for digital platform survival, in particular. Further, due to the heterogeneous and young field of platform studies (Thomas et al. 2014), developing a theoretical framework and formulating hypotheses upfront is hardly feasible (Eisenhardt 1989). Therefore, we opt for an exploratory case study research design (Eisenhardt 1989; Sarker et al. 2012; Yin 2009) to study digital platforms in their real-life context through recursive, iterative data collection and analysis steps that eventually help us derive explorative insights. We particularly opt for a single-case study approach owing to the inherent and multifaceted complexity of digital platforms and their respective ecosystems. Such ecosystems comprise a multitude of actors (static complexity) and dynamically co-evolve in varied patterns and rates of change (dynamic complexity) (Xia and Lee 2005). Therefore, with the aim of providing an in-depth understanding of the phenomenon of interest, we draw on a single-case study approach that represents one digital platform and its respective business ecosystem (service ecosystem level) and comprises multiple service systems to configure various value co-creation processes, one for each subset of end user organizations (service system level).

In this research, we study a digital platform for enterprise software that has grown globally since its launch in 2012. The context of this digital platform is particularly relevant for our study for several reasons. First, the owner of this digital platform has experimented with several other digital platforms before 2012. Thus, long-time experience with several previous digital platform attempts are included in capabilities learned on digital platform survival in the setup of the studied digital platform from the outset. Second, within the six years since the studied digital platform's launch, its owner has attracted around 13,000 partners and 130 corporate end user organizations. Therefore, it represents an exemplary case in that its thriving ecosystem is ideally suited to identify capabilities for digital platform survival. Third, the studied digital platform is central to its owner's strategy in that the respective digital platform serves as *the* means to (1) bring all its owner's on-premise products to a cloud-delivery mode; and to (2) identify and close its owner's standard software package's missing functionalities. Therefore, the owner is substantially committed to this digital platform through extensive top-management support and significant resource allocation.

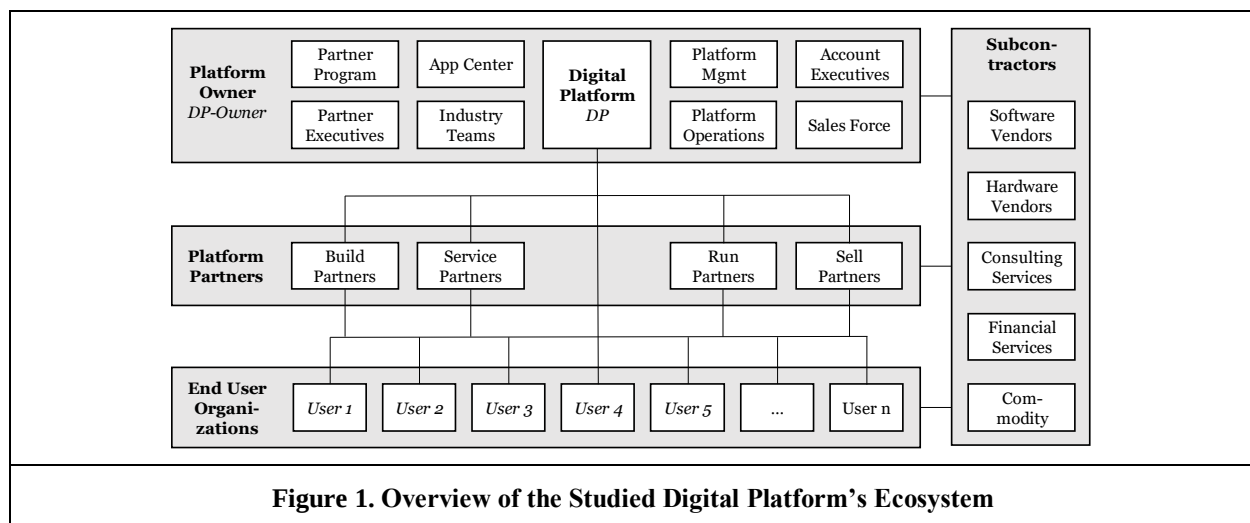
Case Description

The studied **digital platform DP** (a pseudonym) provides an essential function to an IT infrastructure (comprising network, in-memory storage, servers, virtualization, operating systems, middleware, and runtime) for building new and extending existing applications in a secure cloud computing environment. With the aim of integrating end user organizations' data, applications, and business processes, *DP* acts as a foundation upon which a plethora of third parties integrate their resources to develop complementary services. Therefore, *DP* is *the* means of the respective ecosystem's existence without which service exchanges among the ecosystem's participants would be managed by each actor alone regardless of potentially available complementary resources. End user organizations rely on *DP* (1) to better engage with their suppliers' and customers' business processes and (2) to empower their developers in building applications which run in a secure cloud computing environment, but still access data from on-premise or other cloud computing environments. *DP* has successfully scaled from a nascent to an established B2B digital platform that has survived for seven years in a highly competitive enterprise software environment. *DP* generates an ecosystem of various business entities integrating their resources:

DP is managed by its **owner**, which we refer to as *DP-Owner* (a pseudonym), a leading global enterprise software vendor. To complement and market *DP*, *DP-Owner* collaborates within a large digital ecosystem, which we refer to as *DP-Eco* (a pseudonym), with 13,000 build, run, sell, and service **partners** (see Figure 1). Build partners design and develop applications, software, and integrated solutions based on *DP-Owner* technology and its platform. Run partners offer private- or public-cloud-deployed services to their subset of end user organizations based on *DP-Owner* solutions. Sell partners resell *DP-Owner* solutions while managing an entire service's lifecycle at the end user organizations, including pre-sales, sales,

implementation, and maintenance. Service partners provide consulting and implementation services to end user organizations through the design, implementation, and integration of *DP-Owner* solutions. *DP* partners contribute resources such as industry competence, end-user-specific knowledge, close relationships with end user organizations, reach to end user organizations in each geographical location, and human resources capable of serving as sales force, consultants, and augmenting developers.

Further, *DP* has attracted 130 corporate clients as **end user organizations**, most of which are multinational large enterprises. End user organizations typically operate massive arrangements of interconnected systems and technologies that had been introduced over many years and for different purposes. Against this backdrop, end user organizations opt for *DP* to obtain lower cost state-of-the-art technology, more reliable and versatile technology, finely customized IT solutions, high levels of engagement, faster implementation of IT solutions, and *DP* partners that speak the same language as end user organizations for improved user-partner communication. Finally, *DP-Owner*, *DP* partners, and *DP* end user organizations hire a whole microcosm of **subcontractors** to reduce costs and to mitigate project risks. *DP* subcontractors provide software, hardware, consulting, financial services, and commodities (e.g., electricity for server plants). Figure 1 summarizes the actors in the *DP*'s respective ecosystem.



Data Collection

We collected data from January to September 2017 by means of semi-structured interviews. We collected primary data in a three-stage process: identifying potential interviewees, testing the interview guideline, and conducting interviews (see Table 3). For identifying potential interviewees, requirements were (1) business and/or technology roles in relation to *DP*, (2) employment at either *DP-Owner*, a licensed *DP* partner, or a *DP* end user organization, and (3) in-depth familiarity with *DP*. For testing the interview guideline, we conducted prototypical interviews to test and refine our guideline. The resultant guideline comprises introductory questions to understand the interviewee's context in *DP* (i.e., goals, opportunities, challenges). Next, the guideline holds questions to discuss each of the value co-creation's constructs (actor, resource, service system, value, institutional arrangements, service ecosystem, see Table 2) in relation to *DP*, each triggered by an open question. In Appendix 1, we provide the semi-structured interview protocol.

Table 3. Three-stage Process for Primary Data Collection			
Stage	Goal	Means	Interviews
1. Identifying Interviewee	Suitable interviewees at <i>DP-Owner</i> , partners, and end user organizations	Four face-to-face interviews (Ø 56 minutes), 130 emails to account executives	<i>DP</i> managers
2. Testing Guideline	Tested and refined semi-structured interview guideline	Four face-to-face interviews (Ø 62 minutes)	<i>DP-Owner</i> employees
3. Conducting Interviews	Recorded, transcribed interviews from multiple perspectives	15 semi-structured interviews (Ø 53 minutes) via Skype	5 <i>DP</i> managers, 5 <i>DP</i> partners, 5 <i>DP</i> end users (see Table 4)

Table 4. Organizations and Profiles of the Interviewees

Organization (pseudonyms)	Interviewee (Position / Unit / Role / Experience ¹)
<p>DP-Owner (large enterprise): A multinational and leading enterprise software vendor with regional offices in 180 countries with over 13,000 platform partners.</p> <p>Typical resources <i>DP-Owner</i> contributes in value co-creation: Technically high-quality core ERP package, technical know-how leading to continuous innovation in <i>DP</i>, global brand, global and regional knowledge communities with a knowledge sharing platform for partners and end users, global network, and financial strength.</p> <p>To manage and operate its platform, <i>DP-Owner</i> employs an entire array of internal teams. For instance, the app center team operates an online marketplace as a channel for thousands of third-party modules.</p>	Business Development Senior Manager / Products & Innovation / VP Operations of Platform Ecosystem, Global / 17, 12 ¹ (O_M1)
	Business Development Expert / Products & Innovation / Senior Director of Platform Ecosystem, Americas / 26, 14 (O_M2)
	Partner Recruiter / Global Customer Operations / Head of Partner & Channel Programs, Europe / 17, 14 (O_M3)
	Business Development Expert / Office of the CEO / System Integrators Enablement, Global / 20, 17 (O_M4)
	Business Development Senior Manager / Products & Innovation / VP Strategy and Marketing Communications of Independent Software Vendors, Global / 20, 20 (O_M5)
<p>DP-Partner #1 (small enterprise): A Canada-based certified and award-winning build and run partner for specialized industry needs with a key focus on the owner's platform; Member of the <i>DP-Owner</i> Partner Advisory Council for Innovation</p>	Co-founder and Chief Executive Officer / Office of the CEO / Corporate Strategy and External Relations / 11, 8 (P1_CEO)
<p>DP-Partner #2 (small enterprise): A USA-based certified build and service partner specialized on mobile application design and development</p>	Co-founder and Chief Executive Officer / Office of the CEO / Corporate Strategy and Solution Design / 22, 20 (P2_CEO)
<p>DP-Partner #3 (medium enterprise): A Germany-based certified service partner for CRM with 140 employees, 4 offices and over 300 customers</p>	Director Products, Innovations & Business Development / Research & Development / Product Design and Go-to-market / 20, 20 (P3_Director)
<p>DP-Partner #4 (large enterprise): A USA-based certified service, build, and sell partner; Global consulting and professional services company with net revenues of \$34.9 billion, 425,000 employees, clients in 120 countries</p>	Senior Principal / Technology Consulting / Innovation and Solution Lead for Design of <i>DP-Owner</i> Applications / 23, 23 (P4_Principal)
<p>DP-Partner #5 (large enterprise): A Germany-based certified service and sell partner; Global IT service provider with 6,000 employees, net revenues of €812 million (2016) in 25 countries via IT and industry solutions, and management consulting</p>	IT Manager / Product and Custom Development / Head of IT Architecture (with focus on adoption of native cloud applications) / 12, 12 (P5_Manager)
<p>DP-Client #1 (large enterprise): A Europe-based manufacturing company with 25,000 employees and net revenues of CHF4.6 billion (2016)</p>	IT Program Manager / Corporate IT / Head of <i>DP-Owner</i> Applications (with end-to-end responsibility for agile and fast applications development) / 12, 2 (C1_Manager)
<p>DP-Client #2 (large enterprise): A Germany-based leading manufacturer and vendor of healthcare solutions with 5,000 different products and supplementary services</p>	Senior Researcher / Research & Development / VP Intrapreneurship & Co-Creation / 0, 2 (C2_Researcher)
<p>DP-Client #3 (large enterprise): A Brazil-based multinational manufacturer and vendor of agricultural tractors and machines</p>	Senior IT Manager / Corporate IT / Head of Application Portfolio / 8, 4 (C3_Manager)
<p>DP-Client #4 (large enterprise): A Belgium-based multinational service integrator with 1,700 employees in 27 offices and 13 countries</p>	Senior Developer / Corporate IT / Head of <i>DP-Owner</i> Solution Development (with P&L responsibility for all <i>DP-Owner</i> solutions) / 8, 8 (C4_Developer)
<p>DP-Client #5 (large enterprise): A German-based world-largest specialty chemicals company with 33,000 employees in more than 100 countries</p>	Senior Architect / IT Services / Application Management, Platform Management, Team Manager <i>DP-Owner</i> Landscape Architecture / 34, 24 (C5_Architect)

¹ Years in IT industry, years of experience with *DP* or *DP-Owner*, respectively

Table 4 explains the organizations and the portfolio of the 15 interviewees, who contributed in providing primary data. All the interviews were recorded and transcribed verbatim, each transcript containing Ø 12 pages. Besides these semi-structured interviews for collecting primary data, the research team was granted access to a unique collection of intensive secondary data in *DP-Eco*, comprising internal and public documents (*DP* marketing, architecture, interfaces, external analyses, strategy meeting minutes, and events) that contributed to our broader understanding of *DP*.

Data Analysis

Our approach can be characterized as exploratory in that we draw on the interviewees' perspectives and experiences with *DP* to derive capabilities for digital platform survival (Lee 1991; Sarker et al. 2012). We employed coding supported by ATLAS.ti 8 as a technique in qualitative research to reduce data complexity (Holton 2010). Further, we exploited the methodological guidelines summarized by Sarker and Sarker (2009, p. 446) for data analysis. Specifically, we relied on *a-priori* and *open* coding as follows.

A-priori Coding. First, in our initial coding, we used an *a-priori* coding scheme, based on value co-creation constructs (see Table 2) (Vargo and Lusch 2016a). *A-priori* codes served in creating tentative explanations for *DP*'s survival. For instance, the code *actor* captured all *DP*-affiliated actors that are critical for *DP-Eco*. In this stage, the focus of *a-priori* codes was to capture both *service system* and *service ecosystem* levels on which the derived capabilities have an effect. We provide four exemplary coded vignettes in the results section.

Open Coding. Second, we followed the approach of *open* coding to see whether the data supports and continues to support the emerging capabilities. For instance, we started coding for all combinatorial constellations of actors to account for the relations between actors and for the relevant capabilities to these relations. The open code *DP-Owner-Partner*, for instance, captures all combinatorial relations between *DP-Owner* and *DP*-affiliated partners. Further, paralleled data collection and analysis allowed for adhering to the *hermeneutic circle* (Bryant and Charmaz 2007): We adapted the interview questions, while still sticking to the *a-priori* coding scheme (i.e., the major interview questions), to collect more data on the *open* codes that emerged from the already analyzed interviews. We categorized *open* codes and linked them to the *a-priori* coding scheme. In this stage, the focus of *open* coding was to capture both *control* and *generativity* angles (see Table 1) through which the derived capabilities can be categorized.

Triangulation. During the coding process, whenever possible, we compared responses across interviewees, types of organizations (i.e., *DP* owner, partner, and end user organization), and organizational roles of respondents (Patton 2002). For instance, triangulation across owner, partner, and end user perspectives turned out to be very fruitful. We do not consider the lack of agreement as problematic, but as an opportunity to include and explore differing perspectives (Flick 2009). Once a disagreement appeared, it triggered a more in-depth investigation of the respective topic in the remaining interviews. For instance, we contrasted a *DP* partner's overly positive statements with those of another overly negative *DP* partner.

Interpretation and Results

Categorizing the *a-priori* and *open* codes resulted in exploring four main capabilities for digital platform survival. We use the notions of *mode of capability* and *level of capability* to denote two capability characteristics in a structured way (see Figure 2). **Mode of capability** refers to the dualism of *control* and *generativity* as suggested in previous studies (e.g., Ciborra et al. 2000; Farjoun 2010; Tilson et al. 2010). Recalling the section *Research Background: Digital Platforms*, digital platforms seek for both stabilization to exploit the given network at a given point in time (*control*), and for dynamism to explore new avenues of resource integration and resource mobilization in adapting to external stimuli over time (*generativity*). *C1_Manager* refers to the dualism as follows: "We have the separation of solid core and flexible boundary. That is a concept we are driving and I think that is also going along with the strategy of *DP-Owner*". **Level of capability** refers to the system (micro) and ecosystem (macro) levels of value co-creation as suggested by S-D logic (Briscoe et al. 2012; Storbacka et al. 2016; Wieland et al. 2016). Recalling the section *Conceptual Foundation: Value Co-creation*, digital platforms seek for delivering a specific service for a given subset of end user organizations (service system), and for licensing as many loosely coupled actors as possible to increase the digital platform's resource potential (service ecosystem).

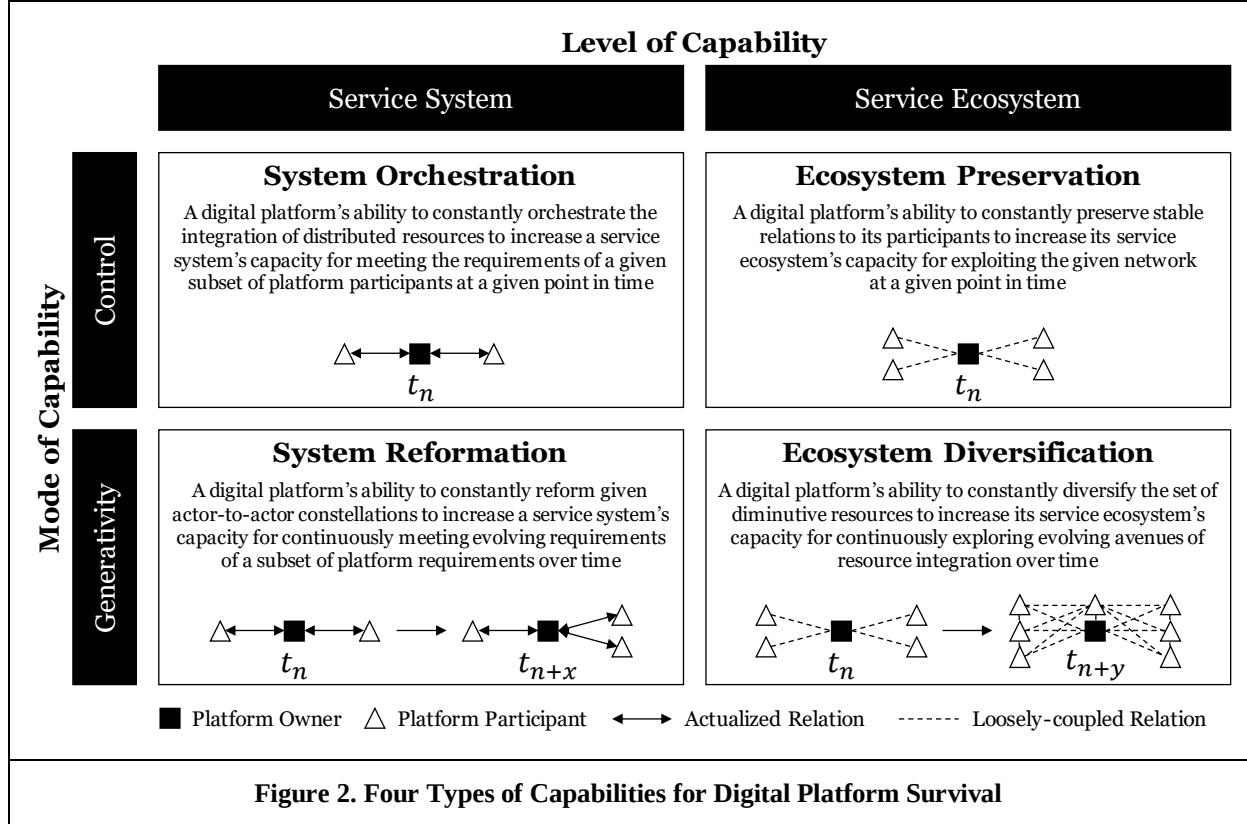


Figure 2 shows how the extracted capabilities for digital platform survival—*system orchestration*, *ecosystem preservation*, *system reformation*, and *ecosystem diversification*—are specified based on their respective modes and levels. As follows, for each capability, we provide an explanation (following a tripartite *challenge-capability-outcome* structure), and empirical evidence. In addition, we further support each capability relying on exiting literature. While supporting arguments are merely illustrative to reflect existing discussions in the literature, our set of explored capabilities can be further used as a basis to categorize the existing body of knowledge in the digital platform literature.

Capability I: System Orchestration

"For the customer, of course, it's the flipside of DP-Owner's value because the customer gets the demand satisfied from one integrated architecture—so also, in an easier to maintain way. I think, the important point is—and this remains true whether we are talking about traditional on-premise or cloud—that business processes run end-to-end across multiple systems usually and the breakpoints that are basically apparent in this business process are the integration points. And if these integration points are not working well, and if you are transcending specifications, then [...] of course the value is reduced or the process doesn't work as it should." (O_M5)

Value co-creation in platform-based service systems is complex due to its networked and socio-technical nature (**challenge**). In contrast to classical bilateral owner-user relationships, value co-creation in digital platforms comprises a networked service system to integrate various organizational and technological resources to meet the IT needs of a given subset of end user organizations. For instance, *DP-Owner* orchestrates what it calls a *partner-to-partner scenario* to serve *DP-Client #1's* IT needs through a combination of *DP-Partner #1* (built a module) and *DP-Partner #5* (sold and implemented *DP-Client #1's* requested app). This further requires integrating subcontractors' resources (e.g., servers, payment gateways, and external audits). To this end, since multiple parties are engaged, a centralized control is crucial in the configuration of platform-based service systems (**capability**). Efficient and effective value co-creation processes on platforms require dedicated configuration and control of service systems—comprising the owner, at least one partner, a multitude of subcontractors, and a given subset of end user organizations. For instance, once there is a demand from a given subset of end user organizations, *DP-Owner* employs a dedicated team (headed by *O_M3*) for partner management with sub-teams per partner engagement model (i.e., build, service, run, sell) to systematically identify, select, negotiate with, and

allocate relevant *DP* partners. *System orchestration* thus results in a tailored IT service delivery for a given subset of end user organization (**outcome**). For instance, *DP-Client #1*'s IT architecture imposes substantial intricacies for *DP-Owner*'s solutions. *DP-Client #1* operates a "solid core" of critical on-premise applications and a "flexible boundary" of customer-facing cloud applications (*C1_Manager*). Moreover, *DP-Client #1* faces the challenges of controlling an entire array of extant interconnected systems and technologies that had been introduced over many years and for different purposes. From *DP-Owner*'s perspective, its *service orchestration* affords a holistic understanding of *DP-Client #1*'s IT architecture, which is decisive for effective IT service delivery (Richardson et al. 1990). From *DP-Client #1*'s perspective, *DP-Owner*'s IT service works well with resources currently being used by *DP-Client #1*. From *DP-Partner #5*'s perspective, it largely depends on *DP-Owner*'s guidance in implementing an appropriate IT solution in *DP-Client #1*'s architecture.

Notably, *system orchestration* appears to be the most frequently mentioned capability both in our empirical data (measured by the number of codes linked to this capability) and literature (Dhanaraj and Parkhe 2006; Sarker et al. 2012; Wareham et al. 2014). Research on network orchestration (Dhanaraj and Parkhe 2006), resource integration (Lusch and Nambisan 2015), and platform governance (Tiwana et al. 2010) has discussed this capability in different contexts. What is common is that usually a (digital) platform owner mobilizes, aligns, and integrates various resources by forming and dissolving multiple types of relationships (Ceccagnoli et al. 2012; Dhanaraj and Parkhe 2006; Lyytinen et al. 2016). For instance, Dhanaraj and Parkhe (2006, p. 659) refer to such orchestration as "the set of deliberate, purposeful actions undertaken by the hub firm as it seeks to create value (expand the pie) and extract value (gain a larger slice of the pie) from the network."

Capability II: Ecosystem Preservation

"I think DP-Owner has done a great job on that. [...] The partner management team [...] give[s] you a framework. So even when you are a baby and you are born in this partnership, they give you step-by-step guide [with] step 1, step 2, step 3. Then you mature. You go to like grade 1. Then you start working with the platform and then you go to grade 2. Then you start working with the partner manager and you go to grade 3. As you progress, you get more tools and you get step-by-step guidance almost like a school or college. You're not just thrown into something like a flood of information. [...] We were able to get even help from architects from DP-Owner [...] and] from some focus group enablement events." (P1_CEO)

Value co-creation in digital platforms requires a *permanent* and *balanced* availability of thousands of loosely-coupled actors that offer access to thousands of readily-available diminutive resource sets (**challenge**). Once a service system is formed to serve a given subset of end user organizations, a unique subset of all available resource sets is required *fast* for the needs of this subset of end user organizations. In *DP*'s year of launch 2012, *DP-Owner* learnt that only very few build partners adopted *DP* due to missing sales support. For instance, while *DP-Partner #3* benefitted from technological support in building its module, it suffered from little or no support in marketing it. To this end, *DP-Owner* fast identified a partner that supports *DP-Partner #3* in marketing the module. Such an *ecosystem preservation* capability ensures positive network effects and sustainable benefits for all actor roles (**capability**). Institutional arrangements are focal for developing this capability (e.g., rules, conventions, standards, norms, beliefs, laws, regulations, and contracts) (Vargo and Lusch 2016a). For instance, *DP-Owner* has installed the norm that dedicated *DP-Owner* employees—partner managers for *DP* partners and account executives for *DP* end user organizations—ensure sustainable revenue streams in contracts between *DP-Owner*, *DP* end user organizations, and *DP* partners. *Ecosystem preservation* thus results in the *permanent* and *balanced* availability of a critical mass of diminutive resource sets at any point in time due to the willingness of many actors to use and benefit from the respective platform (**outcome**). For instance, *DP-Client #3* co-produced an innovative module with *DP-Owner*. Since *DP-Client #3* has the specificity of serving farmers as end users distributed all over Brazil, the module demanded enough *DP* sell and service partners all over Brazil to market the module accordingly. From *DP-Owner*'s perspective, the capability has thus far ensured a thriving ecosystem of 13,000 partners world-wide, including sell and service partners in Brazil that approach Brazilian farmers. From *DP-Client #3*'s perspective, the capability allowed for an effective roll-out of its innovative module for Brazilian farmers. Similarly, affected Brazilian-based *DP* partners benefitted from a sophisticated partner management process to support partners' business relation with *DP-Client #3* (see direct quote above).

Challenges of preserving an ecosystem through adequate platform strategy, architecture, partner incentives, governance, co-learning, and value creation is also reflected in the literature (Friend and Malshe

2016; Tan et al. 2015; Tiwana 2009). In effect, the lack of *ecosystem preservation* capability in digital platform management will in many cases result in the collapse of the ecosystem (Tiwana 2009). Research on network stability (Venkatram and Lee 2004) and actor-to-actor networks (Lusch and Nambisan 2015) has discussed this capability. A prevalent discourse in this research stresses global and local aspects of ecosystem preservation (e.g., Dhanaraj and Parkhe 2006): Designing the *global* logic of ecosystem structure comprises recruiting and incentivizing partners, end user organizations, and subcontractors (membership, structure, and market position). Managing the *local* logic of ecosystem operations comprises the selection, cultivation, and dissolution of individual relationships to operationally co-create value (knowledge mobility, innovation appropriability, and service system stability). Accordingly, digital platform managers require the competency to simultaneously focus on both dimensions to see with both a microscope and a telescope (Wieland et al. 2016).

Capability III: System Reformation

“The key resources the customers bring to the table are [...] the business requirements and the innovative notions that are available in the market as their core business. A partner will now have that deep insight into the core business of the customers. The drive to innovate has to come from the intrinsic motivation of the customer. And that’s something that he has to deliver to the partners and/or to DP-Owner in order to be able to create new solutions on the DP.” (P5_Manager)

End user organizations’ requirements evolve over time that necessitates service systems to reconfigure their organizational and technological resources (**challenge**). If partners and/or end user organizations adjust their requirements, their respective service system needs to be reconfigured accordingly. This is to ensure that an IT service is innovated accordingly to fit the requirements of a given subset of end user organizations. For instance, *DP-Client #1*’s requirements continuously evolve and, accordingly, it provides negative and positive feedback to *DP-Owner*. This feedback becomes a stimulus to introduce new, innovative IT service: *“We provide a lot of feedback to DP-Owner [...]. Since we have a very close relationship [...] it’s also a lot of negative feedback. [...] DP-Owner introduces also new services or new functionality based on our feedback” (C1_Manager)*. To this end, *system reformation* reactively or proactively adjusts platform-based service systems to the evolving requirements (**capability**). Actors in a platform-based service system are dependent on the degrees of freedom and the flexibility of the platform to innovate IT service in response to evolving end user needs. For instance, since 2016, *DP-Owner* is in the process of shifting a subset of its service systems from a license-based pricing model to a usage-based pricing model: *“The biggest disadvantage [...] from my organization’s perspective is that DP is still delivered and operated like an on-premise system [...] which really makes it hard to do things like calculating business cases and also to make the solution attractive for our customers” (P5_Manager)*. *System reformation* thus results in incremental or radical IT service innovation (**outcome**). For instance, existing *DP* partners often innovate their IT service in *DP* service systems in that they enroll in different partner engagement models: *“We want to extend our business and become a cloud solution provider in addition to our consulting business. And that’s for more interest in opportunities and longer term financial stability” (P2_CEO)*. From *DP-Owner*’s perspective, this capability ensures a healthy long-term relation with *DP-Client #1*. *DP-Owner* continuously tracks *DP-Client #1*’s requirements. From *DP-Client #1*’s perspective, this capability allows for evolving toward an operating model of critical on-premise applications (“solid core”) and customer-facing cloud applications (“flexible boundary”). From a *DP* partner perspective, *system reformation* allows a constant identification of gaps in *DP-Owner*’s ERP package, which *DP* partners typically fill.

This capability integrates in extant research on generativity in actor-to-actor networks (Henfridsson and Bygstad 2013; Lusch and Nambisan 2015; Lyytinen et al. 2016). Google, for instance, has a strong *system reformation* capability through Android imposing fewer standards compared to competitors. Android emphasizes the generative aspects on the service system level in that it allows for unforeseen resource re-combinations. This translates into more applications compared to competing mobile ecosystems. In reflecting on this capability, extant research distinguishes *contractual* and *functional/technical* aspects (Adner and Kapoor 2010; Benlian et al. 2011; Henfridsson and Bygstad 2013). Contractual flexibility covers degrees of freedom in changing an IT service system’s payment models and cancellation periods. Functional/technical flexibility covers scalability, interoperability, and modularity of an IT service system.

Capability IV: Ecosystem Diversification

“There are 13,000 individual partners which have a partner contract with DP-Owner. We have different partner tracks or engagement models or partner types. The sell partnership is for the value-added resellers. There are service partners who are doing services for or with DP-Owner and then there are the build partners. [...] Currently, we have 1,967 [build] partners. We have an additional 300 that are in an open program, which is free of charge. That is a limited-period-of-time engagement which lasts for a year for the partner to try free of charge.” (O_M1)

(Re)formation of service systems can be actualized only if enough number of complementary *DP* partners are available. Such a critical mass is required to quickly mobilize distributed resources and effectively respond to the emerged requirements from end user organizations (**challenge**). For instance, due to its origins in standard ERP software, *DP-Owner* lacks in resources such as detailed industry competence, client-specific knowledge, and close relationships with client organizations. To this end, *ecosystem diversification* facilitates the digital platform’s continuous enrichment and sustainability through complementary resources contributed by partners (**capability**). The owner needs the capability to deploy multiple touch points within its digital ecosystem to capture a holistic understanding of end user organizations and ultimately attract and mobilize relevant partners to satisfy the emerging needs. For instance, *DP-Owner* has installed a sophisticated partner management program to attract a diverse range of *DP* partners in four dedicated engagement models: build, run, sell, service. *Ecosystem diversification* thus allows emergent recombination of existing available resources to ultimately respond ever-changing end user organization needs (**outcome**). For instance, the most recent reflection of this capability is *DP-Owner*’s app center to facilitate transparency of the diverse modules in *DP*’s ecosystem: “We have the digital front [...] App Center 2.0 which has just been launched, where these partner apps are being published and the end customer can either directly purchase them from the App Center or [...] clients can basically click on it and get in contact with the partner who sells these apps” (O_M1). From *DP-Owner*’s perspective, putting third-party apps on its App Center 2.0 ensures that the partner and its apps are known to all *DP-Owner*’s end user organizations. This is because *DP-Owner*’s end user organizations use the App Center 2.0 as their starting point to purchase resources (e.g., applications and services) from *DP-Owner* directly. O_M1 indicates that for “this partner support from [*DP-Owner*’s] marketing and sales, [partners] are also willing to pay money [...] to leverage the end customer contact. We are charging for that service a percentage of the revenue the partner does with the end customer.” From a *DP* partner perspective, ecosystem diversity is important since the lack of resources can have pivotal implications on the digital platform’s survival, as indicated by *DP-Partner #2*: “This ecosystem completely ignored a technology [that] was not part of their [*DP-Owner*] KPIs basically. But that one technology actually almost killed the platform because customers learned and started to adopt that.” Finally, end user organizations benefit from an ever-increasing amount of resources available in the ecosystem to serve their diverging and ever-changing requirements.

Table 5. Key Capabilities for Digital Platform Survival

Capability	Mode	Level	Explanation	Rationale
I. System Orchestration	Control	Service System	A capability to align organizational and technological resources in platform-based service systems to meet requirements of a given subset of end user organizations	Digital platform survival is contingent on a controlled mobilization and integration of particular organizational and technological resources (a relevant subset of the respective digital ecosystem) to satisfy specific needs
II. Ecosystem Preservation	Control	Service Ecosystem	A capability to facilitate the preservation of a digital ecosystem’s stability to maintain viable long-term relations with all actors	Digital platform survival is contingent on a set of control mechanisms that ensure permanent and balanced availability of a critical mass of actors in the respective digital ecosystem
III. System Reformation	Generativity	Service System	A capability to continuously allow for reconfiguration of platform-based service systems to meet the evolving requirements of a given subset of end user organizations	Digital platform survival is contingent on sufficiently flexible and continuous reconfiguration of platform-based service systems over time
IV. Ecosystem Diversification	Generativity	Service Ecosystem	A capability to continuously capture and enrich an ecosystem’s diversity to afford an ever-increasing amount of diminutive resource sets	Digital platform survival is contingent on continuous increase of resource diversity and resource complementarity in the digital ecosystem over time

Research on resource mobilization (Böhmman et al. 2014; Lusch and Nambisan 2015; Lyytinen et al. 2016) discusses *ecosystem diversification*. In contrast to pooling of supplementary resources to increase efficiency (Han et al. 2012), firms with a *diminutive* resource intersection establish complementary ecosystems, “in which firms seek to achieve synergies by employing distinct resources that are difficult to accumulate in combination by any given firm” (Lavie 2006, p. 644). Firms affiliate in ecosystems to have access to complements (Hill and Hellriegel 1994). Thus, *ecosystem diversification* is superior to pooling as benefits resulting from resource multiplicity outweigh those generated from pooling supplementary resources (Grover and Kohli 2012; Jacobides 2005; Lavie 2006). Table 5 synthesizes the four outlined key capabilities for digital platform survival in referring to their respective *modes* and *levels*.

Discussion and Conclusion

Digital platforms have become a pivotal means to shape digital ecosystems comprising various actor roles such as platform owner, partners, and end user organizations. This study starts with the premise that the sustained viability and growth of digital platforms, referred to as *digital platform survival*, is associated with the underpinning value co-creation processes in the respective ecosystem’s actor-to-actor networks. The effective manifestation of such value co-creation processes depends on the *control* of the given platform, to centrally stabilize the provision of the requested services, as well as on the *generativity* of the platform, to attract as many resources as possible to satisfy diverging requirements of end users. Control and generativity of a digital platform should also be reflected in both providing a specific service for a given subset of end user organizations (*service system* level) as well as in providing a wide range of services in the respective ecosystem (*service ecosystem* level). Building on these dimensions, we analyzed a business-to-business (B2B) digital platform to understand how a digital platform owner accounts for value co-creation to leverage digital platform survival. Our analysis results in identifying four key capabilities for digital platform survival, namely *system orchestration*, *ecosystem preservation*, *system reformation*, and *ecosystem diversification* (see Table 5). In the following, we discuss this study’s theoretical and managerial implications, limitations, and avenues for future research.

Theoretical and Managerial Implications

The results of this study provide several insights that extend current (1) digital platform and (2) value co-creation discourses. Our findings also offer implications for practice.

Digital Platforms. By investigating digital platform *survival*, this study contributes to a more thorough understanding of what delineates very few vibrant digital platforms to succeed and thrive in the long run, while so many others lie idle. Through spotlighting value co-creation processes as *the* cornerstone of digital platform survival, our research brings a *multi-actor* perspective to the forefront of digital platform research. Existing digital platform research predominantly focuses on *either* platform owner *or* platform partner perspectives (e.g., Ceccagnoli et al. 2012; Sarker et al. 2012). Instead, we offer a multi-actor-role perspective on digital platforms through studying digital platform *ecosystems* as fluid actor-to-actor constellations constituted by the platform owner, partners, end user organizations, and subcontractors. Specifically, we highlight the role of end users (a platform’s customers), following the seminal premise of the value co-creation concept from a service-dominant logic standpoint. We demonstrate that digital platform survival is contingent on their owners’ capabilities to dynamically mobilize and (re)configure *all* actors’ resources to satisfy all affected actors’ ever-changing requirements. In doing so, we incorporate the control-generativity dualism of digital platforms (Ghazawneh and Henfridsson 2013) with their *service system* and *service ecosystem* levels of analysis to provide a comprehensive understanding of digital platform survival.

Further, backed by the analyzed empirical data, we derive a set of capabilities for digital platform survival that may serve as a sound basis for prospective research on digital platforms. While existing research investigates, for instance, digital platforms’ evolution (Tiwana et al. 2010), business models (Giessmann and Legner 2016), innovation (Lyytinen et al. 2016), and competition (Tiwana 2015), platform owners’ required capabilities to ensure surviving digital platforms is underserved to a significant degree (De Reuver et al. 2017). Therefore, the derived capabilities can be considered as a considerable step toward discussing requirements for designing as well as for sustainably managing the evolution of digital platforms.

Value Co-creation. Regarding *value co-creation*, existing research has mainly focused on classical *bilateral* relations in value co-creation processes (Aarikka-Stenroos and Jaakkola 2012). By focusing on

multilateral relations, our analysis comprises many actors that form fluid networks of service systems in one digital ecosystem. In addition, value co-creation in service-dominate logic research mainly remains in its philosophical realm and is limited to theoretical discourses (Grönroos 2011), so that limited *detailed empirical* account and analysis of value co-creation's specificities and intricacies are available. Besides providing empirical evidences on value co-creation processes, in accordance with theoretical premises of value co-creation, we specifically demonstrate the pivotal role of end user organizations' feedback in innovating and designing a specific service for any given end user organization's unique context. In empirically witnessing *all* of our identified capabilities, we stress the need to account for end user organizations' resources, such as requirements, feedback, experience, knowledge, and skills. Thereby, we underscore the pivotal role of end user organizations in studying value co-creation, in general, and in studying digital platform survival, in particular. Further, through studying a *digital* platform, we contribute to the emerging discourses on *IS-enabled* value co-creation (e.g., Ceccagnoli et al. 2012; Lusch and Nambisan 2015; Sarker et al. 2012). Due to the pervasiveness of digital technologies and owing to their contribution in facilitating and materializing value co-creation processes, there are several calls to investigate the role of digital technologies not only in IS (Lusch and Nambisan 2015), but also in service research (Breidbach and Maglio 2016; Vargo and Lusch 2017; Wilden et al. 2017). In this work, by investigating value co-creation in digital platforms, we provide new insights into the previously underserved role of IS in leveraging value co-creation. We demonstrate how digital platforms become the sole means in realizing digital ecosystems' value co-creation processes and how digital platforms survival is contingent on co-creation of value among their constituent actors.

Managerial Implications. Digital platform managers/owners are provided with an organizing logic to understand, develop, and apply a set of capabilities. By applying this logic, they can more clearly define the specific aspects required in realizing value *co-creation* and in leveraging digital platform survival. This may be especially useful for early design decisions that affect digital platforms' evolution trajectories. Focusing on the identified capabilities, managers might anticipate areas of concern and take appropriate measures. The case narrative of the analyzed digital platform itself serves as a consultable record for managers. Reflecting these capabilities can be valuable for other organizations that may be motivated to develop a digital platform, but are unaware of inherent intricacies and required managerial actions.

Limitations and Future Research

Due to our study's particular focus on value co-creation in leveraging digital platform survival, we provide no specific insights on how organizations can build-up, combine, deploy, and improve the identified capabilities dynamically over time in reaction to changing environments (Barreto 2010). This constrains our understanding of the extracted capabilities' antecedents, mechanisms, and consequences. This also concerns the dynamics of these capabilities in dealing with changes in both social and technical environments. Therefore, future studies might examine and explicate capabilities' antecedents, mechanisms, and consequences as well as their dynamics. To this end, longitudinal studies of multiple digital platform cases would provide fruitful insights across multiple cases and over time. In addition, deriving *additional* capabilities from different perspectives (e.g., business model, competition, or boundary resource perspectives) would complement the set of four capabilities presented in this work. A broader set of different or alternative capabilities might result from such studies.

In addition, in this study we focus on the digital platform owner's required capabilities for digital platform survival. This is due to the most immediate and powerful influence of platform owners' interventions on digital platform performance in the majority of conventional digital platform cases (Tan et al. 2015). Nevertheless, digital platforms can have no clearly defined platform owner (e.g., in open source platforms) or shared platform ownership (e.g., in research-consortia platforms or public-private partnership platforms). In such cases, the control-generativity balance may unfold differently. Therefore, prospective research is motivated to examine the required capabilities to ensure survival in such situations.

Finally, the capabilities identified in our descriptive research provide a sound basis for future prescriptive studies. Building on our research, prospective design science research studies may develop design principles with the aim of ensuring sustained growth and guided evolution of digital platforms. Examining the conditions in which digital platforms succeed is of value beyond the academic realm. A classification of such conditions into a spectrum from *necessary* to *nice-to-have* would be of immediate value for digital platform designers.

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Appendix

Appendix 1. Semi-structured Interview Protocol	
Construct	Question(s)
Actor; Service Ecosystem	1. What actors (or actor roles) are engaged in the initiative? 2. Why are these actors (or actor roles) engaged in the initiative?
Resource	3. What <i>tangible</i> resources (e.g., IT applications, network, in-memory storage, servers, virtualization, operating systems, middleware, runtime) do actors (or actor roles) contribute? 4. What <i>intangible</i> resources (e.g., skills, competencies, know-how) do actors (or actor roles) contribute?
Service; Service System	5. What services are provided? 6. What actors (or actor roles) are engaged to provide such services?
Value	7. What is the value of the initiative for your organization? 8. What is the value of the initiative for other actors (or actor roles)?
Institutional Arrangement	9. What stable, valued, and recurring patterns of behaviour influence the actors' actions—e.g., rules, conventions, standards, norms, beliefs, laws, regulations, contracts, languages?

Due to our recursive, iterative data collection and analysis approach, we used the above protocol only to ensure that we cover all constructs of interests in the interviews. However, other points emerged during our semi-structured interviews and parallel data analysis that we further added to the protocol (e.g., for specific groups of interviewees entailing platform owner, third parties, and end user organizations).

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