A Review of SD-logic Resources in Information Systems

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A REVIEW OF SD-LOGIC RESOURCES IN INFORMATION SYSTEMS

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Abstract

The evolution from a Goods-dominant logic (GD-logic) into a Service-dominant logic (SD-logic) is marked by fundamental changes in how we leverage resources for innovation. The current paper offers a review of service-dominant logic (SD-logic) resources within the field of Information Systems (IS). It uses a scoping review method of papers from the senior scholars' basket of journals and the two flagship IS conferences: ECIS and ICIS. The review is focused on examining the theoretical and empirical applications of SD-logic in order to develop a basic conceptual classification of resources within IS that contributes into understanding service innovation in market and society. Four main conceptualizations of resources were identified in the reviewed papers of which only two embrace resources as conceptualized in SD-logic. Also, the review suggests that the field of IS does not seem to have yet maturely embraced SD-logic and has not sufficiently made its way into dominant journals and conferences with the field.

Keywords: SD-logic, Service Dominant Logic, Resources, Service, Value, co-creation, Service Innovation

1 Introduction

The classical understanding of value, that is, it is embedded in a product and can be transferred through exchange among actors is currently under scrutiny (Vargo and Lusch, 2017). This understanding is often labelled as goods-dominant logic (GD-logic) (Vargo and Lusch, 2004). GD-logic views the firm as the sole creator of value (Vargo et al. 2008). Value creation is done by firms through leveraging their own unique resources which they use in manufacturing goods. This logic can be found in IS research using the resource-based view of the firm where unique, inimitable resources are owned and leveraged by firms to manufacture and deliver valuable products for customers in the market (Bharadwaj, 2000; Wade & Hulland, 2004; Ravichandran et al., 2005). Resources are seen in this view as key sources for competitive advantage and customers are largely product recipients, uninvolved in the value creation process.

In light of unfolding market changes driven by technological advancements, Vargo & Lusch (2004) introduced a different logic – labelled as service-dominant logic (SD-logic) – that could be identified in service processes. In contrast to GD-logic, SD-logic stresses that value is co-created among multiple actors in service delivery and exchange. It therefore extends the traditional firm-customer relationship into a network of relationships among multiple actors. The role of the firm and the customer are not distinct in SD-logic since both engage in co-creating value jointly and reciprocally (Vargo & Lusch., 2008). Yan et al. (2010) discussed that SD-logic implies that ‘‘producing” should be transformed into ‘‘resourcing”. Resourcing, they explained, allows collaborative value creation, not only involving the provider and the beneficiary but all parties or actors in a value-creation network.

For the past decade, and since the introduction of SD-logic, this premise is found in much of IS literature on value co-creation in service innovation (Findsrud et al 2016., Kleinaltenkamp et al., 2012; Lusch & Nambisan, 2015). Scholarly work that uses SD-logic to understand value co-creation in digital service ecosystems (Breidbach & Malgio, 2016) often emphasizes on the importance of resource exchange and integration as a foundation for value co-creation and generally human economic exchange (Vargo & Lusch, 2011; Lusch & Nambisan, 2015). Besides the transformation of value, resources have also been reconceptualized in SD-logic prompting what is now an established distinction between two key types of resources in the IS literature. First, operant resources which are intangible and dynamic (e.g., mental human skills), and second operand resources which are tangible and static (e.g. natural resources) (Lusch & Nambisan, 2015). Scholars often refer to this conceptualization of resources while emphasizing on specialized knowledge and skills (operant resources) as the most important type of resources (Lusch & Nambisan, 2015; Vargo & Lusch, 2004, 2008); a departure from the emphasis on resources as physical and tangible assets exclusively owned by firms as in GD-logic.

However, as contemporary service innovations are defined by new combinations of physical and digital components (Lusch & Nambisan, 2015) resources continue to evolve into complex artefacts in that the relationship between the physical and digital or tangible and intangible is ever more blurry. This complexity is characterized by the high prevalence of information components in most IT-enabled products and services which transcend the digital-physical divide (Lusch & Nambisan, 2015) - something which has also facilitated the shift from traditional tangible offerings (Vargo et al., 2008) into intangible digital products and services. Yoo et al. (2010) discussed this complexity in layered modular architecture which is created by the decomposition of a product into multiple resources and components, unlike integral architectures. They explained that modularity helps to decrease complexity and at the same time facilitate flexibility to recombine resources and components. This recombination becomes a key source of value creation. It is therefore essential to understand the kinds of resources embedded in a product, either digital or physical, to leverage the potential of contemporary modular product architectures.

Against this background, the current literature review aims at examining the concept of resources and its development in IS research using SD-logic. Our contribution is manifold: first, our intention is to advance scholarly knowledge by developing a conceptual classification of SD-logic resources and contributing into the growing debate on the differentiation between products and services where little work has been done in IS (Barrett et al., 2011). Second, SD-logic is a marketing perspective where resources make up a central part of its key processes of resource exchange and resource integration. IS scholarship have the potential to offer unique knowledge and insights into IT/digital resources that essentially enable the creation, exchange and delivery of digital services and products. This is in line with previous calls in IS for the need to study underlying architectures of digital innovations (Tilson et al., 2010; Yoo et al., 2010). Third, our paper aims at making a theoretical contribution that informs the study and application of SD- logic in digital ecosystems. Such a theoretical contribution is necessary to clarify micro foundations of SD- logic such as resources that are often undertheorized in favour of macro concepts such as value co-creation (Storbacka et al., 2016).

2 Resources in SD-Logic and a Retrospective on IT Resources in IS

It is unavoidable when discussing the concept of resources to acknowledge classic understandings of the resource-based view (RBV) of the firm. This view has been dominant within IS and many scholars in the field have tried to identify IT related resources in an attempt to understand effects of IT on firm performance (Bharadwaj, 2000; Wade & Hulland, 2004; Ravichandran et al., 2005) and address questions about the productivity paradox. RBV suggests that firms competitive advantage comes from the unique resources it has that are rare, difficult to imitate, and non-substitutable by other kinds of resources (Ravichandran, 2005: Bharadwaj, 2000). Resources in this view are exclusively owned by the firm and can either be tangible such as financial capital and physical assets or intangible such as brand image and product quality. It is therefore a view that resonates with a goods-dominant logic (Vargo et al., 2008) since the firm is in a position to use these resources, manufacture products, and then deliver to the market. In this respect, based on their review of IS studies on resources, Bharadwaj (2000) generalized IS resources into two categories: technology-based IS assets (i.e. IT infrastructures) and systems-based IS capabilities (i.e. technical skills, managerial ability). They explained that IS assets (tangible such as hardware or intangible such as software patents) are the most fragile source for competitive advantage since they are easy to copy and imitate by competitors, while emphasizing on firms' IS capabilities as a core source for competitive advantage. The ultimate aim here is to leverage resources, as a set of assets and capabilities (Bharadwaj, 2000; Wade & Hulland, 2004; Ravichandran et al., 2005), for market differentiation and long-term competitive advantage through preventing resource imitation (Bharadwaj, 2000; Wade & Hulland, 2004). The concept of capabilities is described as the ability to deploy resources (Bharadwaj, 2000; Ravichandran et al., 2005) and as such reflects intangible knowledge, skills, and competencies. While capabilities in this context refer to firm capabilities, their description as a kind of intangible resources (i.e. operant resource) well connects to the conceptualization of resources in SD-logic (Vargo & Lusch, 2008; Lusch & Nambisan, 2015).

In the context of SD-logic, resources are often exchanged and integrated by multiple actors in the ecosystem in a collaborative process of value co-creation (Vargo & Lusch, 2004; Lusch & Nambisan, 2015). The most established distinction of resources in SD-logic is offered by Lusch & Nambisan (2015). Broadening the traditional notion of resources as anything physical or tangible, they discussed two main categories of resources: operand and operant. The former is basically resources used for support. The role of operand resources is therefore to enable or facilitate and they are as such tangible and static. In contrast, operant resources are intangible and dynamic in nature in a sense that they can change and be leveraged in various ways. Mental human skills are examples of operant resources. These kinds of resources require other resources to be leveraged and result in effects. Leveraging human programming skills for instance requires a computer software - an operand resource - to develop computer programs and applications. In their later work following the original SD-logic article from 2004, Vargo & Lusch (2008) developed a number of modified foundational premises of

which one is focused knowledge. The new premise here, which they refer to as FP4, posits operant resources, rather than merely knowledge, as a fundamental source for competitive advantage. They wanted to emphasize on the distinction between operant and operand resources which at the time has become more common and most, if not all, IS literature relies on it in their studies using SD-logic.

In addition, in their call for papers for an MISQ special issue on service innovation, Barrett et al. (2011), stressed: "*The nature of service activities nonetheless involves negotiated and often co-generated exchange between a provider and a supplier or customer in the provision of largely intangible assets, as well as collective coordination and integration of knowledge in service delivery*." This is a departure from the traditional GD-logic because it triggers a shift from operand to operant resources. Vargo & Lusch (2008) stressed that such a shift is not merely accommodative but rather foundational since it has ramifications for general exchange processes, structures, and institutions in society. Nowadays, the shift is manifested in the evolution of the role of IT or digital resources which have rapidly grown to become an integral part of innovation and value co-creation (Lusch & Nambisan, 2015).

3 Research Methodology

As this paper seeks to explore how resources have been conceptualized within IS literature that refer to service dominant logic, the chosen method for the current review is a scoping review (Arksey and O'Malley, 2005). It is worth noting that the current paper reports a basic conceptual classification of resources. Systematic scoping reviews are argued to be useful when a specific body of literature has not yet been examined and are good for synthesizing the current body of knowledge of a given concept (Arksey and O'Malley, 2005; Colquhoun et al., 2014; Peters et al., 2015). A strength of the selected review method is that it allows for the inclusion of articles and/or other sources after the initial search has been conducted (Arksey and O'Malley, 2005; Colquhoun et al., 2014). Arksey and O'Malley (2005) outlined six steps to perform a scoping review: 1. Identifying the research question, 2. Identifying relevant studies, 3. Studying selection, 4. Charting the data, 5. Collating, summarizing, and reporting the results, 6. Optional stage, consultation. In each of the steps outlined, both authors of this paper worked together throughout the process. The scoping review process is shown in Figure 1:

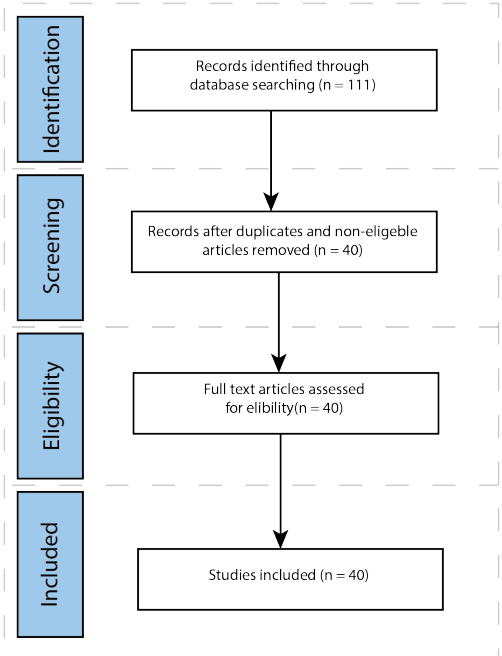

Figure 1. The process of scoping review of papers

The first step is outlined in the beginning of this paper and assist in setting the criteria for identifying and searching for relevant studies in the second step. The initial search, step 2, focused on performing a keyword search by using selected keywords to identify relevant articles in the senior scholars' basket of journals. These include: Information Systems Journal, Management Information Systems Quarterly, European Journal of Information Systems, Information Systems Research, Journal of AIS, Journal of Information Technology, Journal of MIS, and Journal of Strategic Information Systems. Each journal was searched separately using the following keywords: "service dominant logic", "service-dominant logic", "SD-logic", "Vargo", and "Lusch". The search hence explicitly targets journal papers that either use or mention service dominant logic explicitly or in some way refer to the work of Vargo & Lusch on this logic. After the initial search, the scoping review was focused on searching the proceedings of the two top conferences in Information Systems: The European Conference on Information Systems and The International Conference on Information Systems. In this search the names of the two authors of the original SD-logic article, Vargo and Lusch, were removed from the search and instead were replaced with variations of the word resources. This was mainly done for two reasons. The previous search found papers from authors with the same last names and we wanted to place more emphasis on the SD-logic itself and the concept of resources. The search string for this increment of the search was defined in the following manner: "service dominant logic" OR "Service Dominant Logic" OR "SD-Logic" OR "SD-logic" OR "SDL" AND "resources" OR "Resources". The overall results of the literature search can be found in Table 1 below.

The basic inclusion criteria, step 3, used to filter out the results from the keyword search was based on examining whether a paper uses SD-logic either conceptually or empirically. In other words, SD-logic should have been used in a selected article as a theoretical or empirical foundation. In order to do this, the authors of the current paper collaboratively examined titles, abstracts and reference lists of all identified articles from all eight journals and the two conferences. Any article that did not use SD-logic as a full-fledged theoretical or empirical foundation was not included in the 4th step.

Step 4 includes reading, reviewing, and analysing each article. Colquhoun et al. (2014, p. 1293) explain activities in this step as follows: 1) The research team should collectively determine which variables to extract in order to answer the research question, 2) Charting should be considered an iterative process in which reviewers continually extract data and update the data charting form, 3) Reviewers should pilot the charting form on five to ten studies to determine whether their approach to data extraction is consistent with the research question and purpose, 4) Contextual or process-oriented data may require a qualitative content analysis approach. It is worth noting that alongside these activities, additional papers and/or journals could be included in the scoping review, something the method allows for (Colquhoun et al., 2014). For charting the data, the authors of the current0 paper worked simultaneously to examine how resources are conceptualized in the identified papers. The intention of this step was to develop a joint classification showing the variety of conceptual accounts of SD-logic resources. Table 2 below highlights the classification and includes definition/description, features, and origin of the concept of resources. The following criteria were followed for the initial stage of the classification: look for the *origins* of the concept in each paper; which fields are drawn upon to define it using a concept matrix structure as exemplified by Webster & Watson (2002).

In the final stage, step 5, of the scoping review, the results of the review will be synthesized, collated and summarized based on the recommendations by Arksey and O'Malleys (2005) and Colquhoun et al., (2014). This stage is yet to be conducted and will be part of an effort to further develop the initial conceptual classification of resources in the current review that is aimed at a journal publication. In this later effort, critical realism will be used as a synthesizing device to conceptualize resources especially the ontological separation (Leonardi, 2013) of the social and the material and how they are put into a relationship or constitutively entangled through human action (i.e. synthesizing the divide between tangible operand resources and intangible operant resources in service innovation).

4 Results and Analysis

Preliminary results of the scoping review are presented in Table 1 below. All searches were conducted using " " around the entire search string. Each journal was searched separately. Note that the search results for "service dominant logic" and "service-dominant logic" are the same for each journal, i.e. the results of each of the searches returned the same articles. The search string "SD-logic" did not return any results. This particular search string was initially included since this is the way the original authors of SD-logic often refer to service dominant logic in their own work (see e.g., Vargo and Lusch, 2017). As can be seen in Table 1, the total number of articles using or referring to SD-logic is 111 articles in all top 8 journals and the two conferences. Excluding duplicates and removing search results that did not return a research article, see e.g., the search results for MISQ where announcements of special issues were returned as back matter items, the total number of articles totals 40 unique articles. The references to these articles can be found in the column entitled "Author(s)" in the table below.

An interesting trend that we observed in the results shows that the authors of SD-logic seem to be referenced more than the logic itself in the IS literature. Why is it this way is something to be further investigated. Since one of the inclusion criteria is that the paper should use SD-logic either conceptually or empirically, it is important to ascertain that the specific reference to either Vargo or Lusch is because the authors of the paper wanted to reference and use the SD-logic.

Outlet	*Total # of articles found in the search*	*Author(s) of included articles*	*Search String*
MISQ	6	Back matter only	"Service dominant logic": 1 "Service-dominant logic": 1 "SD-logic": 0 "Vargo": 2 "Lusch": 2
European Journal of Information Systems	12	(Lycett 2013; Hu, Kettinger, and Poston 2015; Söllner, Hoffmann, and Leimeister 2016; Piccoli and Lui 2014; Hanseth and Bygstad 2015; Cho, Ryoo, and Kim 2017)	"Service dominant logic": 1 "Service-dominant logic": 1 "SD-logic": 0 "Vargo": 4 "Lusch": 6
Information Systems Journal	14	(Alter 2016; Öbrand et al. 2018; Giesbrecht, Schwabe, and Schenk 2016; Steininger 2018; Gaskin et al. 2017)	"Service dominant logic": 4 "Service-dominant logic": 4 "SD-logic": 0 "Vargo": 3 "Lusch": 3
Information Systems Research	9	(Sun et al. 2012; Rai and Sambamurthy 2006; Hong and Pavlou 2017; Barrett, Oborn, and Orlikowski 2016)	"Service dominant logic": 0 "Service-dominant logic": 0 "SD-logic": 0 "Vargo": 5 "Lusch": 4
Journal of AIS	8	(Nambisan 2013; Barrett et al. 2017)	"Service dominant logic": 1 "Service-dominant logic": 1 "SD-logic": 0 "Vargo": 4 "Lusch": 2
Journal of Information Technology	15	(Lempinen and Rajala 2014; Venters and Whitley 2012; Nicolescu et al. 2018)	"Service dominant logic": 2 "Service-dominant logic": 2 "SD-logic": 0 "Vargo": 5 "Lusch": 6

Outlet	*Total # of articles found in the search*	*Author(s) of included articles*	*Search String*
Journal of MIS	21	(Lehrer et al. 2018; Keith, Demirkan, and Goul 2013; Bardhan et al. 2010; Chiang et al. 2018; Peters, Blohm, and Leimeister 2015; Dong, Johar, and Kumar 2011; Angst, Devaraj, and D'Arcy 2012)	"Service dominant logic": 6 "Service-dominant logic": 6 "SD-logic": 0 "Vargo": 4 "Lusch": 5
Journal of Strategic Information Systems	17	(Fielt et al. 2013; Barrett and Oborn 2013; Abbott et al. 2013; Jia and Reich 2013; Hadaya and Cassivi 2012; Schermann et al. 2016)	"Service dominant logic": 2 "Service-dominant logic": 2 "SD-logic": 0 "Vargo": 7 "Lusch": 6
European Conference on Information Systems	5	Lintula et al. 2017, Panigrahi and Srivastava 2018, Villapol et al. 2018, Schulz and Überle, 2018	"service dominant logic" OR "Service Dominant Logic" OR "SD-Logic" OR "SD-logic" OR "SDL" AND "resources" OR "Resources"
International Conference on Information Systems	4	Thambusamy and Palvia 2011, Li and Peter 2018, Lintula et al. 2018	"service dominant logic" OR "Service Dominant Logic" OR "SD-Logic" OR "SD-logic" OR "SDL" AND "resources" OR "Resources"

Table 1. Results of the scoping review of papers on SD-logic resources.

Once the articles were found, the authors of the paper started to map the origin of how each paper conceptualized *resources* as recommended by Webster and Watson (2002). In Table 2 below, the results of the origin mapping are shown. The first two columns in the table refer to how resources were conceptualized, and the three following columns refer to where the conceptualization of resources emerged from in each of the selected papers.

Resource conceptualized as...	**Author(s)**	**Main reference used for defining resources**	**Field where defining reference comes from**	**Definition used empirically or Conceptually**
operant and operand tools which are to be combined for value co-creation within a service process	Lintula et al. 2017	Vargo & Lusch 2004, 2016, 2017	Service Marketing and Management	Empirically
	Lintula et al. 2018			Empirically
	Villapol et al. 2018			Empirically
	Schulz & Überle, 2018			Empirically
	Hanseth & Bygstad 2015	Lusch & Nambisan, 2014	Information Systems	Empirically
	Alter 2016	Vargo & Lusch 2004	Service marketing and management	Conceptual
	Sun et al. 2012	Vargo & Lusch 2004	Service marketing and management	Empirically
	Rai & Sambamurthy 2006	Vargo & Lusch 2004	Service marketing and management	Conceptual
	Barrett, Oborn, & Orlikowski 2016	Bharadwaj et al. 2013	Information Systems	Empirically

	Nambisan 2013	Vargo & Lusch 2004	Service marketing and management	Conceptual
	Lempinen & Rajala 2014	Grönroos & Ravalad 2011	Service marketing and management	Empirically
	Lehrer et al. 2018	Vargo & Lusch 2004	Service marketing and management	Empirically
	Peters, Blohm, & Leimeister 2015	Maglio & Spohrer 2013	Information Systems	Empirically
	Dong, Johar, & Kumar 2011	Maglio & Spohrer 2013	Information Systems	Empirically
	Fielt et al. 2013	Vargo & Lusch 2004	Service marketing and management	Conceptually
the configuration of information-based tools to enhance the value co-creation process	Paluch & Blut 2011	No reference	N/A	N/A
	Li & Peter 2018	Fromm & Pardoso, 2015	Information Systems service research	Empirically
	Lycett 2013	Normann, 2001	Information Systems	Empirically
	Piccoli & Lui 2014	Nevo & Wade, 2010	Information Systems	Empirically
	Cho, Ryoo, & Kim 2017	Gulati & Sytch 2007	Business Administration	Empirically
	Giesbrecht, Schwabe, & Schenk 2016	Grönroos & Voima, 2014	Service Marketing and Management	Empirically
	Hong & Pavlou 2017	No reference	N/A	N/A
	Barrett & Oborn 2013	Lusch & Nambisan 2013	Information systems	Empirically
	Hadaya & Cassivi 2012	Klein & Rai 2009	Information systems	Empirically
the capability to combine resources to build capacity within the organization	Thambusamy & Palvia 2011	Barney 1991, Wernerfelt, 1984, Palvia et al. 2010	Management	Empirically
	Söllner, Hoffmann, & Leimeister 2016	No reference	N/A	N/A
	Steininger 2018	Barney 1991	Management	Empirically
	Gaskin et al. 2017	Cohen & Levinthal 1990	Business Administration	Empirically
Monetary/object oriented	Panigrahi & Srivastava 2018	No reference	N/A	N/A
	Hu, Kettinger, & Poston 2015	No reference	N/A	N/A
	Öbrand et al. 2018	No reference	N/A	N/A
	Barrett et al. 2017	No reference	N/A	N/A
	Venters & Whitley 2012	No reference	N/A	N/A

	Keith, Demirkan, & Goul 2013	No reference	N/A	N/A
	Bardhan et al. 2010	No reference	N/A	N/A
	Chiang et al. 2018	No reference	N/A	N/A
	Angst, Devaraj, & D'Arcy 2012	No reference	N/A	N/A
	Abbott et al. 2013	No reference	N/A	N/A
	Jia & Reich 2013	No reference	N/A	N/A
	Schermann et al. 2016	No reference	N/A	N/A

Table 2. Conceptualizations of resources and origin-mapping

5 Discussion and Conclusions

Given the results of origin-mapping of the included papers in the review, four main perspectives on resources within IS literature can be found. As expected, the operant and operand resource view of SD-logic can be found in the material. However, in addition to this, a variation of this view can also be identified as placing the focus on information-based resources that can be better reconfigured for value co-creation. These perspectives draw from the SD-logic point of view but place information systems and technology as the intervention for enhancing and improving the value co-creation process. Both perspectives are rooted in SD-logic and hence how services and specifically resources have been defined as they pertain to the service marketing and management perspective. Also, there is a body of literature that draw on the concept of capacity and capacity building within the organization. Although this perspective acknowledges the tangible and intangible aspects of resources, it largely considers resources to be something that exists within a firm or organization. Hence, a firm or organization is capable to interact with its surroundings and extract resources which they then can utilize. This view is not dissimilar with the fourth and last identified perspective, i.e. the monetary or object-oriented perspective. Here resources are identified and managed as if they were objects. In the papers where this perspective was identified the focus of the research was not on contributing to the general discussion on service, value co-creation or resource integrational activities.

Service dominant logic, SD-logic, has as of yet not made its way into the dominant journals and conferences within the information systems research field. This can be seen in the number of articles included in the review. References to the logic might lie elsewhere. That service as a concept is referenced to within the IS body of literature cannot be questioned. Alter's (2010) seminal work on bridging SD-logic with IS concepts and work systems theory (see e.g., Alter, 2013) is one of the efforts in trying to explore the relationship between information systems and SD-logic. However, due to the initial results of the scoping review it seems that SD-logic and hence its subsidiary definitions of its key concepts, including resources, is yet to be fully explored.

An aspect of this can be seen in the first two perspectives where in one resources and SD-logic are fully accepted and in the other technology is singled out as a tool for better managing information-based resources. The difference in these two perspectives lie not in the conceptualization of resources, i.e. that they have tangible and intangible aspects to them, but in the way, technology is viewed. In SD-logic literature, tools like smart phones, computers etc. are vessels upon which value co-creation activities can occur. However, these vessels are also considered to be resources within the larger ecosystem. In the perspective where the technology is seen as a tool for restructuring processes they are separated from the activities, and hence the ecosystem, of which they are part of. This is a critical distinction between the two perspectives. In the first, the tangible resources, i.e. the vessels, can be ma-

nipulated by actors within the ecosystem to conform to current value co-creation activities. In the latter, these vessels are conceptualized as static objects which upon completion can only deliver a given set of value co-creation options for the actors within the ecosystem. The third perspective sees resources as tools for building capacity mainly within the own organization; something that can be associated with a resource-based view of the firm (Bharadwaj, 2000; Vargo et al., 2008). Although this view represents how organizations can work with attaining knowledge and absorbing it into its own organization, it does not align with the SD-logic perspective on resources, resource integration and value co-creation. Similarly, the fourth and final perspective of monetary resources is not fit with the conceptual understanding of SD-logic.

Finally, the four different conceptualizations may shed light into the conceptual variety of resources in IS. One could also argue that this variety may be driven by some sort of a conceptual tension between the traditional view of tangible resources found in IS literature on the resource-based view of the firm (e.g., Bharadwaj, 2000; Wade & Hull and, 2004; Ravichandran et al., 2005) and the 'new' view that emphasizes on intangible resources in SD-logic, as scholars scramble to conceptualize and apply resources in their work. This tension can be further complicated by the duality of the role of IT (Lusch & Nambisan, 2015) both as a tangible, operand resource used as an enabling tool and an intangible, operant resource in service innovation. We believe further work is needed to address this tension to better theorize the digital-physical divide (cf. Lusch & Nambisan, 2015); something which we aim to do in a journal publication.

5.1 Limitations and Implications

One of the main limitations of the current review is that the identified conceptualizations need to be synthesized. This is step 5 in the scoping review which is to be performed in a later work aimed at a journal. Surely, a notable limitation would be the scope of our search for articles in IS conferences and journals. While we focused only on the top 8 journals and the 2 top conferences in our search, it is possible that other conferences and journals may include interesting papers. Finally, the identified classifications are sufficient only for conceptual purposes. The complexity that exists in the relationship between tangible and intangible resources can only be addressed by further synthesis of the classifications.

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