Value Appropriation Strategies for Interorganizational Data Sharing – a Case Study

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Short Paper

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Abstract

Interorganizational data sharing (IODS) grows increasingly complex in the context of business ecosystems. As the literature on IODS finds that organizations only share data if they perceive benefits from it, this study explores value appropriation strategies (VAS) through an ongoing inductive case study of the German orthopedic ecosystem, exploiting interview and secondary data from executives of various treatment facilities and a leading manufacturer of health products. Our preliminary grounded theorizing indicates that VAS for IODS involve four elements (partner selection, data tailoring, reciprocal design, and control enforcement) that each are realized by specific VAS activities. Further, we find that, different from other contexts, ensuring VAS for IODS is not about controlling the value creation process but is grounded in upstream strategic decisions. This understanding of VAS for IODS indicates that having strategies for value appropriation in place before diving into IODS is crucial for succeeding in data ecosystems.

Keywords: Interorganizational data sharing, value appropriation, business ecosystems

Introduction

Interorganizational data sharing (IODS) has become a fundamental driver of innovation, value creation, and competitive advantage in today's dynamic business landscape. Collaboration, data sharing, and the ability to capitalize on shared data are crucial for organizations to attain relational rents (Levy et al., 2003).

Data sharing is particularly promising in business ecosystems, which are characterized by the alignment structure of a diverse group of actors that must interact collectively to realize a focal value proposition (Adner, 2017; Jacobides et al., 2018). Here, IODS facilitates the cooperative development of innovative products and services, benefitting end customers and complementary actors alike (Morgan et al., 2013). The complex interplay between these actors, however, also points towards unique challenges and opportunities for IODS, emphasizing the need to understand the factors influencing data sharing decisions.

On the one hand, organizations often face challenges and hesitations in engaging in IODS (Susha et al., 2023). Key concerns are trust between data sharing partners (Chen et al., 2014), the power imbalance that exists between them (Kembro et al., 2014; Susha et al., 2023), as well as the unique characteristics of data as information goods. The latter results in the amount of created value being determined only after the actual data sharing (Arrow, 1962; Shapiro & Varian, 1999).

On the other hand, research finds that the possibility of benefitting from IODS increases an organization's willingness to share data (Ho & Ganesan, 2013). Therefore, the core issue at stake to elicit IODS is the question of value appropriation, i.e., whether or not all parties involved can effectively benefit from the co-

created value. For instance, although data shared by smaller firms may be instrumental for the development of innovative products, they may refrain from doing sharing if they consider themselves unable to benefit from the overall increased value. Hence, value appropriation strategies (VAS), i.e., the process of extracting profits after creating value through innovation (Jacobides et al., 2006; Mizik & Jacobson, 2003), play a pivotal role in value creation and innovation in ecosystems.

Considering the challenges of IODS and the opportunities of VAS to overcome them, this ongoing research project addresses the following question: *Which strategies of IODS enable the data-sharing organization to participate in resulting value creation?*

In this research-in-progress-paper, we first outline the theoretical foundations of IODS and VAS. We then present our inductive case study of the German orthopedic business ecosystem, which serves as primary data source. Finally, we discuss preliminary findings and their implications, alongside our intended next steps in our research endeavor.

Our results constitute a first step towards disentangling the elements of VAS in the context of data sharing. They suggest that VAS must be developed before IODS in order to secure value appropriation from it because, in contrast to other contexts, VAS in data sharing do not necessarily require direct control over the value creation process. Rather, they rely on decisions made prior to data sharing. In the next steps of our research project, we seek to manifest the complex interdependencies between elements and activities of VAS that our initial results point to. We also want to unveil the contextual boundaries of our findings by extending our view on the ecosystem investigated in this research-in-progress paper.

Theoretical Foundations

IODS forms the theoretical frame for our project as it is found to create relational rents by enabling joint value creation (Levy et al., 2003) and enabling firms to improve their performance (R. Klein & Rai, 2009). However, as we argued above, the appropriability of co-created value is central for organizations to engage in IODS (Ho & Ganesan, 2013). Hence, we describe insights from both streams in the following.

Interorganizational Data Sharing

Within organizational research on IODS, the emphasis is primarily set on the sharing of knowledge between organizations. This often entails sharing valuable insights with supply chain partners to refine manufacturing processes. Evidence from various studies highlights that successful transfer of knowledge or information can yield substantial benefits for supply chain partners, ultimately improving their overall performance (e.g., Kembro et al., 2014; R. Klein & Rai, 2009; Li et al., 2017).

Prior research also finds that organizations consider risks when sharing data. For instance, organizations perceive opportunistic behavior from the receiving organizations (Clemons & Hitt, 2004; Das & Teng, 2001; Loebbecke et al., 1999), loss of competitive advantage (Das & Teng, 2001; Kembro et al., 2014), and costly information system investments (Kembro et al., 2014). These risks are particularly prevalent in networked environments such as ecosystems where multiple actors engage with one another to achieve a common goal (Nienstedt et al., 2023; Trkman & Desouza, 2012). Conversely, the expectation of significant positive outcomes can encourage data sharing (e.g., Ho & Ganesan, 2013; Li et al., 2017). Addressing these risks and benefits can influence an organization's willingness to share data (Levy et al., 2003; Loebbecke et al., 1999).

The IODS stream centers around the question of what outcomes organizations can expect from data sharing decisions. As data sharing is understood as a means of cooperative value creation (Susha et al., 2023), this implies that firms' outcomes are determined by the ability of a firm to appropriate this created value, or in other words, developing and employing VAS.

Value Appropriation Strategies

VAS are crucial for firms to capture value from their innovative efforts and maintain a competitive advantage. While the earlier work of Teece (1986) finds the architectural advantage in the contractual surrounding of the innovation, Jacobides et al. (2006) extend this view to the industry level. Related to that, Mizik & Jacobson (2003) find that industry characteristics have moderating effects on the relation between value appropriation emphasis and stock market developments of a firm. In this context, the authors

describe value creation as complementary, though contradictory processes. Analyzing these conflicting dynamics, the authors find that a focus on value appropriation can lead to short-time profit increases but bears the risk of long-time losses. Hence, balancing these processes is central to an organization's strategic prosperity and must be integrated with its overall strategy.

Extending the conceptualization of value appropriation as a process between only customers and producers, more recent research acknowledges the complexity of value creation and appropriation problems by considering stakeholder theories (Garcia-Castro & Aguilera, 2015). While this research considers the longevity of relations and joint value creation between multiple actors, the proposed value appropriation strategies still focus on the expansion and utilization of bargaining power. In the context of data sharing, bargaining power relates to *ex-ante* VAS that do not apply in IODS settings where *ex-post* value creation is inherently ambiguous. Further, while this line of work considers multiple stakeholders in the value appropriation process, the assumed process omits the complexity of value creation (and hence, appropriation) in ecosystem settings (Adner, 2017; Jacobides et al., 2018).

Looking at the interactions of multiple actors, strategy research highlights the importance of coalitions in handling value creation-appropriation tensions (Asmussen et al., 2021). Researchers show that forming coalitions can help less powerful actors to appropriate value from significantly powerful actors. However, strategic alliances research finds that this formation of coalitions comes with questions of intra-coalition value appropriation (Adegbesan & Higgins, 2011; Lavie, 2007).

Information systems research also addresses value appropriation, focusing either on open source software (Morgan & Finnegan, 2014) or platform ecosystems (e.g., Oh et al., 2015; Schreieck et al., 2021; Song et al., 2018). In the context of platform ecosystems, for instance, Schreieck et al. (2021) find that technology-related and relationship-driven capabilities enable platform owners to balance value creation and appropriation. However, this literature describes governance mechanisms for platform owners that can influence interactions of platform users directly. Our research, however, focuses on ecosystem actors who do not have direct power to orchestrate the relevant value creation-appropriation actions.

Despite the various perspectives taken in existing research on value appropriation, the aspect of VAS related to IODS remains unexplored. Consequently, our research aims to shed light on the dynamics of value appropriation strategies in the context of IODS.

Research Framework

Considering that VAS for IODS is a relatively unexplored field in the information systems domain and, hence, having scarce theoretical underpinnings, we argue for the application of inductive reasoning to qualitative data from a case study using grounded theory methodology (Glaser, 1992; Urquhart, 2013). Specifically, we conducted open, selective, and theoretical coding (Glaser, 1992) on the preliminarily collected data to develop an initial understanding of the case. Open coding so far involved sentence-level and occasionally word-level analysis, as well as constantly comparing statements within and across interviewees. Selective coding refined the research question, leading to a focus on VAS. Analytical moves (Grodal et al., 2021) were employed for abstraction, such as questioning and dropping categories. By complementing perspectives from two data collection phases, we further strengthened the triangulation of our findings (Myers & Newman, 2007). During our analysis, conflicting perspectives were examined using theory as a "sensitizing device" (H. K. Klein & Myers, 1999, p. 75). Further, we remain vigilant for potential biases in data collection due to the first author's previous affiliation with the case company during the first data collection phase. Collaborative discussions helped us mitigate biases.

Case Description

This case study focuses on the German orthopedic business ecosystem from the perspective of treatment facilities (TFs). In Germany, when individuals require orthopedic care, they visit a doctor's office for an initial evaluation or directly consult a specialized TF. At the TF, patients share personal information such as name, address, and email by presenting their health card, which contains their medical records. During the consultation, a treatment professional tailors a proposed plan to the patient's specific needs and future mobility prospects. This information is then added to the patient's record within the TF. Given that the German healthcare system operates on a reimbursement model, TFs must first contact the patient's insurance company to secure funding before treatment can begin. This process involves submitting cost estimates and justifications for the proposed treatments. Once approval is obtained, the necessary orthopedic products are ordered from suppliers.

While primarily sharing product-specific data during the ordering process, TFs often also provide pseudonymized patient identifiers to link the products to the appropriate individual. Upon receipt, TFs customize and assemble the products for the patient. Follow-up treatments, including mandatory product maintenance or the provision of updates and upgrades, depend on the initial intervention. Maintaining long-term relationships with patients is crucial for TFs to facilitate these ongoing treatments. Consequently, the collection and storage of patient data play a critical role in ensuring effective follow-up care.

In this ecosystem, IODS would bring a multitude of benefits to various actors. For instance, manufacturers could leverage patient data obtained from TFs to enhance their research and development initiatives or to tailor marketing strategies to individuals. In a reciprocal manner, TFs could improve patient treatment by utilizing movement data sourced from digitized prosthetics, which are collected by manufacturers. This could, for example, lead to more personalized rehabilitation programs or the design of better fitting prosthetics.

Although the benefits of IODS in this ecosystem are evident, actors are also faced with the challenge that they perceive value in the utilization of the data from other organizations but perceive potential risks in sharing these data themselves – requiring them to consider VAS when sharing data.

Interviewee	**Organization**	**Position**	**Purpose of Data**
Initial Data Collection Phase (January-March 2022)			
P1	Manufacturer	Marketing Manager	Familiarization with the case
P2	Manufacturer	Head of Digital Product Unit	
P3	Manufacturer	Data Analytics Expert	
P4	Manufacturer	C-Level Manager	
P5	Manufacturer	Global Head of Business Unit	
P6	Treatment Facility A	Director Patientcare	Understanding of appropriation strategies
P7	Treatment Facility A	Team Leader	
P8	Treatment Facility B	Managing Director	
P9	Treatment Facility C	Managing Director	
P10	Treatment Facility D	Managing Director	
P11	Treatment Facility E	Managing Director	
P12	Treatment Facility F	Member of the executive board	
Second Data Collection Phase (March-April 2023)			
P13	Coalition of TFs	Coalition Manager	
P14	Treatment Facility G	Managing Director	
P15	3d Printing Merchant	Managing Director	

Table 1. Collected Primary Data and Corresponding Purpose

Data Collection

In response to the complexity of the case and the research question, we rely on a comprehensive dataset comprised of qualitative data from semi-structured interviews (see Table 1), supplemented by secondary interviews, documents, newspaper articles, and webpages. The data was collected in two main phases. Initially, a substantial amount of qualitative data was gathered for a related research project (cf. Nienstedt et al., 2023), which, despite differing research questions, provided valuable insights that prompted the current study. Informed by the analysis of this initial data collection phase, we collected additional data specifically targeting value appropriation strategies in IODS settings.

One major insight from the analysis of the initial first collection phase was that the value appropriation in the ecosystem is a problem containing the interplay of multiple coalitions on multiple levels. Hence, we specifically included a manager of a strategic coalition aiming at knowledge exchange (P13), a manager from a 3D printing/modeling merchant that is also part of this coalition (P15), and a manager from a TF that recently joined forces with a large manufacturer of orthopedic products (P14).

Preliminary Findings

Nine activities emerged from the data analysis that serve as the building blocks of VAS (see Table 2). We categorized these activities along four elements: partner selection, data tailoring, reciprocity design, and control enforcement. The activities pertain to the central questions that have to be answered when designing a VAS: *with whom* should *what* data be shared and *how*?

Partner selection: The first element of a VAS is concerned with the question of whom data should be shared with. Our case represents a heterogeneous ecosystem with a variety of actors. Differences in size, market capitalization, and related, power of the data-receiving organization determine an organization's considerations on data sharing. To be able to appropriate value from IODS, they apply four interrelated activities in partner selection for IODS.

First, to *avoid direct (local) competition*, TFs prefer sharing data with geographically distant TFs. That is because IODS is perceived as a potential means to strengthen the receiving organization, possibly weakening the relative position of the data-sharing organization. This activity cuts the risk of intensifying competitive pressure by limiting the likelihood of competing for patients from the same area.

Second, TFs carefully consider the perceived power of the data receiver before engaging in IODS. They are particularly cautious when the receiving organization is deemed too powerful, as this might lead to an imbalance in the competitive landscape. In such cases, data-sharing organizations may choose to withhold data to maintain their competitive advantage and prevent the receiver from gaining an even stronger position in the ecosystem.

Third, another action to avoid an overpowering data receiver, we find that TFs *form coalitions*. Here, the first two strategies are combined: members of the competition are considered to be on "eye-level" (P15) with regard to their size and power as well as from different localities. Further, this selection is characterized by the multi-level nature of the analyzed ecosystem. In the coalitions, organizations do not cooperate with all actors in the whole ecosystem (e.g., around a central manufacturer), but with specific actors from distinct sub-ecosystems with distinct objectives. On a larger scale, TFs collaborate by forming procurement syndicates aiming at, e.g., increasing bargaining power towards suppliers, exercising political influence, and exchanging knowledge and capabilities.

Fourth, when selecting partners for IODS, we find that TFs aim to *reduce technological lock-ins* by only sharing data with organizations that offer open data interfaces. Here, the rationale is that when engaging with systems that only provide propriety interfaces for joint value creation, with whom data is shared cannot be changed without substantial efforts.

Data tailoring: The decision of what data to share is found to be an important element of VAS. Investigating the data sharing practices in more detail, we find that this element is mostly implemented through activities of aggregating or trimming the shared data vertically (e.g., sharing only data of individual patients, rather than multiple) and/or horizontally (e.g., reducing the number of attributes shared).

When *trimming data vertically*, we find that TFs only share data of individual patients to ensure that value from this data sharing is appropriated. Examples for such behavior can be found when TFs order products from manufacturers to get individual configurations of a product or when data is needed to prove to the insurance company that a treatment was necessary and thus can be reimbursed.

When *trimming data horizontally*, TFs trim data in a way that specific attributes of, e.g., patient data sets are not shared. For instance, TFs, even if entitled to, do not (like to) share the patient's address and name with potential local competition as they perceive the risk of not being able to appropriate any of the value created from IODS. However, patient-specific identifiers are shared as from this, appropriable value, such as the ability to commission orders, is perceived.

The *aggregation of data* is also found to be an activity contributing to the VAS. This activity is illustrated in the case by the elaborations of one interviewee arguing that when sharing 3D models, TFs pay attention to the question of whether the information receiver can re-engineer the know-how included in the model. Only if they are certain that sharing the 3D model does not allow this spillover, they engage in IODS.

Reciprocity design: Another category of VAS activities considers how data can be shared to ensure appropriability. Through the development of reciprocal IODS—data sharing that *ensures immediate benefits*—we find that TFs can effectively engage in IODS and reap its advantages. In the present case, this

VAS activities	**Exemplary quotes**
Partner selection	
Avoid direct (local) competition	*"I don't want that the competing treatment facility in Wuppertal [a German city] might also have access to the data or would participate in the data. And that wouldn't benefit me at all."* (P9)
Avoid powerful data receiver	*"So that, I see the risk, the bigger my counterpart is, the more difficult it becomes."* (P15)
Form coalitions	*"Actually, it would be desirable for smaller companies to join forces in larger associations and pool their resources for such studies, which they can then carry out together. Otherwise, a giant will do it."* (P13)
Avoid lock-ins	*"It is also the case that these closed systems […] are viewed much more skeptically nowadays, […] because the value of data sovereignty can now be assessed differently."* (P15)
Data tailoring	
Trim data vertically	*"A knee brace, we don't have that on-site, it needs to be ordered on a commission basis. Then we place an order and indicate to the supplier that it is a commission order."* (P9)
Trim data horizontally	*"What I had problems sharing would be address, phone number, social status, average order volume, average gross profit… These are all topics where I would say, these are company internals that don't necessarily need to be shared externally."* (P9)
Aggregation of data	*"That would be an example of how to model it afterwards, or for example, how to align the whole thing so that there is no problem sharing it, because it's not that specific, and this is the construction that also takes place in this modeling tool, but happens on my leg, meaning on this purple 3D scan. That's the more critical part."* (P13)
Reciprocity design	
Ensure immediate benefits	*"The data that we have, I am currently providing it, basically, just to get the product, let's say. So that it is properly adapted to the user's needs."* (P12)
Control enforcement	
Keep data value creation steps	*"We in the network are convinced that in order to be successful in the long term, value creation must absolutely be kept in-house and therefore, the orthopedic-technical know-how must also be retained in-house."* (P13)

Table 2. Preliminary findings on VAS, elements, and activities

VAS element is exemplified in several instances, ranging from data sharing during the product ordering process and supplying 3D models for printing jobs, to other practical applications.

This aspect is further illustrated when approaching it from the opposite direction. For example, we find that the opportunity of benefitting from innovations induced by the shared data is not considered a sufficient reason to share data. Analyzing the instances in which interviewees argue towards this end, we find that the missing immediacy, and hence the perception of value appropriability is the main reason for the corresponding decisions not to engage in IODS. Hence, designing IODS in a reciprocal that enables direct value appropriation is an important element of VAS.

Control enforcement: Further guiding how to appropriate value from IODS, we find the element of control enforcement. This element describes activities in which TFs *keep data value creation steps* in-house. Here, interviewees claim that they do not want to outsource 3D modeling tasks as the modeling itself represents their main contribution to value creation. In contrast, activities such as 3D printing, where TFs do not perceive any competitive advantage, sharing 3D models is not considered critical.

Referring back to the research question of this study, we illustrate how these activities can be combined into a variety of VAS using two examples: First, interviewees describe strategies in which 3D scans in the ordering process (reciprocal design) are split vertically (data tailoring) and shared with different organizations (partner selection). Thereby, it is expected that none of the receiving organizations can use the shared data for more than the creation of value that is also appropriable by the sharing organization. Second, in the previously mentioned activity of avoiding local competition, we also observe decision-making regarding the type of data being shared. Specifically, to prevent losing patients as a consequence of IODS, TFs refrain from sharing contact information (data tailoring) with local competitors (partner selection). This approach helps maintain a competitive edge while still facilitating data sharing among organizations.

Preliminary Contributions and Outlook

This short paper presents initial insights into the question of which strategies of IODS enable the data-sharing organization to participate in resulting value creation. Our preliminary findings reveal that constructing a VAS for IODS involves four interrelated elements (partner selection, data tailoring, reciprocity design, and control enforcement), each implemented through specific activities. Summarizing the current findings from this case study, we point toward multiple contributions to the literature.

First, VAS in the literature have been perceived as processes occurring after value creation (Jacobides et al., 2006). However, our findings indicate that activities preceding actual value creation can significantly influence value appropriation. By proactively considering the elements of VAS, organizations can position themselves to appropriate value from their IODS initiatives and mitigate potential risks associated with it. This proactive approach highlights the importance of adopting a comprehensive strategy that addresses not only value creation but also appropriation in the early stages of IODS. Thereby, we combine perspectives from VAS and IODS, which is our second contribution. Here, we contribute to the present knowledge by integrating the specific characteristics of exchanging data (Shapiro & Varian, 1999) to VAS. That is, the ability to tailor the shared data in a way that value appropriation becomes probable.

Third, in contrast to prior research on VAS (e.g., Oh et al., 2015; Schreieck et al., 2021; Song et al., 2018), our findings suggest that strategies considering with whom to share what data and how enable the participation in overall value creation without having direct control over the value creation process.

Fourth, contributing to the strategy literature (Asmussen et al., 2021; Mizik & Jacobson, 2003), our findings indicate that developing VAS for IODS is a multi-level problem that is characterized by power asymmetries. Our observation that organizations form coalitions to increase value appropriation from IODS is consistent with prior research (Asmussen et al., 2021). Further, in accordance with Jacobides et al. (2006), industry architectures influence the value appropriation strategies of organizations.

Moreover, we strive to offer practical implications for managers by outlining tangible activities that form VAS for IODS. This guidance empowers managers to make informed decisions about with whom to share what data and how, in order to derive value from the resulting value creation.

In the next steps of this research project, we are going to expand our study in three ways. First, although we identified elements of VAS enabling IODS through the appropriability of co-created value (Ho & Ganesan,

2013), these elements are characterized by the limitation of both, the amount of data shared (data tailoring) and the range of partners that can utilize the data (partner selection). Hence, these VAS set boundaries to the overall value creation. Pushing these boundaries, our research project aims at further unraveling the complex interdependencies between the elements of VAS to maximize value creation while maintaining the appropriability of value by the sharing organizations. Although some IODS-specific actions work towards this end, we expect further data collection and analysis to engender a more detailed understanding of the complex dynamics and boundary conditions of these strategies. For instance, we do expect differences between different types of actors (manufacturer, TF, etc.) that we cannot confidently ground in our current data. Hence, we will collect further data from interviews with different actors.

Second, our findings also highlight the critical role of partner selection in VAS, as it involves activities related to forming coalitions across multiple tiers. Based on our current understanding, we believe that these intricate relationships warrant further analysis from an ecosystem perspective (Jacobides et al., 2018). Specifically, data sharing within ecosystems may give rise to tensions concerning data reuse by other ecosystem members. To investigate this possibility, we will incorporate data from additional coalitions and engage with the ecosystem literature to contextualize our prospective findings.

Lastly, we want to expand beyond the single case and investigate other contexts with different levels of digitization. To this end, we will further enrich our dataset by explicitly including digital and disruptive organizations in the case. Thereby, we further expect to observe more instances of innovative data sharing. Our findings as of now result from inductive reasoning from a single case. Further, we expect that longer-term observations of such IODS relationships can yield insightful perspectives into the sustainability of VAS. Hence, we investigate opportunities to complement our data collection with longitudinal data.

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